

References

- Abba, M.C., Laguens, R.M., Dulout, F.N. & Golijow, C.D. (2004) The *c-myc* activation in cervical carcinomas and HPV 16 infections. *Mutation. Res.*, **557**, 151–158
- Abdel-Hady, E.-S., Martin-Hirsch, P., Duggan-Keen, M., Stern, P.L., Moore, J.V., Corbitt, G., Kitchener, H.C. & Hampson, I.N. (2001) Immunological and viral factors associated with the response of vulval intraepithelial neoplasia to photodynamic therapy. *Cancer Res.*, **61**, 192–196
- Adachi, A., Kiyono, T., Hayashi, Y., Ohashi, M. & Ishibashi, M. (1996) Detection of human papillomavirus (HPV) type 47 DNA in malignant lesions from epidermodysplasia verruciformis by protocols for precise typing of related HPV DNAs. *J. clin. Microbiol.*, **34**, 369–375
- Adam, J.L., Briggs, M.W. & McCance, D.J. (2000) A mutagenic analysis of the E5 protein of human papillomavirus type 16 reveals that E5 binding to the vacuolar H⁺-ATPase is not sufficient for biological activity, using mammalian and yeast expression systems. *Virology*, **272**, 315–325
- Adami, H.-O., Kuper, H., Andersson, S.-O., Bergström, R. & Dillner, J. (2003) Prostate cancer risk and serologic evidence of human papilloma virus infection: A population-based case-control study. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 872–875
- Adams, M., Borysiewicz, L., Fiander, A., Man, S., Jasani, B., Navabi, H., Lipetz, C., Evans, A.S. & Mason, M. (2001) Clinical studies of human papilloma vaccines in pre-invasive and invasive cancer. *Vaccine*, **19**, 2549–2556
- af Geijersstam, V., Eklund, C., Wang, Z., Sapp, M., Schiller, J.T., Dillner, J. & Dillner, L. (1999) A survey of seroprevalence of human papillomavirus types 16, 18 and 33 among children. *Int. J. Cancer*, **80**, 489–493
- Agarwal, C., Roke, E.A., Irwin, J.C. & Eckert, R.L. (1991) Immortalization by human papillomavirus type 16 alters retinoid regulation of human ectocervical epithelial cell differentiation. *Cancer Res.*, **51**, 3982–3989
- Agliano, A.M., Gradilone, A., Gazzaniga, P., Napolitano, M., Vercillo, R., Albonici, L., Naso, G., Manzari, V., Frati, L. & Vecchione, A. (1994) High frequency of human papillomavirus detection in urinary bladder cancer. *Urol. Int.*, **53**, 125–129
- Agrawal, N., Mane, M., Chiriva-Internati, M., Roman, J.J. & Hermonat, P.L. (2002) Temporal acceleration of the human papillomavirus life cycle by adeno-associated virus (AAV) type 2 superinfection in natural host tissue. *Virology*, **297**, 203–210

- Ahdieh, L., Muñoz, A., Vlahov, D., Trimble, C.L., Timpson, L.A. & Shah, K. (2000) Cervical neoplasia and repeated positivity of human papillomavirus infection in human immunodeficiency virus-seropositive and -seronegative women. *Am. J. Epidemiol.*, **151**, 1148–1157
- Ahdieh, L., Klein, R.S., Burk, R., Cu-Uvin, S., Schuman, P., Duerr, A., Safaeian, M., Astemborski, J., Daniel, R. & Shah, K. (2001) Prevalence, incidence, and type-specific persistence of human papillomavirus in human immunodeficiency virus (HIV)-positive and HIV-negative women. *J. infect. Dis.*, **184**, 682–690
- Ahdieh-Grant, L., Li, R., Levine, A.M., Massad, L.S., Strickler, H.D., Minkoff, H., Moxley, M., Palefsky, J., Sacks, H., Burk, R.D. & Gange, S.J. (2004) Highly active antiretroviral therapy and cervical squamous intraepithelial lesions in human immunodeficiency virus-positive women. *J. natl Cancer Inst.*, **96**, 1070–1076
- Ahn, W.S., Bae, S.M., Chung, J.E., Lee, H.K., Kim, B.K., Lee, J.M., Namkoong, S.E., Kim, C.K. & Sin, J. (2003) Evaluation of adenoassociated virus 2 and human papilloma virus 16 and 18 infection in cervical cancer biopsies. *Gynecol. Oncol.*, **89**, 105–111
- Akgül, B., Lemme, W., García-Escudero, R., Storey, A. & Pfister, H.J. (2005) UV-B irradiation stimulates the promoter activity of the high-risk, cutaneous human papillomavirus 5 and 8 in primary keratinocytes. *Arch. Virol.*, **150**, 145–151
- Alam, M., Caldwell, J.B. & Eliezri, Y.D. (2003) Human papillomavirus-associated digital squamous cell carcinoma: Literature review and report of 21 new cases. *J. Am. Acad. Dermatol.*, **48**, 385–393
- Alazawi, W., Pett, M., Strauss, S., Moseley, R., Gray, J., Stanley, M. & Coleman, N. (2004) Genomic imbalances in 70 snap-frozen cervical squamous intraepithelial lesions: Associations with lesion grade, state of HPV 16 E2 gene and clinical outcome. *Br. J. Cancer*, **91**, 2063–2070
- Al-Ghamdi, A.A., Sanders, C.M., Keefe, M., Coggon, D. & Maitland, N.J. (1995) Human papillomavirus DNA and TP53 mutations in lung cancers from butchers. *Br. J. Cancer*, **72**, 293–297
- Al-Ghamdi, A., Freedman, D., Miller, D., Poh, C., Rosin, M., Zhang, L. & Gilks, C.B. (2002) Vulvar squamous cell carcinoma in young women: A clinicopathologic study of 21 cases. *Gynecol. Oncol.*, **84**, 94–101
- Allen, M., Kalantari, M., Ylitalo, N., Pettersson, B., Hagmar, B., Scheibenpflug, L., Johansson, B., Petterson, U. & Gyllensten, U. (1996) HLA DQ-DR haplotype and susceptibility to cervical carcinoma: indications of increased risk for development of cervical carcinoma in individuals infected with HPV 18. *Tissue Antigens*, **48**, 32–37
- Alliance for Cervical Cancer Prevention (2004) Overview of cervical cancer treatment and palliative care. In: *Planning and Implementing Cervical Cancer Prevention and Control Programme: A Manual for Managers*, Seattle
- Alloub, M.I., Barr, B.B.B., McLaren, K.M., Smith, I.W., Bunney, M.H. & Smart, G.E. (1989) Human papillomavirus infection and cervical intraepithelial neoplasia in women with renal allografts. *Br. med. J.*, **298**, 153–156
- Almadori, G., Cadoni, G., Cattani, P., Posteraro, P., Scarano, E., Ottaviani, F., Paludetti, G. & Maurizi, M. (1996) Detection of human papillomavirus DNA in laryngeal squamous cell carcinoma by polymerase chain reaction. *Eur. J. Cancer*, **32A**, 783–788
- Alonio, L.V., Picconi, M.A., Dalbert, D., Mural, J., Bartt, O., Bazan, G., Dominguez, M. & Teyssie, A.R. (2003) Ha-ras oncogene mutation associated to progression of papillomavirus induced lesions of uterine cervix. *J. clin. Virol.*, **27**, 263–269

- Alonso, E., Maróstica, A., Roma, S., Redín, I., Sánchez Mazzaferri, F. & Toffoni, C. (1997) [Low-grade papillary transitional-cell carcinoma of the distal urethra with focal squamous differentiation and association with human papillomavirus types 6–11.] *Arch. Esp. Urol.*, **50**, 875–878 (in Spanish)
- Altekruse, S.F., Lacey, J.V., Jr, Brinton, L.A., Gravitt, P.E., Silverberg, S.G., Barnes, W.A., Jr, Greenberg, M.D., Hadjimichael, O.C., McGowan, L., Mortel, R., Schwartz, P.E. & Hildesheim, A. (2003) Comparison of human papillomavirus genotypes, sexual, and reproductive risk factors of cervical adenocarcinoma and squamous cell carcinoma: Northeastern United States. *Am. J. Obstet. Gynecol.*, **188**, 657–663
- Alunni-Fabbroni, M., Littlewood, T., Deleu, L., Caldeira, S., Giarre, M., Dell’Orco, M. & Tommasino, M. (2000) Induction of S phase and apoptosis by the human papillomavirus type 16 E7 protein are separable events in immortalized rodent fibroblasts. *Oncogene*, **19**, 2277–2285
- Alvarez, R.D., Conner, M.G., Weiss, H., Klug, P.M., Niwas, S., Manne, U., Bacus, J., Kagan, V., Sexton, K.C., Grubbs, C.J., Eltoun, I.-E. & Grizzle, W.E. (2003) The efficacy of 9-*cis*-retinoic acid (aliretinoin) as a chemopreventive agent for cervical dysplasia: Results of a randomized double-blind clinical trial. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 114–119
- Amella, C.A., Lofgren, L.A., Ronn, A.M., Nouri, M., Shikowitz, M.J. & Steinberg, B.M. (1994) Latent infection induced with cottontail rabbit papillomavirus. A model for human papillomavirus latency. *Am. J. Pathol.*, **144**, 1167–1171
- Ames, B.N. & Wakimoto, P. (2002) Are vitamin and mineral deficiencies a major cancer risk? *Nat. Rev. Cancer*, **2**, 694–704
- Amin, A.A., Titolo, S., Pelletier, A., Fink, D., Cordingley, M.G. & Archambault, J. (2000) Identification of domains of the HPV11 E1 protein required for DNA replication *in vitro*. *Virology*, **272**, 137–150
- Ammatuna, P., Giovannelli, L., Giambelluca, D., Mancuso, S., Rubino, E., Colletti, P., Mazzola, G., Belfiore, P. & Lima, R. (2000) Presence of human papillomavirus and Epstein-Barr virus in the cervix of women infected with the human immunodeficiency virus. *J. med. Virol.*, **62**, 410–415
- Amtmann, E. & Wayss, K. (1987) Papillomaviruses and carcinogenic progression. II. The *Mastomys natalensis* papillomavirus. In: Salzmann, N.P. & Howley, P.M., eds, *The Papovaviridae*, Vol. 2, *The Papillomaviruses*, New York, Plenum Press, pp.187–198
- Amtmann, E., Volm, M. & Wayss, K. (1984) Tumour induction in the rodent *Mastomys natalensis* by activation of endogenous papilloma virus genomes. *Nature*, **308**, 291–292
- Amundadottir, L.T., Thorvaldsson, S., Gudbjartsson, D.F., Sulem, P., Kristjansson, K., Arnason, S., Gulcher, J.R., Bjornsson, J., Kong, A., Thorsteinsdottir, U. & Stefansson, K. (2004) Cancer as a complex phenotype: Pattern of cancer distribution within and beyond the nuclear family. *PLOS Med.*, **1**, 229–236
- Anderson, R. & Theron, A.J. (1990) Physiological potential of ascorbate, β -carotene and α -tocopherol individually and in combination in the prevention of tissue damage, carcinogenesis and immune dysfunction mediated by phagocyte-derived reactive oxidants. *World Rev. Nutr. Diet.*, **62**, 27–58
- Anderson, M., Handley, J., Hopwood, L., Murant, S., Stower, M. & Maitland, N.J. (1997) Analysis of prostate tissue DNA for the presence of human papillomavirus by polymerase chain reaction, cloning, and automated sequencing. *J. med. Virol.*, **52**, 8–13
- Anderson, C.A., Boller, A.M., Richardson, C.J., Balcos, E.G. & Zera, R.T. (2004) Anal condyloma: A comparison between HIV positive and negative patients. *Am. Surg.*, **70**, 1014–1018

- Andersson-Ellström, A., Dillner, J., Hagmar, B., Schiller, J. & Forssman, L. (1994) No serological evidence for non-sexual spread of HPV16. *Lancet*, **344**, 1435
- Andersson-Ellström, A., Hagmar, B., Johansson, B., Kalantari, M., Wäreby, B. & Forssman, L. (1996) Human papillomavirus deoxyribonucleic acid in cervix only detected in girls after coitus. *Int. J. STD AIDS*, **7**, 333–336
- Androphy, E.J., Dvoretzky, I. & Lowy, D.R. (1985) X-linked inheritance of epidermodysplasia verruciformis: Genetic and virologic studies of a kindred. *Arch. Dermatol.*, **121**, 864–868
- Angelos, J.A., Marti, E., Lazary, S. & Carmichael, L.E. (1991) Characterization of BPV-like DNA in equine sarcoids. *Arch. Virol.*, **119**, 95–109
- Anh, P.K., Khanh, N.T., Ha, D.T., Chien, D.T., Thuc, P.T., Luong, P.H., Kilmarx, P.H., Wongchotigul, V., Kitayaporn, D. & Rowe, P.J. (2003) Prevalence of lower genital tract infection among women attending maternal and child health and family planning clinics in Hanoi, Vietnam. *Southeast Asian J. Trop. Med. Public Health*, **34**, 367–373
- Antinore, M.J., Birrer, M.J., Patel, D., Nader, L. & McCance, D.J. (1996) The human papillomavirus type 16 E7 gene product interacts with and *trans*-activates the AP1 family of transcription factors. *EMBO J.*, **15**, 1950–1960
- Antonsson, A. & Hansson, B.G. (2002) Healthy skin of many animal species harbors papillomaviruses which are closely related to their human counterparts. *J. Virol.*, **76**, 12537–12542
- Antonsson, A., Forslund, O., Ekberg, H., Sterner, G. & Hansson, B.G. (2000) The ubiquity and impressive genomic diversity of human skin papillomaviruses suggest a commensalic nature of these viruses. *J. Virol.*, **74**, 11636–11641
- Antonsson, A., Karanfilovska, S., Lindqvist, P.G. & Hansson, B.G. (2003) General acquisition of human papillomavirus infections of skin occurs in early infancy. *J. clin. Microbiol.*, **41**, 2509–2514
- Anttila, M., Syrjänen, S., Ji, H., Saarikoski, S. & Syrjänen, K. (1999) Failure to demonstrate human papillomavirus DNA in epithelial ovarian cancer by general primer PCR. *Gynecol. Oncol.*, **72**, 337–341
- Anttila, T., Saikku, P., Koskela, P., Bloigu, A., Dillner, J., Ikäheimo, I., Jellum, E., Lehtinen, M., Lenner, P., Hakulinen, T., Närvänen, A., Pukkala, E., Thoresen, S., Youngman, L. & Paavonen, J. (2001) Serotypes of Chlamydia trachomatis and risk for development of cervical squamous cell carcinoma. *J. Am. med. Assoc.*, **285**, 47–51
- Anwar, K., Nakakuki, K., Shiraishi, T., Naiki, H., Yatani, R. & Inuzuka, M. (1992a) Presence of *ras* oncogene mutations and human papillomavirus DNA in human prostate carcinomas. *Cancer Res.*, **52**, 5991–5996
- Anwar, K., Naiki, H., Nakakuki, K. & Inuzuka, M. (1992b) High frequency of human papillomavirus infection in carcinoma of the urinary bladder. *Cancer*, **70**, 1967–1973
- Apple, R.J., Erlich, H.A., Klitz, W., Manos, M.M., Becker, T.M. & Wheeler, C.M. (1994) HLA DR–DQ associations with cervical carcinoma show papillomavirus-type specificity. *Nat. Genet.*, **6**, 157–162
- Apple, R.J., Becker, T.M., Wheeler, C.M. & Erlich, H.A. (1995) Comparison of human leukocyte antigen DR–DQ disease associations found with cervical dysplasia and invasive cervical carcinoma. *J. natl Cancer Inst.*, **87**, 427–436
- Arany, I. & Tyring, S.K. (1996) Status of local cellular immunity in interferon-responsive and -non-responsive human papillomavirus-associated lesions. *Sex. transm. Dis.*, **23**, 475–480

- Arbeit, J.M., Howley, P.M. & Hanahan, D. (1996) Chronic estrogen-induced cervical and vaginal squamous carcinogenesis in human papillomavirus type 16 transgenic mice. *Proc. natl Acad. Sci. USA*, **93**, 2930–2935
- Arbyn, M. & Dillner, J. (2007) Review of current knowledge on HPV vaccination: An appendix to the European Guidelines for Quality Assurance in Cervical Cancer Screening. *J. clin. Virol.*, **38**, 189–197
- Arbyn, M., Buntinx, F. & Van Ranst, M. (2002) Triage of Women with Atypical or Low-grade Cytological Abnormalities of the Cervix by HPV Testing. Systematic Review and Meta-analysis (IPH/EPI-REPORTS Nos 2001-019), Brussels, Institute of Public Health
- Arbyn, M., Buntinx, F., Van Ranst, M., Paraskevaidis, E., Martin-Hirsch, P. & Dillner, J. (2004a) Virologic versus cytologic triage of women with equivocal Pap smears: A meta-analysis of the accuracy to detect high-grade intraepithelial neoplasia. *J. natl Cancer Inst.*, **96**, 280–293
- Arbyn, M., Dillner, J., Van Ranst, M., Buntinx, F., Martin-Hirsch, P. & Paraskevaidis, E. (2004b) Re: Have we resolved how to triage equivocal cervical cytology? *J. natl Cancer Inst.*, **96**, 1401–1402
- Arbyn, M., Paraskevaidis, E., Martin-Hirsch, P., Prendiville, W. & Dillner, J. (2005) Clinical utility of HPV–DNA detection: Triage of minor cervical lesions, follow-up of women treated for high-grade CIN: An update of pooled evidence. *Gynecol. Oncol.*, **99** (Suppl.), S7–S11
- Arroyo, M., Bagchi, S. & Raychaudhuri, P. (1993) Association of the human papillomavirus type 16 E7 protein with the S-phase-specific E2F-cyclin A complex. *Mol. cell. Biol.*, **13**, 6537–6546
- Asato, T., Maehama, T., Nagai, Y., Kanazawa, K., Uezato, H. & Kariya, K.-I. (2004) A large case–control study of cervical cancer risk associated with human papillomavirus infection in Japan, by nucleotide sequencing-based genotyping. *J. infect. Dis.*, **189**, 1829–1832
- Ashinoff, R., Li, J.J., Jacobson, M., Friedman-Kien, A.E. & Geronemus, R.G. (1991) Detection of human papillomavirus DNA in squamous cell carcinoma of the nail bed and finger determined by polymerase chain reaction. *Arch. Dermatol.*, **127**, 1813–1818
- Ashley, R.L. & Wald, A. (1999). Genital herpes: Review of the epidemic and potential use of type-specific serology. *Clin. Microbiol. Rev.*, **12**, 1–8
- Ashrafi, G.H., Pitts, J.D., Faccini, A.M., McLean, P., O'Brien, V., Finbow, M.E. & Campo, M.S. (2000) Binding of bovine papillomavirus type 4 E8 to ductin (16K proteolipid), down-regulation of gap junction intercellular communication and full cell transformation are independent events. *J. gen. Virol.*, **81**, 689–694
- Ashrafi, G.H., Tsirimonaki, E., Marchetti, B., O'Brien, P.M., Sibbet, G.J., Andrew, L., & Campo, M.S. (2002) Down-regulation of MHC class I by bovine papillomavirus E5 oncoproteins. *Oncogene*, **21**, 248–259
- Ashrafi, G.H., Haghshenas, M.R., Marchetti, B., O'Brien, P.M. & Campo, M.S. (2005) E5 protein of human papillomavirus type 16 selectively downregulates surface HLA class I. *Int. J. Cancer*, **113**, 276–283
- Astori, G., Lavergne, D., Benton, C., Höckmayr, B., Egawa, K., Garbe, C. & de Villiers, E.-M. (1998) Human papillomaviruses are commonly found in normal skin of immunocompetent hosts. *J. invest. Dermatol.*, **110**, 752–755
- Ateenyi-Agaba, C., Weiderpass, E., Smet, A., Dong, W., Dai, M., Kahwa, B., Wabinga, H., Katongole-Mbidde, E., Franceschi, S. & Tommasino, M. (2004) *Epidermodysplasia verruciformis* human papillomavirus types and carcinoma of the conjunctiva: A pilot study. *Br. J. Cancer*, **90**, 1777–1779

- Atula, S., Grenman, R., Kujari, H. & Syrjänen, S. (1999) Detection of human papillomavirus (HPV) in laryngeal carcinoma cell lines provides evidence for a heterogeneous cell population. *Eur. J. Cancer*, **35**, 825–832
- Auborn, K.J. (2002) Therapy for recurrent respiratory papillomatosis. *Antivir. Ther.*, **7**, 1–9
- Auborn, K.J., Woodworth, C., DiPaolo, J.A. & Bradlow, H.L. (1991) The interaction between HPV infection and estrogen metabolism in cervical carcinogenesis. *Int. J. Cancer*, **49**, 867–869
- Audeau, A., Han, H.W., Johnston, M.J., Whitehead, M.W. & Frizelle, F.A. (2002) Does human papilloma virus have a role in squamous cell carcinoma of the colon and upper rectum? *Eur. J. surg. Oncol.*, **28**, 657–660
- Auvinen, E., Tarkkanen, J., Mattila, P. & Mattila, S. (2002) Human papillomavirus 16 in a heart transplant recipient. *Transplant. Proc.*, **34**, 1281–1282
- Aynaud, O., Ionesco, M. & Barrasso, R. (1994) Penile intraepithelial neoplasia. Specific clinical features correlate with histologic and virologic findings. *Cancer*, **74**, 1762–1767
- Aynaud, O., Tranbaloc, P. & Orth, G. (1998) Lack of evidence for a role of human papillomaviruses in transitional cell carcinoma of the bladder. *J. Urol.*, **159**, 86–89
- Baay, M.F.D., Duk, J.M., Burger, M.P.M., Walboomers, J., ter Schegget, J., Groenier, K.H., de Bruijn, H.W.A., Stolz, E. & Herbrink, P. (1995) Antibodies to human papillomavirus type 16 E7 related to clinicopathological data in patients with cervical carcinoma. *J. clin. Pathol.*, **48**, 410–414
- Baay, M.F.D., Duk, J.M., Groenier, K.H., Burger, M.P.M., de Bruijn, H.W.A., Hollema, H., Stolz, E. & Herbrink, P. (1997) Relation between HPV-16 serology and clinico-pathological data in cervical carcinoma patients: Prognostic value of anti-E6 and/or anti-E7 antibodies. *Cancer Immunol. Immunother.*, **44**, 211–215
- Baay, M.F.D., Kjetland, E.F., Ndhlovu, P.D., Deschoolmeester, V., Mduluzza, T., Gomo, E., Friis, H., Midzi, N., Gwanzura, L., Mason, P.R., Vermorken, J.B. & Gundersen, S.G. (2004) Human papillomavirus in a rural community in Zimbabwe: The impact of HIV co-infection on HPV genotype distribution. *J. med. Virol.*, **73**, 481–485
- Bachtiary, B., Obermair, A., Dreier, B., Birner, P., Breiteneker, G., Knocke, T.-H., Selzer, E. & Pötter, R. (2002) Impact of multiple HPV infection on response to treatment and survival in patients receiving radical radiotherapy for cervical cancer. *Int. J. Cancer*, **102**, 237–243
- Badal, V., Chuang, L.S.H., Tan, E.H.-H., Badal, S., Villa, L.L., Wheeler, C.M., Li, B.F.L. & Bernard, H.-U. (2003) CpG methylation of human papillomavirus type 16 DNA in cervical cancer cell lines and in clinical specimens: Genomic hypomethylation correlates with carcinogenic progression. *J. Virol.*, **77**, 6227–6234
- Badal, S., Badal, V., Calleja-Macias, I.E., Kalantari, M., Chuang, L.S.H., Li, B.F.L. & Bernard, H.-U. (2004) The human papillomavirus-18 genome is efficiently targeted by cellular DNA methylation. *Virology*, **324**, 483–492
- Báez, A., Almodóvar, J.I., Cantor, A., Celestin, F., Cruz-Cruz, L., Fonseca, S., Trinidad-Pinedo, J. & Vega, W. (2004) High frequency of HPV16-associated head and neck squamous cell carcinoma in the Puerto Rican population. *Head Neck*, **26**, 778–784
- Bailey, R.N. & Guethlein, M.E. (1990) Diagnosis and management of conjunctival papillomas. *J. Am. optom. Assoc.*, **61**, 405–412
- Baken, L.A., Koutsky, L.A., Kuypers, J., Kosorok, M.R., Lee, S.-K., Kiviat, N.B. & Holmes, K.K. (1995) Genital human papillomavirus infection among male and female sex partners: Prevalence and type-specific concordance. *J. infect. Dis.*, **171**, 429–432

- Balaram, P., Nalinakumari, K.R., Abraham, E., Balan, A., Hareendran, N.K., Bernard, H.-U. & Chan, S.-Y. (1995) Human papillomaviruses in 91 oral cancers from Indian betel quid chewers — High prevalence and multiplicity of infections. *Int. J. Cancer*, **61**, 450–454
- Baldwin, P.J., van der Burg, S.H., Boswell, C.M., Offringa, R., Hickling, J.K., Dobson, J., Roberts, J.S.C., Latimer, J.A., Moseley, R.P., Coleman, N., Stanley, M.A. & Sterling, J.C. (2003) Vaccinia-expressed human papillomavirus 16 and 18 E6 and E7 as a therapeutic vaccination for vulval and vaginal intraepithelial neoplasia. *Clin. Cancer Res.*, **9**, 5205–5213
- Baldwin, S.B., Wallace, D.R., Papenfuss, M.R., Abrahamsen, M., Vaught, L.C. & Giuliano, A.R. (2004) Condom use and other factors affecting penile human papillomavirus detection in men attending a sexually transmitted disease clinic. *Sex. transm. Dis.*, **31**, 601–607
- Balsitis, S.J., Sage, J., Duensing, S., Münger, K., Jacks, T. & Lambert, P.F. (2003) Recapitulation of the effects of the human papillomavirus type 16 E7 oncogene on mouse epithelium by somatic *Rb* deletion and detection of pRb-independent effects of E7 in vivo. *Mol. cell. Biol.*, **23**, 9094–9103
- Band, V., Zajchowski, D., Kulesa, V. & Sager, R. (1990) Human papilloma virus DNAs immortalize normal human mammary epithelial cells and reduce their growth factor requirements. *Proc. natl Acad. Sci. USA*, **87**, 463–467
- Band, V., Dalal, S., Delmolino, L. & Androphy, E.J. (1993) Enhanced degradation of p53 protein in HPV-6 and BPV-1 E6-immortalized human mammary epithelial cells. *EMBO J.*, **12**, 1847–1852
- Bandyopadhyay, S., Sen, S., Majumdar, L. & Chatterjee, R. (2003) Human papillomavirus infection among Indian mothers and their infants. *Asian Pacif. J. Cancer Prev.*, **4**, 179–184
- Bantel-Schaal, U. (1995) Growth properties of a human melanoma cell line are altered by adeno-associated parvovirus type 2. *Int. J. Cancer*, **60**, 269–274
- Bar-Am, A., Lessing, J.B., Niv, J., Brenner, S.H. & Peyser, M.R. (1993) High- and low-power CO₂ lasers. Comparison of results for three clinical indications. *J. reprod. Med.*, **38**, 455–458
- Barbosa, M.S. & Schlegel, R. (1989) The E6 and E7 genes of HPV-18 are sufficient for inducing two-stage in vitro transformation of human keratinocytes. *Oncogene*, **4**, 1529–1532
- Barnard, P. & McMillan, N.A.J. (1999) The human papillomavirus E7 oncoprotein abrogates signaling mediated by interferon- α . *Virology*, **259**, 305–313
- Barnard, P., Payne, E. & McMillan, N.A.J. (2000) The human papillomavirus E7 protein is able to inhibit the antiviral and anti-growth functions of interferon- α . *Virology*, **277**, 411–419
- Barr, B.B.B., Benton, E.C., McLaren, K., Bunney, M.H., Smith, I.W., Blessing, K. & Hunter, J.A.A. (1989) Human papilloma virus infection and skin cancer in renal allograft recipients. *Lancet*, **i**, 124–128
- Barrasso, R., de Brux, J., Croissant, O. & Orth, G. (1987) High prevalence of papillomavirus-associated penile intraepithelial neoplasia in sexual partners of women with cervical intraepithelial neoplasia. *New Engl. J. Med.*, **317**, 916–923
- Barrett, T.J., Silbar, J.D. & McGinley, J.P. (1954) Genital warts — A venereal disease. *J. Am. med. Assoc.*, **154**, 333–334
- Barton, S.E., Maddox, P.H., Jenkins, D., Edwards, R., Cuzick, J. & Singer, A. (1988) Effect of cigarette smoking on cervical epithelial immunity: A mechanism for neoplastic change? *Lancet*, **ii**, 652–654
- Bartsch, D., Boye, B., Baust, C., zur Hausen, H. & Schwarz, E. (1992) Retinoic acid-mediated repression of human papillomavirus 18 transcription and different ligand regulation of the reti-

- noic acid receptor β gene in non-tumorigenic and tumorigenic HeLa hybrid cells. *EMBO J.*, **11**, 2283–2291
- Basile, J.R., Zacny, V. & Münger, K. (2001) The cytokines tumor necrosis factor- α (TNF- α) and TNF-related apoptosis-inducing ligand differentially modulate proliferation and apoptotic pathways in human keratinocytes expressing the human papillomavirus-16 E7 oncoprotein. *J. biol. Chem.*, **276**, 22522–22528
- Bastien, N. & McBride, A.A. (2000) Interaction of the papillomavirus E2 protein with mitotic chromosomes. *Virology*, **270**, 124–134
- Batova, A., Danielpour, D., Pirisi, L. & Creek, K.E. (1992) Retinoic acid induces secretion of latent transforming growth factor β_1 and β_2 in normal and human papillomavirus type 16-immortalized human keratinocytes. *Cell Growth Differ.*, **3**, 763–772
- Baud, D., Ponci, F., Bobst, M., De Grandi, P. & Nardelli-Haeffliger, D. (2004) Improved efficiency of a *Salmonella*-based vaccine against human papillomavirus type 16 virus-like particles achieved by using a codon-optimized version of L1. *J. Virol.*, **78**, 12901–12909
- Bauer, H.M., Ting, Y., Greer, C.E., Chambers, J.C., Tashiro, C.J., Chimera, J., Reingold, A. & Manos, M.M. (1991) Genital human papillomavirus infection in female university students as determined by a PCR-based method. *J. Am. med. Assoc.*, **265**, 472–477
- Bauknecht, T., Angel, P., Royer, H.-D. & zur Hausen, H. (1992) Identification of a negative regulatory domain in the human papillomavirus type 18 promoter: Interaction with the transcription repressor YY1. *EMBO J.*, **11**, 4607–4617
- Bauknecht, T., Jundt, F., Herr, I., Oehler, T., Delius, H., Shi, Y., Angel, P. & zur Hausen, H. (1995) A switch region determines the cell type-specific positive or negative action of YY1 on the activity of the human papillomavirus type 18 promoter. *J. Virol.*, **69**, 1–12
- Bauman, N.M. & Smith, R.J.H. (1996) Recurrent respiratory papillomatosis. *Paediat. Otolaryngol.*, **43**, 1385–1401
- Bavin, P.J., Giles, J.A., Deery, A., Crow, J., Griffiths, P.D., Emery, V.C. & Walker, P.G. (1993) Use of semi-quantitative PCR for human papillomavirus DNA type 16 to identify women with high grade cervical disease in a population presenting with a mildly dyskaryotic smear report. *Br. J. Cancer*, **67**, 602–605
- Be, X., Hong, Y., Wei, J., Androphy, E.J., Chen, J.J. & Baleja, J.D. (2001) Solution structure determination and mutational analysis of the papillomavirus E6 interacting peptide of E6AP. *Biochemistry*, **40**, 1293–1299
- Beard, J.W. (1956) The fallacy of the concept of virus ‘masking’: A review. *Cancer Res.*, **16**, 279–291
- Beard, J.W. & Rous, P. (1935) Effectiveness of the Shope papilloma virus in various American rabbits. *Proc. Soc. Exp. Biol. Med.*, **33**, 191–193
- Beaudenon, S., Praetorius, F., Kremendorf, D., Lutzner, M., Worsaae, N., Pehau-Arnaudet, G. & Orth, G. (1987) A new type of human papillomavirus associated with oral focal epithelial hyperplasia. *J. invest. Dermatol.*, **88**, 130–135
- Bechtold, V., Beard, P. & Raj, K. (2003) Human papillomavirus type 16 E2 protein has no effect on transcription from episomal viral DNA. *J. Virol.*, **77**, 2021–2028
- Becker, T.M., Wheeler, C.M., McGough, N.S., Parmenter, C.A., Jordan, S.W., Stidley, C.A., McPherson, R.S. & Dorin, M.H. (1994) Sexually transmitted diseases and other risk factors for cervical dysplasia among southwestern Hispanic and non-Hispanic white women. *J. Am. med. Assoc.*, **271**, 1181–1188

- Beckmann, A.M., Sherman, K.J., Saran, L. & Weiss, N.S. (1991) Genital-type human papillomavirus infection is not associated with surface epithelial ovarian carcinoma. *Gynecol. Oncol.*, **43**, 247–251
- Begum, S., Gillison, M.L., Ansari-Lari, M.A., Shah, K. & Westra, W.H. (2003) Detection of human papillomavirus in cervical lymph nodes: A highly effective strategy for localizing site of tumor origin. *Clin. Cancer Res.*, **9**, 6469–6475
- Belinson, J., Pretorius, R.G., Zhang, W.H., Wu, L.Y., Qiao, Y.L. & Elson, P. (2001a) Cervical cancer screening by simple visual inspection after acetic acid. *Obstet. Gynecol.*, **98**, 441–444
- Belinson, J.L., Qiao, Y.L., Pretorius, R.G., Zhang, W.H., Elson, P., Li, L., Pan, Q.J., Fisher, C., Lorincz, A. & Zahniser, D. (2001b) Shanxi Province Cervical Cancer Screening Study: A cross-sectional comparative trial of multiple techniques to detect cervical neoplasia. *Gynecol. Oncol.*, **83**, 439–444
- Bell, M.C., Crowley-Nowick, P., Bradlow, H.L., Sepkovic, D.W., Schmidt-Grimminger, D., Howell, P., Mayeaux, E.J., Tucker, A., Turbat-Herrera, E.A. & Mathis, J.M. (2000) Placebo-controlled trial of indole-3-carbinol in the treatment of CIN. *Gynecol. Oncol.*, **78**, 123–129
- Benamouzig, R., Pigot, F., Quiroga, G., Validire, P., Chaussade, S., Catalan, F. & Couturier, D. (1992) Human papillomavirus infection in esophageal squamous-cell carcinoma in western countries. *Int. J. Cancer*, **50**, 549–552
- Benamouzig, R., Jullian, E., Chang, F., Robaskiewicz, M., Flejou, J.-F., Raoul, J.-L., Coste, T., Couturier, D., Pompidou, A. & Rautureau, J. (1995) Absence of human papillomavirus DNA detected by polymerase chain reaction in French patients with esophageal carcinoma. *Gastroenterology*, **109**, 1876–1881
- Benedet, J.L. & Anderson, G.H. (1996) Stage IA carcinoma of the cervix revisited. *Obstet. Gynecol.*, **87**, 1052–1059
- Bens, G., Wieland, U., Hofmann, A., Höpfl, R. & Pfister, H. (1998) Detection of new human papillomavirus sequences in skin lesions of a renal transplant recipient and characterization of one complete genome related to epidermodysplasia verruciformis-associated types. *J. gen. Virol.*, **79**, 779–787
- Berek, J.S., Howe, C., Lagasse, L.D. & Hacker, N.F. (2005) Pelvic exenteration for recurrent gynecologic malignancy: Survival and morbidity analysis of the 45-year experience at UCLA. *Gynecol. Oncol.*, **99**, 153–159
- Berezutskaya, E. & Bagchi, S. (1997) The human papillomavirus E7 oncoprotein functionally interacts with the S4 subunit of the 26 S proteasome. *J. biol. Chem.*, **272**, 30135–30140
- Berg, M., DiFatta, J., Hoiczky, E., Schlegel, R. & Ketner, G. (2005) Viable adenovirus vaccine prototypes: High-level production of a papillomavirus capsid antigen from the major late transcriptional unit. *Proc. natl Acad. Sci. USA*, **102**, 4590–4595
- Bergeron, C., Naghashfar, Z., Canaan, C., Shah, K., Fu, Y. & Ferenczy, A. (1987a) Human papillomavirus type 16 in intraepithelial neoplasia (Bowenoid papulosis) and coexistent invasive carcinoma of the vulva. *Int. J. Gynecol. Pathol.*, **6**, 1–11
- Bergeron, C., Ferenczy, A., Shah, K.V. & Naghashfar, Z. (1987b) Multicentric human papillomavirus infections of the female genital tract: Correlation of viral types with abnormal mitotic figures, colposcopic presentation, and location. *Obstet. Gynecol.*, **69**, 736–742
- Bergman, A. & Nalick, R. (1991) Genital human papillomavirus infection in men. Diagnosis and treatment with laser and 5-fluorouracil. *J. reprod. Med.*, **36**, 363–366

- Berkhout, R.J.M., Tieben, L.M., Smits, H.L., Bouwes Bavinck, J.N., Vermeer, B.J. & ter Schegget, J. (1995) Nested PCR approach for detection and typing of epidermodysplasia verruciformis-associated human papillomavirus types in cutaneous cancers from renal transplant recipients. *J. clin. Microbiol.*, **33**, 690–695
- Berkhout, R.J.M., Bouwes Bavinck, J.N. & ter Schegget, J. (2000) Persistence of human papillomavirus DNA in benign and (pre)malignant skin lesions from renal transplant recipients. *J. clin. Microbiol.*, **38**, 2087–2096
- Bernard, H.-U. (2002) Gene expression of genital human papillomaviruses and considerations on potential antiviral approaches. *Antiviral Ther.*, **7**, 219–237
- Bernard, H.-U. (2004) Established and potential strategies against papillomavirus infections. *J. anti-microb. Chemother.*, **53**, 137–139
- Bernard, H.-U., Chan, S.-Y., Mano, M.M., Ong, C.-K., Villa, L.L., Delius, H., Peyton, C.L., Bauer, H.M. & Wheeler, C.M. (1994) Identification and assessment of known and novel human papillomaviruses by polymerase chain reaction amplification, restriction fragment length polymorphisms, nucleotide sequence, and phylogenetic algorithms. *J. infect. Dis.*, **170**, 1077–1085
- Bernauer, H.S., Welkoborsky, H.-J., Tilling, A., Amedee, R.G. & Mann, W.J. (1997) Inverted papillomas of the paranasal sinuses and the nasal cavity: DNA indices and HPV infection. *Am. J. Rhinol.*, **11**, 155–160
- Berrington, A., Jha, P., Peto, J., Green, J. & Hermon, C. on behalf of the UK National Case-control Study of Cervical Cancer (2002) Oral contraceptives and cervical cancer. *Lancet*, **360**, 410
- Berumen, J., Unger, E.R., Casas, L. & Figueroa, P. (1995) Amplification of human papillomavirus types 16 and 18 in invasive cervical cancer. *Hum. Pathol.*, **26**, 676–681
- Beskow, A.H., Josefsson, A.M. & Gyllensten, U.B. (2001) HLA class II alleles associated with infection by HPV16 in cervical cancer *in situ*. *Int. J. Cancer*, **93**, 817–822
- van Beurden, M., ten Kate, F.J.W., Smits, H.L., Berkhout, R.J.M., de Craen, A.J.M., van der Vange, N., Lammes, F.B. & ter Schegget, J. (1995) Multifocal vulvar intraepithelial neoplasia grade III and multicentric lower genital tract neoplasia is associated with transcriptionally active human papillomavirus. *Cancer*, **75**, 2879–2884
- van Beurden, M., ten Kate, F.W.J., Tjong-A-Hung, S.P., de Craen, A.J.M., van der Vange, N., Lammes, F.B. & ter Schegget, J. (1998) Human papillomavirus DNA in multicentric vulvar intraepithelial neoplasia. *Int. J. gynecol. Pathol.*, **17**, 12–16
- Beutner, K.R., Reitano, M.V., Richwald, G.A., Wiley, D.J. & the AMA Expert Panel on External Genital Warts (1998a) External genital warts: Report of the American Medical Association Consensus Conference. *Clin. infect. Dis.*, **27**, 796–806
- Beutner, K.R., Spruance, S.L., Hougham, A.J., Fox, T.L., Owens, M.L. & Douglas, J.M., Jr (1998b) Treatment of genital warts with an immune-response modifier (imiquimod). *J. Am. Acad. Dermatol.*, **38**, 230–239
- Beutner, K.R., Tyring, S.K., Trofatter, K.F., Jr, Douglas, J.M., Jr, Spruance, S., Owens, M.L., Fox, T.L., Hougham, A.J. & Schmitt, K.A. (1998c) Imiquimod, a patient-applied immune-response modifier for treatment of external genital warts. *Antimicrob. Agents Chemother.*, **42**, 789–794
- Beverley, P.C.L., Sadovnikova, E., Zhu, X., Hickling, J., Gao, L., Chain, B., Collins, S., Crawford, L., Vousden, K. & Stauss, H.J. (1994) Strategies for studying mouse and human immune responses to human papillomavirus type 16. In: *Vaccines against Virally Induced Cancers* (Ciba Foundation Symposium 187), Chichester, John Wiley & Sons, pp. 78–96

- Bezerra, A.L.R., Lopes, A., Landman, G., Alencar, G.N., Torloni, H. & Villa, L.L. (2001a) Clinico-pathologic features and human papillomavirus DNA prevalence of warty and squamous cell carcinoma of the penis. *Am. J. surg. Pathol.*, **25**, 673–678
- Bezerra, A.L.R., Lopes, A., Santiago, G.H., Ribeiro, K.C.B., Latorre, M.R.D.O. & Villa, L.L. (2001b) Human papillomavirus as a prognostic factor in carcinoma of the penis. Analysis of 82 patients treated with amputation and bilateral lymphadenectomy. *Cancer*, **91**, 2315–2321
- Biemelt, S., Sonnewald, U., Galmbacher, P., Willmitzer, L. & Müller, M. (2003) Production of human papillomavirus type 16 virus-like particles in transgenic plants. *J. Virol.*, **77**, 9211–9220
- Biliris, K.A., Koumantakis, E., Dokianakis, D.N., Sourvinos, G. & Spandidos, D.A. (2000) Human papillomavirus infection of non-melanoma skin cancers in immunocompetent hosts. *Cancer Lett.*, **161**, 83–88
- Birkeland, S.A., Storm, H.H., Lamm, L.U., Barlow, L., Blohmé, I., Forsberg, B., Eklund, B., Fjeldborg, O., Friedberg, M., Frödin, L., Glatte, E., Halvorsen, S., Holm, N.V., Jakobsen, A., Jørgensen, H.E., Ladefoged, J., Lindholm, T., Lundgren, G. & Pukkala, E. (1995) Cancer risk after renal transplantation in the Nordic countries, 1964–1986. *Int. J. Cancer*, **60**, 183–189
- Birner, P., Bachtiry, B., Dreier, B., Schindl, M., Joura, E.A., Breitenecker, G. & Oberhuber, G. (2001) Signal-amplified colorimetric *in situ* hybridization for assessment of human papillomavirus infection in cervical lesions. *Mod. Pathol.*, **14**, 702–709
- Bjørge, T., Dillner, J., Anttila, T., Engeland, A., Hakulinen, T., Jellum, E., Lehtinen, M., Luostarinen, T., Paavonen, J., Pukkala, E., Sapp, M., Schiller, J., Youngman, L. & Thoresen, S. (1997a) Prospective seroepidemiological study of role of human papillomavirus in non-cervical anogenital cancers. *Br. med. J.*, **315**, 646–649
- Bjørge, T., Hakulinen, T., Engeland, A., Jellum, E., Koskela, P., Lehtinen, M., Luostarinen, T., Paavonen, J., Sapp, M., Schiller, J., Thoresen, S., Wang, Z., Youngman, L. & Dillner, J. (1997b) A prospective, seroepidemiological study of the role of human papillomavirus in esophageal cancer in Norway. *Cancer Res.*, **57**, 3989–3992
- Bjørge, T., Engeland, A., Luostarinen, T., Mork, J., Gislefoss, R. E., Jellum, E., Koskela, P., Lehtinen, M., Pukkala, E., Thoresen, S.Ø. & Dillner, J. (2002) Human papillomavirus infection as a risk factor for anal and perianal skin cancer in a prospective study. *Br. J. Cancer*, **87**, 61–64
- Bleeker, M.C.G., Hogewoning, C.J.A., van den Brule, A.J.C., Voorhorst, F.J., van Andel, R.E., Risse, E.K.J., Starink, T.M. & Meijer, C.J.L.M. (2002) Penile lesions and human papillomavirus in male sexual partners of women with cervical intraepithelial neoplasia. *J. Am. Acad. Dermatol.*, **47**, 351–357
- Bleeker, M.C.G., Hogewoning, C.J.A., Voorhorst, F.J., van den Brule, A.J.C., Snijders, P.J.F., Starink, T.M., Berkhof, J. & Meijer, C.J.L.M. (2003) Condom use promotes regression of human papillomavirus-associated penile lesions in male sexual partners of women with cervical intraepithelial neoplasia. *Int. J. Cancer*, **107**, 804–810
- Bleeker, M.C.G., Hogewoning, C.J.A., Voorhorst, F.J., van den Brule, A.J.C., Berkhof, J., Hesselink, A.T., Lettink, M., Starink, T.M., Stoof, T.J., Snijders, P.J.F. & Meijer, C.J.L.M. (2005a) HPV-associated flat penile lesions in men of a non-STD hospital population: Less frequent and smaller in size than in male sexual partners of women with CIN. *Int. J. Cancer*, **113**, 36–41
- Bleeker, M.C., Berkhof, H., Hogewoning, C.J., Voorhorst, F.J., van den Brule, A.J., Starink, T.M., Snjeders, P.J. & Meijer, C.J.L.M. (2005b) HPV type concordance in sexual couples determines the effect of condoms on regression of flat penile lesions. *Br. J. Cancer*, **92**, 1388–1392

- Blessing, K., McLaren, K.M., Benton, E.C., Barr, B.B., Bunney, M.H., Smith, I.W. & Beveridge, G.W. (1989) Histopathology of skin lesions in renal allograft recipients — An assessment of viral features and dysplasia. *Histopathology*, **14**, 129–139
- Blessing, K., McLaren, K.M., Morris, R., Barr, B.B., Benton, E.C., Alloub, M., Bunney, M.H., Smith, I.W., Smart, G.E. & Bird, C.C. (1990) Detection of human papillomavirus in skin and genital lesions of renal allograft recipients by in situ hybridization. *Histopathology*, **16**, 181–185
- Bloch, N. & Breen, M. (1997) Bovine papillomavirus type 5: Partial sequence and comparison with other bovine papillomaviruses. *Virus Genes*, **14**, 171–174
- Bloch, N., Sutton, R.H. & Spradbrow, P.B. (1994a) Bovine cutaneous papillomas associated with bovine papillomavirus type 5. *Arch. Virol.*, **138**, 373–377
- Bloch, N., Breen, M. & Spradbrow, P.B. (1994b) Genomic sequences of bovine papillomaviruses in formalin-fixed sarcoids from Australian horses revealed by polymerase chain reaction. *Vet. Microbiol.*, **41**, 163–172
- Blumenthal, P.D., Gaffikin, L., Chirenje, Z.M., McGrath, J., Womack, S. & Shah, K. (2001) Adjunctive testing for cervical cancer in low resource settings with visual inspection, HPV, and the Pap smear. *Int. J. Gynecol. Obst.*, **72**, 47–53
- Bodaghi, S., Yamanegi, K., Xiao, S.-Y., Da Costa, M., Palefsky, J.M. & Zheng, Z.-M. (2005) Colorectal papillomavirus infection in patients with colorectal cancer. *Clin. Cancer Res.*, **11**, 2862–2867
- Boguszaková, L., Hirsch, I., Bricháček, B., Faltyn, J., Fric, P., Dvoráková, H. & Vonka, V. (1988) Absence of cytomegalovirus, Epstein-Barr virus, and papillomavirus DNA from adenoma and adenocarcinoma of the colon. *Acta virol.*, **32**, 303–308
- Bohlmeier, T., Le, T.N., Shroyer, L., Markham, N. & Shroyer, K.R. (1998) Detection of human papillomavirus in squamous cell carcinomas of the lung by polymerase chain reaction. *Am. J. respir. Cell. mol. Biol.*, **18**, 265–269
- van Bommel, P.F.J., van den Brule, A.J.C., Helmerhorst, T.J.M., Gallee, M.P.W., Gaarenstroom, K.N., Walboomers, J.M.M., Meijer, C.J.L.M. & Kenemans, P. (1993) HPV DNA presence and HPV genotypes as prognostic factors in low-stage squamous cell cervical cancer. *Gynecol. Oncol.*, **48**, 333–337
- Boner, W., Taylor, E.R., Tsirimonaki, E., Yamane, K., Campo, M.S. & Morgan, I.M. (2002) A functional interaction between the human papillomavirus 16 transcription/replication factor E2 and the DNA damage response protein TopBP1. *J. biol. Chem.*, **277**, 22297–22303
- Bongain, A., Rampal, A., Durant, J., Michiels, J.-F., Dellamonica, P. & Gillet, J.-Y. (1996) Cervical intra-epithelial neoplasia in women infected with human immunodeficiency virus. *Eur. J. Obstet. Gynecol. reprod. Biol.*, **65**, 195–199
- Bonnez, W., Da Rin, C, Rose, R.C & Reichman, R.C. (1991) Use of human papillomavirus type 11 virions in an ELISA to detect specific antibodies in humans with condylomata acuminata. *J. gen. Virol.*, **72**, 1343–1347
- Bonnez, W., Rose, R.C. & Reichman, R.C. (1992) Antibody-mediated neutralization of human papillomavirus type 11 (HPV-11) infection in the nude mouse: Detection of HPV-11 mRNAs. *J. infect. Dis.*, **165**, 376–380
- Bonnez, W., Elswick, R.K., Jr, Bailey-Farchione, A., Hallahan, D., Bell, R., Isenberg, R., Stoler, M.H. & Reichman, R.C. (1994) Efficacy and safety of 0.5% podofilox solution in the treatment and suppression of anogenital warts. *Am. J. Med.*, **96**, 420–425

- Bontkes, H.J., van Duin, M., de Gruijl, T.D., Duggan-Keen, M.F., Walboomers, J.M.M., Stukart, M.J., Verheijen, R.H.M., Helmerhorst, T.J.M., Meijer, C.J.L.M., Scheper, R.J., Stevens, F.R.A., Dyer, P.A., Sinnott, P. & Stern, P.L. (1998) HPV 16 infection and progression of cervical intra-epithelial neoplasia: Analysis of HLA polymorphism and HPV 16 E6 sequence variants. *Int. J. Cancer*, **78**, 166–171
- Bontkes, H.J., de Gruijl, T.D., Walboomers, J.M.M., Schiller, J.T., Dillner, J., Helmerhorst, T.J.M., Verheijen, R.H.M., Scheper, R.J. & Meijer, C.J.L.M. (1999) Immune responses against human papillomavirus (HPV) type 16 virus-like particles in a cohort study of women with cervical intraepithelial neoplasia. II. Systemic but not local IgA responses correlate with clearance of HPV-16. *J. gen. Virol.*, **80**, 409–417
- Boon, M.E., Baak, J.P.A., Kurver, P.J.H., Overdiep, S.H. & Verdonk, G.W. (1981) Adenocarcinoma *in situ* of the cervix: An underdiagnosed lesion. *Cancer*, **48**, 768–773
- Borchers, A., Braspenning, J., Meijer, J., Osen, W., Gissmann, L. & Jochmus, I. (1999) E7-specific cytotoxic T cell tolerance in HPV-transgenic mice. *Arch. Virol.*, **144**, 1539–1556
- Borg, A.J., Medley, G. & Garland, S.M. (1993) Prevalence of HPV in a Melbourne female STD population: Comparison of RNA and DNA probes in detecting HPV by dot blot hybridization. *Int. J. sex transm. Dis. AIDS*, **4**, 159–164
- Borger, D.R., Mi, Y.-D., Geslani, G., Zyzak, L.L., Batova, A., Engin, T.S.W., Pirisi, L. & Creek, K.E. (2000) Retinoic acid resistance at late stages of human papillomavirus type 16-mediated transformation of human keratinocytes arises despite intact retinoid signaling and is due to a loss of sensitivity to transforming growth factor- β . *Virology*, **270**, 397–407
- Bornstein, J., Shapiro, S., Rahat, M., Goldshmid, N., Goldik, Z., Abramovici, H. & Lahat, N. (1996) Polymerase chain reaction search for viral etiology of vulvar vestibulitis syndrome. *Am. J. Obstet. Gynecol.*, **175**, 139–144
- Bornstein, J., Pascal, B., Zarfati, D., Goldshmid, N. & Abramovici, H. (1997) Recombinant human interferon- β for condylomata acuminata: A randomized double-blind, placebo-controlled study of intralesional therapy. *Int. J. STD AIDS*, **8**, 614–621
- Borysiewicz, L.K., Fiander, A., Nimako, M., Man, S., Wilkinson, G.W.G., Westmoreland, D., Evans, A.S., Adams, M., Stacey, S.N., Bournsnel, M.E.G., Rutherford, E., Hickling, J.K. & Inglis, S.C. (1996) A recombinant vaccinia virus encoding human papillomavirus types 16 and 18, E6 and E7 proteins as immunotherapy for cervical cancer. *Lancet*, **347**, 1523–1527
- Borzacchiello, G., Ambrosio, V., Galati, P., Poggiali, F., Venuti, A. & Roperto, F. (2001) The pagetoid variant of urothelial carcinoma *in situ* of urinary bladder in a cow. *Vet. Pathol.*, **38**, 113–116
- Borzacchiello, G., Iovane, G., Marcante, M.L., Poggiali, F., Roperto, F., Roperto, S. & Venuti, A. (2003a) Presence of bovine papillomavirus type 2 DNA and expression of the viral oncoprotein E5 in naturally occurring urinary bladder tumours in cows. *J. gen. Virol.*, **84**, 2921–2926
- Borzacchiello, G., Ambrosio, V., Roperto, S., Poggiali, F., Tsirimonakis, E., Venuti, A., Campo, M.S. & Roperto, F. (2003b) Bovine papillomavirus type 4 in oesophageal papillomas of cattle from the south of Italy. *J. comp. Pathol.*, **128**, 203–206
- Bosch, F.X., Muñoz, N., de Sanjosé, S., Izarzugaza, I., Gili, M., Viladiu, P., Tormo, M.J., Moreo, P., Ascunce, N., Gonzalez, L.C., Tafur, L., Kaldor, J.M., Guerrero, E., Aristizabal, N., Santamaria, M., Alonso de Ruiz, P. & Shan, K.V. (1992) Risk factors for cervical cancer in Colombia and Spain. *Int. J. Cancer*, **52**, 750–758

- Bosch, F.X., Manos, M.M., Muñoz, N., Sherman, M., Jansen, A.M., Peto, J., Schiffman, M.H., Moreno, V., Kurman, R. & Shah, K.V. for the International Biological Study on Cervical Cancer (IBSCC) Study Group (1995) Prevalence of human papillomavirus in cervical cancer: A worldwide perspective. *J. natl Cancer Inst.*, **87**, 796–802
- Bosch, F.X., Castellsagué, X., Muñoz, N., de Sanjosé, S., Ghaffari, A.M., Gonzalez, L.C., Gili, M., Izarzugaza, I., Viladiu, P., Navarro, C., Vergara, A., Ascunce, N., Guerrero, E. & Shah, K.V. (1996) Male sexual behavior and human papillomavirus DNA: Key risk factors for cervical cancer in Spain. *J. natl Cancer Inst.*, **88**, 1060–1067
- Boshart, M., Gissmann, L., Ikenberg, H., Kleinheinz, A., Scheurlen, W. & zur Hausen, H. (1984) A new type of papillomavirus DNA, its presence in genital cancer biopsies and in cell lines derived from cervical cancer. *EMBO J.*, **3**, 1151–1157
- Boucher, N.R., Scholefield, J.H. & Anderson, J.B. (1996) The aetiological significance of human papillomavirus in bladder cancer. *Br. J. Urol.*, **78**, 866–869
- Boursnell, M.E.G., Rutherford, E., Hickling, J.K., Rollinson, E.A., Munro, A.J., Rolley, N., McLean, C.S., Borysiewicz, L.K., Vousden, K. & Inglis, S.C. (1996) Construction and characterisation of a recombinant vaccinia virus expressing human papillomavirus proteins for immunotherapy of cervical cancer. *Vaccine*, **14**, 1485–1494
- Bousarghin, L., Combata-Rojas, A.-L., Touzé, A., El Mehdaoui, S., Sizaret, P.-Y., Bravo, M.M. & Coursaget, P. (2002) Detection of neutralizing antibodies against human papillomaviruses (HPV) by inhibition of gene transfer mediated by HPV pseudovirions. *J. clin. Microbiol.*, **40**, 926–932
- Bouvard, V., Storey, A., Pim, D. & Banks, L. (1994a) Characterization of the human papillomavirus E2 protein: Evidence of *trans*-activation and *trans*-repression in cervical keratinocytes. *EMBO J.*, **13**, 5451–5459
- Bouvard, V., Matlashewski, G., Gu, Z.-M., Storey, A. & Banks, L. (1994b) The human papillomavirus type 16 E5 gene cooperates with the E7 gene to stimulate proliferation of primary cells and increases viral gene expression. *Virology*, **203**, 73–80
- Bouwes Bavinck, J.N. & Berkhout, R.J.M. (1997) HPV infections and immunosuppression. *Clin. Dermatol.*, **15**, 427–437
- Bouwes Bavinck, J.N., Hardie, D.R., Green, A., Cutmore, S., MacNaught, A., O’Sullivan, B., Siskind, V., Van Der Woude, F.J. & Hardie, I.R. (1996) The risk of skin cancer in renal transplant recipients in Queensland, Australia. A follow-up study. *Transplantation*, **61**, 715–721
- Bouwes Bavinck, J.N., Feltkamp, M., Struijk, L. & ter Schegget, J. (2001) Human papillomavirus infection and skin cancer risk in organ transplant recipients. *J. invest. Dermatol. Symp. Proc.*, **6**, 207–211
- Bowden, F.J., Paterson, B.A., Mein, J., Savage, J., Fairley, C.K., Garland, S.M. & Tabrizi, S.N. (1999) Estimating the prevalence of *Trichomonas vaginalis*, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and human papillomavirus infection in indigenous women in northern Australia. *Sex. transm. Infect.*, **75**, 431–434
- Bower, M., Powles, T., Newsom-Davis, T., Thirlwell, C., Stebbing, J., Mandalia, S., Nelson, M. & Gazzard, B. (2004) HIV-associated anal cancer: Has highly active antiretroviral therapy reduced the incidence or improved the outcome? *J. acquir. immune Defic. Syndr.*, **37**, 1563–1565
- Boxman, I.L.A., Berkhout, R.J.M., Mulder, L.H.C., Wolkers, M.C., Bouwes Bavinck, J.N., Vermeer, B.J. & ter Schegget, J. (1997) Detection of human papillomavirus DNA in plucked hairs from renal transplant recipients and healthy volunteers. *J. invest. Dermatol.*, **108**, 712–715

- Boxman, I.L.A., Mulder, L.H.C., Russell, A., Bouwes Bavinck, J.N., Green, A. & ter Schegget, J. (1999) Human papillomavirus type 5 is commonly present in immunosuppressed and immunocompetent individuals. *Br. J. Dermatol.*, **141**, 246–249
- Boxman, I.L.A., Russell, A., Mulder, L.H.C., Bouwes Bavinck, J.N., ter Schegget, J., Green, A. & the Nambour Skin Cancer Prevention Study Group (2000) Case-control study in a subtropical Australian population to assess the relation between non-melanoma skin cancer and epidermodysplasia verruciformis human papillomavirus DNA in plucked eyebrow hairs. *Int. J. Cancer*, **86**, 118–121
- Boxman, I.L.A., Russell, A., Mulder, L.H.C., Bouwes Bavinck, J.N., ter Schegget, J., Green, A. & Collaborators of the Nambour Prevention Study (2001) Association between epidermodysplasia verruciformis-associated human papillomavirus DNA in plucked eyebrow hair and solar keratoses. *J. invest. Dermatol.*, **117**, 1108–1112
- Boyer, S.N., Wazer, D.E. & Band, V. (1996) E7 protein of human papilloma virus-16 induces degradation of retinoblastoma protein through the ubiquitin-proteasome pathway. *Cancer Res.*, **56**, 4620–4624
- Boyle, D.C.M. & Smith, J.R. (1999). Infection and cervical intraepithelial neoplasia. *Int. J. Gynecol. Cancer*, **9**, 177–186
- Boyle, D.C.M., Barton, S.E., Uthayakumar, S., Hay, P.E., Pollock, J.W., Steer, P.J. & Smith, J.R. (2003) Is bacterial vaginosis associated with cervical intraepithelial neoplasia? *Int. J. Gynecol. Cancer*, **13**, 159–163
- Braakhuis, B.J.M., Snijders, P.J.F., Keune, W.-J.H., Meijer, C.J.L.M., Ruijter-Schippers, H.J., Leemans, C.R. & Brakenhoff, R.H. (2004) Genetic patterns in head and neck cancers that contain or lack transcriptionally active human papillomavirus. *J. natl Cancer Inst.*, **96**, 998–1006
- Bradford, C.R., Hoffman, H.T., Wolf, G.T., Carey, T.E., Baker, S.R. & McClatchey, K.D. (1990) Squamous carcinoma of the head and neck in organ transplant recipients: Possible role of oncogenic virus. *Laryngoscope*, **100**, 190–194
- Bradshaw, B.R., Nuovo, G.J., DiCostanzo, D., Cohen, S.R. (1992) Human papillomavirus type 16 in a homosexual man. Association with perianal carcinoma in situ and condyloma acuminatum. *Arch. Dermatol.*, **128**, 949–952
- Brake, T. & Lambert, P.F. (2005) Estrogen contributes to the onset, persistence, and malignant progression of cervical cancer in a human papillomavirus-transgenic mouse model. *Proc. natl Acad. Sci. USA*, **102**, 2490–2495
- Brake, T., Connor, J.P., Petereit, D.G. & Lambert, P.F. (2003) Comparative analysis of cervical cancer in women and in a human papillomavirus-transgenic mouse model: Identification of *minichromosome maintenance protein 7* as an informative biomarker for human cervical cancer. *Cancer Res.*, **63**, 8173–8180
- Branca, M., Delfino, A., Rossi, E., Giacomini, G., Leoncini, L., Riti, M.G. & Morosini, P.L. (1995) Cervical intraepithelial neoplasia and human papillomavirus related lesions of the genital tract in HIV positive and negative women. *Eur. J. Gynaecol. Oncol.*, **16**, 410–417
- Branca, M., Migliore, G., Giuliani, M., Leoncini, L., Ippolito, G., Cappiello, G., Garbuglia, A.R., Schiesari, A., Rezza, G. & the DIANAIDS Cooperative Study Group (2000) Squamous intraepithelial lesions (SILs) and HPV associated changes in HIV infected women or at risk of HIV. *Eur. J. Gynaecol. Oncol.*, **21**, 155–159

- Branca, M., Garbuglia, A.R., Benedetto, A., Cappiello, T., Leoncini, L., Migliore, G., Agarossi, A., Syrjanen, K. & the DIANAIDS Cooperative Study Group (2003) Factors predicting the persistence of genital human papillomavirus infections and PAP smear abnormality in HIV-positive and HIV-negative women during prospective follow-up. *Int. J. STD AIDS*, **14**, 417–425
- Branca, M., Costa, S., Mariani, L., Sesti, F., Agarossi, A., di Carlo, A., Galati, M., Benedetto, A., Ciotti, M., Giorgi, C., Criscuolo, A., Valieri, M., Favalli, C., Paba, P., Santini, D., Piccione, E., Alderisio, M., De Nuzzo, M., di Bonito, L. & Syrjanen, K. (2004) Assessment of risk factors and human papillomavirus (HPV) related pathogenetic mechanisms of CIN in HIV-positive and HIV-negative women. Study design and baseline data of the HPV-PathogenISS Study. *Eur. J. Gynaecol. Oncol.*, **25**, 689–698
- Brandsma, J.L. & Abramson, A.L. (1989) Association of papillomavirus with cancers of the head and neck. *Arch. Otolaryngol. Head Neck Surg.*, **115**, 621–625
- Brannon, A.R., Maresca, J.A., Boeke, J.D., Basrai, M.A., & McBride, A.A. (2005) Reconstitution of papillomavirus E2-mediated plasmid maintenance in *Saccharomyces cerevisiae* by the Brd4 bromodomain protein. *Proc. natl Acad. Sci. USA*, **102**, 2998–3003
- Bratthauer, G.L., Tavassoli, F.A. & O'Leary, T.J. (1992) Etiology of breast carcinoma: No apparent role for papillomavirus types 6/11/16/18. *Pathol. Res. Pract.*, **188**, 384–386
- Bregman, C.L., Hirth, R.S., Sundberg, J.P. & Christensen, E.F. (1987) Cutaneous neoplasms in dogs associated with canine oral papillomavirus vaccine. *Vet. Pathol.*, **24**, 477–487
- Brehm, A., Miska, E.A., McCance, D.J., Reid, J.L., Bannister, A.J. & Kouzarides, T. (1998) Retinoblastoma protein recruits histone deacetylase to repress transcription. *Nature*, **391**, 597–601
- Brehm, A., Nielsen, S.J., Miska, E.A., McCance, D.J., Reid, J.L., Bannister, A.J. & Kouzarides, T. (1999) The E7 oncoprotein associates with Mi2 and histone deacetylase activity to promote cell growth. *EMBO J.*, **18**, 2449–2458
- Breitburd, F. & Coursaget, P. (1999) Human papillomavirus vaccines. *Semin. Cancer Biol.*, **9**, 431–445
- Breitburd, F., Kirnbauer, R., Hubbert, N.L., Nonnenmacher, B., Trin-Dinh-Desmarquet, C., Orth, G., Schiller, J.T. & Lowy, D.R. (1995) Immunization with viruslike particles from cottontail rabbit papillomavirus (CRPV) can protect against experimental CRPV infection. *J. Virol.*, **69**, 3959–3963
- Briggs, M.W., Adam, J.L. & McCance, D.J. (2001) The human papillomavirus type 16 E5 protein alters vacuolar H⁺-ATPase function and stability in *Saccharomyces cerevisiae*. *Virology*, **280**, 169–175
- Brinton, L.A. (1992) Epidemiology of cervical cancer — Overview. In: Muñoz, N., Bosch, F.X., Shah, K.V. & Meheus, A., eds, *The Epidemiology of Cervical Cancer and Human Papillomavirus* (IARC Scientific Publications No. 199). Lyon, pp. 3–23
- Brinton, L.A., Tashima, K.T., Lehman, H.F., Levine, R.S., Mallin, K., Savitz, D.A., Stolley, P.D. & Fraumeni, J.F., Jr (1987) Epidemiology of cervical cancer by cell type. *Cancer Res.*, **47**, 1706–1711
- Brouchet, L., Valmary, S., Dahan, M., Didier, A., Galateau-Salle, F., Brousset, P. & Degano, B. (2005) Detection of oncogenic virus genomes and gene products in lung carcinoma. *Br. J. Cancer*, **92**, 743–746
- Browder, J.F., Araujo, O.E., Myer, N.A. & Flowers, F.P. (1992) The interferons and their use in condyloma acuminata. *Ann. Pharmacother.*, **26**, 42–45

- Brown, D.R. & Bryan, J.T. (2000) Abnormalities of cornified cell envelopes isolated from human papillomavirus type 11-infected genital epithelium. *Virology*, **271**, 65–70
- Brown, M.R., Noffsinger, A., First, M.R., Penn, I. & Husseinzadeh, N. (2000) HPV subtype analysis in lower genital tract neoplasms of female renal transplant recipients. *Gynecol. Oncol.*, **79**, 220–224
- van den Brule, A.J.C., Meijer, C.J.L.M., Bakels, V., Kenemans, P. & Walboomers, J.M.M. (1990) Rapid detection of human papillomavirus in cervical scrapes by combined general primer-mediated and type-specific polymerase chain reaction. *J. clin. Microbiol.*, **28**, 2739–2743
- van den Brule, A.J.C., Pol, R., Fransen-Daalmeijer, N., Schouls, L.M., Meijer, C.J.L.M. & Snijders, P.J.F. (2002) GP5+/6+ PCR followed by reverse line blot analysis enables rapid and high-throughput identification of human papillomavirus genotypes. *J. clin. Microbiol.*, **40**, 779–787
- Brumm, C., Rivière, A., Wilckens C. & Löning, T. (1990) Immunohistochemical investigation and northern blot analysis of c-erb-B-2 expression in normal, premalignant and malignant tissues of the corpus and cervix uteri. *Virchows Arch. A. pathol. Anat. Histopathol.*, **417**, 477–484
- Bryant, P., Davies, P. & Wilson, D. (1991) Detection of human papillomavirus DNA in cancer of the urinary bladder by in situ hybridisation. *Br. J. Urol.*, **68**, 49–52
- Bubb, V., McCance, D.J. & Schlegel, R. (1988) DNA sequence of the HPV-16 E5 ORF and the structural conservation of its encoded protein. *Virology*, **163**, 243–246
- Buchwald, C., Franzmann, M.-B., Jacobsen, G.K., Juhl, B.R. & Lindeberg, H. (1997) Carcinomas occurring in papillomas of the nasal septum associated with human papilloma virus (HPV). *Rhinology*, **35**, 74–78
- Buchwald, C., Lindeberg, H., Pedersen, B.L. & Franzmann, M.-B. (2001) Human papilloma virus and p53 expression in carcinomas associated with sinonasal papillomas: A Danish epidemiological study 1980–1998. *Laryngoscope*, **111**, 1104–1110
- Bulk, S., van Kemenade, F.J., Rozendaal, L. & Meijer, C.J.L.M. (2004) The Dutch CISOE-A framework for cytology reporting increases efficacy of screening upon standardisation since 1996. *J. clin. Pathol.*, **57**, 388–393
- Bulkmans, N.W.J., Rozendaal, L., Snijders, P.J.F., Voorhorst, F.J., Boeke, A.J.P., Zandwijken, G.R.J., van Kemenade, F.J., Verheijen, R.H.M., von Groningen, K., Boon, M.E., Keuning, H.J.F., van Ballegooijen, M., van den Brule, A.J.C. & Meijer, C.J.L.M. (2004) POBASCAM, a population-based randomized controlled trial for implementation of high-risk HPV testing in cervical screening: Design, methods and baseline data of 44 102 women. *Int. J. Cancer*, **110**, 94–101
- Bulten, J., van der Laak, J.A.W.M., Gemmink, J.H., Pahlplatz, M.M.M., de Wilde, P.C.M. & Hanselaar, A.G.J.M. (1996) MIB1, a promising marker for the classification of cervical intra-epithelial neoplasia. *J. Pathol.*, **178**, 268–273
- Buonaguro, F.M., Tornesello, M.L., Buonaguro, L., Del Gaudio, E., Beth-Giraldo, E. & Giraldo, G. (1994) Role of HIV as cofactor in HPV oncogenesis: In vitro evidences of virus interactions. *Antibiot. Chemother.*, **46**, 102–109
- Buonaguro, F.M., Tornesello, M.L., Salatiello, I., Okong, P., Buonaguro, L., Beth-Giraldo, E., Biryahwaho, B., Sempala, S.D.K. & Giraldo, G. (2000) The Uganda study on HPV variants and genital cancers. *J. clin. Virol.*, **19**, 31–41

- Burk, R.D., Kelly, P., Feldman, J., Bromberg, J., Vermund, S.H., DeHovitz, J.A. & Landesman, S.H. (1996) Declining prevalence of cervicovaginal human papillomavirus infection with age is independent of other risk factors. *Sex. transm. Dis.*, **23**, 333–341
- Burstein, G.R., Gaydos, C.A., Diener-West, M., Howell, M.R., Zenilman, J.M. & Quinn, T.C. (1998) Incident *Chlamydia trachomatis* infections among inner-city adolescent females. *J. Am. med. Assoc.*, **280**, 521–526
- Burstein, G.R., Snyder, M.H., Conley, D., Boekeloo, B.O., Quinn, T.C. & Zenilman, J.M. (2001) Adolescent chlamydia testing practices and diagnosed infections in a larged managed care organization. *Sex. transm. Dis.*, **28**, 477–483
- Burtscher, H., Grundberg, W. & Meingassner, G. (1973) Infectious keratoacanthomas of the epidermis in *Praomys (Mastomys) natalensis*. *Naturwissenschaften*, **60**, 209–210
- Busson, P., Keryer, C., Ooka, T. & Corbex, M. (2004). EBV-associated nasopharyngeal carcinomas: From epidemiology to virus-targeting strategies. *Trends Microbiol.*, **12**, 356–360
- Bustos, D.A., Grenon, M.S., Benitez, M., de Boccardo, G., Pavan, J.V. & Gendelman, H. (2001) Human papillomavirus infection in cyclosporin-induced gingival overgrowth in renal allograft recipients. *J. Periodontol.*, **72**, 741–744
- Butler, D., Collins, C., Mabruk, M., Barry Walsh, C., Leader, M.B. & Kay, E.W. (2000) Deletion of the FHIT gene in neoplastic and invasive cervical lesions is related to high-risk HPV infection but is independent of histopathological features. *J. Pathol.*, **192**, 502–510
- Butler, D., Collins, C., Mabruk, M., Leader, M.B. & Kay, E.W. (2002) Loss of Fhit expression as a potential marker of malignant progression in preinvasive squamous cervical cancer. *Gynecol. Oncol.*, **86**, 144–149
- Butterworth, C.E., Jr, Hatch, K.D., Macaluso, M., Cole, P., Sauberlich, H.E., Soong, S.J., Borst, M. & Baker, V.V. (1992) Folate deficiency and cervical dysplasia. *J. Am. med. Assoc.*, **267**, 528–533
- Byars, R.W., Poole, G.V. & Barber, W.H. (2001) Anal carcinoma arising from condyloma acuminata. *Am Surg.*, **67**, 469–472
- Byrne, J.C., Tsao, M.-S., Fraser, R.S. & Howley, P.M. (1987) Human papillomavirus-11 DNA in a patient with chronic laryngotracheobronchial papillomatosis and metastatic squamous-cell carcinoma of the lung. *New Engl. J. Med.*, **317**, 873–878
- Cairey-Remonnay, S., Humbey, O., Mougin, C., Algros, M.P., Mauny, F., Kanitakis, J., Euvrard, S., Laurent, R. & Aubin, F. (2002) TP53 polymorphism of exon 4 at codon 72 in cutaneous squamous cell carcinoma and benign epithelial lesions of renal transplant recipients and immunocompetent individuals: Lack of correlation with human papillomavirus status. *J. invest. Dermatol.*, **118**, 1026–1031
- Caldeira, S., Zehbe, I., Accardi, R., Malanchi, I., Dong, W., Giarrè, M., de Villiers, E.-M., Filotico, R., Boukamp, P. & Tommasino, M. (2003) The E6 and E7 proteins of the cutaneous human papillomavirus type 38 display transforming properties. *J. Virol.*, **77**, 2195–2206
- Calero, L. & Brusis, T. (2003) [Laryngeal papillomatosis — First recognition in Germany as an occupational disease in an operating room nurse.] *Laryngo-Rhino-Otologie*, **82**, 790–793 (in German)
- Calore, E.E., Cavaliere, M.J. & Calore, N.M.P. (1998) Squamous intraepithelial lesions in cervical smears of human immunodeficiency virus-seropositive adolescents. *Diagn. Cytopathol.*, **18**, 91–92
- Calore, E.E., Pereira, S.M.M. & Cavaliere, M.J. (2001) Progression of cervical lesions in HIV-seropositive women: A cytological study. *Diagn. Cytopathol.*, **24**, 117–119

- Calos, M.P. (1998) Stability without a centromere. *Proc. natl Acad. Sci. USA*, **95**, 4084–4085
- Campo, M.S. (2002) Animal models of papillomavirus pathogenesis. *Virus Res.*, **89**, 249–261
- Campo, M.S., Moar, M.H., Jarrett, W.F.H. & Laird, H.M. (1980) A new papillomavirus associated with alimentary cancer in cattle. *Nature*, **286**, 180–182
- Campo, M.S., Moar, M.H., Laird, H.M. & Jarrett, W.F.H. (1981) Molecular heterogeneity and lesion site specificity of cutaneous bovine papillomaviruses. *Virology*, **113**, 323–335
- Campo, M.S., Moar, M.H., Sartirana, M.L., Kennedy, I.M. & Jarrett, W.F.H. (1985) The presence of bovine papillomavirus type 4 DNA is not required for the progression to, or the maintenance of, the malignant state in cancers of the alimentary canal in cattle. *EMBO J.*, **4**, 1819–1825
- Campo, M.S., Jarrett, W.F.H., Barron, R., O’Neil, B.W. & Smith, K.T. (1992) Association of bovine papillomavirus type 2 and bracken fern with bladder cancer in cattle. *Cancer Res.*, **52**, 6898–6904
- Campo, M.S., Jarrett, W.F.H., O’Neil, W. & Barron, R.J. (1994a) Latent papillomavirus infection in cattle. *Res. vet. Sci.*, **56**, 151–157
- Campo, M.S., O’Neil, B.W., Barron, R.J. & Jarrett, W.F.H. (1994b) Experimental reproduction of the papilloma–carcinoma complex of the alimentary canal in cattle. *Carcinogenesis*, **15**, 1597–1601
- Campo, M.S., O’Neil, B.W., Grindlay, G.J., Curtis, F., Knowles, G. & Chandrachud, L. (1997) A peptide encoding a B-cell epitope from the N-terminus of the capsid protein L2 of bovine papillomavirus-4 prevents disease. *Virology*, **234**, 261–266
- Cappiello, G., Garbuglia, A.R., Salvi, R., Rezza, G., Giuliani, M., Pezzotti, P., Suligoj, B., Branca, M., Migliore, G., Formigoni Pomponi, D., D’Ubaldo, C., Ippolito, G., Giacomini, G., Benedetto, A. & the DIANAIDS Collaborative Study Group (1997) HIV infection increases the risk of squamous intra-epithelial lesions in women with HPV infection: An analysis of HPV genotypes. *Int. J. Cancer*, **72**, 982–986
- Carlson, C.A. & Ethier, S.P. (2000) Lack of RB protein correlates with increased sensitivity to UV-radiation-induced apoptosis in human breast cancer cells. *Radiat. Res.*, **154**, 590–599
- Carney, H.C., England, J.J., Hodgins, E.C., Whiteley, H.E., Adkinson, D.L. & Sundberg, J.P. (1990) Papillomavirus infection of aged Persian cats. *J. vet. diagn. Invest.*, **2**, 294–299
- Carozzi, F., Lombardi, F.C., Zendron, P., Confortini, M., Sani, C., Bisanzi, S., Pontenani, G. & Ciatto, S. (2004) Association of human papillomavirus with prostate cancer: Analysis of a consecutive series of prostate biopsies. *Int. J. Biol. Markers*, **19**, 257–261
- Carr, E.A., Théon, A.P., Madewell, B.R., Griffey, S.M. & Hitchcock, M.E. (2001a) Bovine papillomavirus DNA in neoplastic and nonneoplastic tissues obtained from horses with and without sarcoids in the western United States. *Am. J. vet. Res.*, **62**, 741–744
- Carr, E.A., Théon, A.P., Madewell, B.R., Hitchcock, M.E., Schlegel, R. & Schiller, J.T. (2001b) Expression of a transforming gene (E5) of bovine papillomavirus in sarcoids obtained from horses. *Am. J. vet. Res.*, **62**, 1212–1217
- Carter, J.J., Hagensee, M., Taflin, M.C., Lee, S.K., Koutsky, L.A. & Galloway, D.A. (1993) HPV-1 capsids expressed *in vitro* detect human serum antibodies associated with foot warts. *Virology*, **195**, 456–462
- Carter, J.J., Hagensee, M.B., Lee, S.K., McKnight, B., Koutsky, L.A. & Galloway, D.A. (1994) Use of HPV-1 capsids produced by recombinant vaccinia viruses in an ELISA to detect serum antibodies in people with foot warts. *Virology*, **199**, 284–291

- Carter, J.J., Wipf, G.C., Hagensee, M.E., McKnight, B., Habel, L.A., Lee, S.-K., Kuypers, J., Kiviat, N., Daling, J.R., Koutsky, L.A., Watts, D.H., Holmes, K.K. & Galloway, D.A. (1995) Use of human papillomavirus type 6 capsids to detect antibodies in people with genital warts. *J. infect. Dis.*, **172**, 11–18
- Carter, P.S., de Ruiters, A., Whatrup, C., Katz, D.R., Ewings, P., Mindel, A. & Northover, J.M.A. (1995) Human immunodeficiency virus infection and genital warts as risk factors for anal intraepithelial neoplasia in homosexual men. *Br. J. Surg.*, **82**, 473–474
- Carter, J.J., Koutsky, L.A., Wipf, G.C., Christensen, N.D., Lee, S.-K., Kuypers, J., Kiviat, N. & Galloway, D.A. (1996) The natural history of human papillomavirus type 16 capsid antibodies among a cohort of university women. *J. infect. Dis.*, **174**, 927–936
- Carter, J.J., Koutsky, L.A., Hughes, J.P., Lee, S.K., Kuypers, J., Kiviat, N. & Galloway, D.A. (2000) Comparison of human papillomavirus types 16, 18, and 6 capsid antibody responses following incident infection. *J. infect. Dis.*, **181**, 1911–1919
- Carter, J.J., Madeleine, M.M., Shera, K., Schwartz, S.M., Cushing-Haugen, K.L., Wipf, G.C., Porter, P., Daling, J.R., McDougall, J.K. & Galloway, D.A. (2001) Human papillomavirus 16 and 18 L1 serology compared across anogenital cancer sites. *Cancer Res.*, **61**, 1934–1940
- Carter, J.J., Wipf, G.C., Benki, S.F., Christensen, N.D. & Galloway, D.A. (2003) Identification of a human papillomavirus type 16-specific epitope on the C-terminal arm of the major capsid protein L1. *J. Virol.*, **77**, 11625–11632
- Carter, J.J., Wipf, G.C., Madeleine, M.M., Schwartz, S.M., Koutsky, L.A. & Galloway, D.A. (2006) Identification of human papillomavirus type 16 L1 surface loops required for neutralization by human sera. *J. Virol.*, **80**, 4664–4672
- Caruso, M.L. & Valentini, A.M. (1999) Different human papillomavirus genotypes in ano-genital lesions. *Anticancer Res.*, **19**, 3049–3053
- Cason, J., Kaye, J., Pakarian, F., Raju, K.S. & Best, J.M. (1995) HPV-16 transmission. *Lancet*, **345**, 197–198
- Castellsagué, X. & Muñoz, N. (2003) Chapter 3: Cofactors in human papillomavirus carcinogenesis — Role of parity, oral contraceptives, and tobacco smoking. *J. natl Cancer Inst. Monogr.*, **31**, 20–28
- Castellsagué, X., Ghaffari, A., Daniel, R.W., Bosch, F.X., Muñoz, N. & Shah, K.V. (1997) Prevalence of penile human papillomavirus DNA in husbands of women with and without cervical neoplasia: A study in Spain and Colombia. *J. infect. Dis.*, **176**, 353–361
- Castellsagué, X., Menéndez, C., Loscertales, M.-P., Kornegay, J.R., dos Santos F., Gómez-Olivé, F.X., Lloveras, B., Abarca, N., Vaz, N., Barreto, A., Bosch, F.X. & Alonso, P. (2001) Human papillomavirus genotypes in rural Mozambique. *Lancet*, **358**, 1429–1430
- Castellsagué, X., Bosch, F.X., Muñoz, N., Meijer, C.J.L.M., Shah, K.V., de Sanjosé, S., Eluf-Neto, J., Ngelangel, C.A., Chichareon, S., Smith, J.S., Herrero, R., & Franceschi, S. for the International Agency for Research on Cancer Multicenter Cervical Cancer Study Group (2002) Male circumcision, penile human papillomavirus infection, and cervical cancer in female partners. *New Engl. J. Med.*, **346**, 1105–1112
- Castellsagué, X., Bosch, F.X. & Muñoz, N. (2003) The male role in cervical cancer. *Salud publica Mex.*, **45** (Suppl. 3), S345–S353
- Castle, P.E. & Giuliano, A.R. (2003) Genital tract infections, cervical inflammation, and antioxidant nutrients — Assessing their roles as human papillomavirus cofactors. *J. natl Cancer Inst. Monogr.*, **31**, 29–34

- Castle, P.E., Hillier, S.L., Rabe, L.K., Hildesheim, A., Herrero, R., Bratti, M.C., Sherman, M.E., Burk, R.D., Rodriguez, A.C., Alfaro, M., Hutchinson, M.L., Morales, J. & Schiffman, M. (2001) An association of cervical inflammation with high-grade cervical neoplasia in women infected with oncogenic human papillomavirus (HPV). *Cancer Epidemiol. Biomarkers Prev.*, **10**, 1021–1027
- Castle, P.E., Schiffman, M., Gravitt, P.E., Kendall, H., Fishman, S., Dong, H., Hildesheim, A., Herrero, R., Bratti, M.C., Sherman, M.E., Lorincz, A., Schussler, J.E. & Burk, R.D. (2002a) Comparisons of HPV DNA detection by MY09/11 PCR methods. *J. med. Virol.*, **68**, 417–423
- Castle, P.E., Wacholder, S., Lorincz, A.T., Scott, D.R., Sherman, M.E., Glass, A.G., Rush, B.B., Schussler, J.E. & Schiffman, M. (2002b) A prospective study of high-grade cervical neoplasia risk among human papillomavirus-infected women. *J. natl Cancer Inst.*, **94**, 1406–1414
- Castle, P.E., Lorincz, A.T., Scott, D.R., Sherman, M.E., Glass, A.G., Rush, B.B., Wacholder, S., Burk, R.D., Manos, M.M., Schussler, J.E., Macomber, P. & Schiffman M. (2003a) Comparison between prototype Hybrid Capture 3 and Hybrid Capture 2 human papillomavirus DNA assays for detection of high-grade cervical intraepithelial neoplasia and cancer. *J. clin. Microbiol.*, **41**, 4022–4030
- Castle, P.E., Escoffery, C., Schachter, J., Rattray, C., Schiffman, M., Moncada, J., Sugai, K., Brown, C., Cranston, B., Hanchard, B., Palefsky, J.M., Burk, R.D., Hutchinson, M.L. & Strickler, H.D. (2003b) *Chlamydia trachomatis*, herpes simplex virus 2, and human T-cell lymphotropic virus type 1 are not associated with grade of cervical neoplasia in Jamaican colposcopy patients. *Sex. transm. Dis.*, **30**, 575–580
- Castle, P.E., Solomon, D., Schiffman, M. & Wheeler, C.M. for the ALTS Group (2005) Human papillomavirus type 16 infections and 2-year absolute risk of cervical precancer in women with equivocal or mild cytologic abnormalities. *J. natl Cancer Inst.*, **97**, 1066–1071
- Cattani, P., Hohaus, S., Bellacosa, A., Genuardi, M., Cavallo, S., Rovella, V., Almadori, G., Cadoni, G., Galli, J., Maurizi, M., Fadda, G. & Neri, G. (1998) Association between cyclin D1 (*CCND1*) gene amplification and human papillomavirus infection in human laryngeal squamous cell carcinoma. *Clin. Cancer Res.*, **4**, 2585–2589
- Cavatorta, A.L., Fumero, G., Chouhy, D., Aguirre, R., Nocito, A.L., Giri, A.A., Banks, L. & Gardiol, D. (2004) Differential expression of the human homologue of *Drosophila* discs large oncosuppressor in histologic samples from human papillomavirus-associated lesions as a marker for progression to malignancy. *Int. J. Cancer*, **111**, 373–380
- Cecchini, S., Bonardi, R., Mazzotta, A., Grazzini, G., Iossa, A. & Ciatto, S. (1993) Testing cervicography and cervicoscopy as screening tests for cervical cancer. *Tumori*, **79**, 22–25
- Chambers, G., Ellsmore, V.A., O'Brien, P.M., Reid, S.W.J., Love, S., Campo, M.S. & Nasir, L. (2003a) Association of bovine papillomavirus with the equine sarcoid. *J. gen. Virol.*, **84**, 1055–1062
- Chambers, G., Ellsmore, V.A., O'Brien, P.M., Reid, S.W.J., Love, S., Campo, M.S. & Nasir, L. (2003b) Sequence variants of bovine papillomavirus E5 detected in equine sarcoids. *Virus Res.*, **96**, 141–145
- Chan, W.-K., Klock, G. & Bernard, H.-U. (1989) Progesterone and glucocorticoid response elements occur in the long control regions of several human papillomaviruses involved in anogenital neoplasia. *J. Virol.*, **63**, 3261–3269
- Chan, S.-Y., Ho, L., Ong, C.-K., Chow, V., Drescher, B., Durst, M., ter Meulen, J., Villa, L., Luande, J., Mgaya, H.N. & Bernard, H.-U. (1992a) Molecular variants of human papilloma-

- virus type 16 from four continents suggest ancient pandemic spread of the virus and its co-evolution with humankind. *J. Virol.*, **66**, 2057–2066
- Chan, S.-Y., Bernard, H.-U., Ong, C.-K., Chan, S.-P., Hofmann, B. & Delius, H. (1992b) Phylogenetic analysis of 48 papillomavirus types and 28 subtypes and variants: A showcase for the molecular evolution of DNA viruses. *J. Virol.*, **66**, 5714–5725
- Chan, S.-Y., Tan, C.-H., Delius, H. & Bernard, H.-U. (1994) Human papillomavirus type 2c is identical to human papillomavirus type 27. *Virology*, **201**, 397–398
- Chan, S.-Y., Delius, H., Halpern, A.L. & Bernard, H.-U. (1995) Analysis of genomic sequences of 95 papillomavirus types: Uniting typing, phylogeny, and taxonomy. *J. Virol.*, **69**, 3074–3083
- Chan, K.W., Wong, K.Y. & Srivastava, G. (1997) Prevalence of six types of human papillomavirus in inverted papilloma and papillary transitional cell carcinoma of the bladder: An evaluation by polymerase chain reaction. *J. clin. Pathol.*, **50**, 1018–1021
- Chan, S.-Y., Bernard, H.-U., Ratterree, M., Birkebak, T.A., Faras, A.J. & Ostrow, R.S. (1997a) Genomic diversity and evolution of papillomaviruses in rhesus monkeys. *J. Virol.*, **71**, 4938–4943
- Chan, S.-Y., Ostrow, R.S., Faras, A.J. & Bernard, H.-U. (1997b) Genital papillomaviruses (PVs) and epidermodysplasia verruciformis PVs occur in the same monkey species: Implications for PV evolution. *Virology*, **228**, 213–217
- Chan, P.K.S., Chan, M.Y.M., Li, W.W.H., Chan, D.P.C., Cheung, J.L.K. & Cheng, A.F. (2001) Association of human β -herpesviruses with the development of cervical cancer: Bystanders or cofactors. *J. clin. Pathol.*, **54**, 48–53
- Chandrachud, L.M., Grindlay, G.J., McGarvie, G.M., O’Neil, B.W., Wagner, E.R., Jarrett, W.F.H. & Campo, M.S. (1995) Vaccination of cattle with the N-terminus of L2 is necessary and sufficient for preventing infection by bovine papillomavirus-4. *Virology*, **211**, 204–208
- Chang, Y.E. & Laimins, L.A. (2000) Microarray analysis identifies interferon-inducible genes and Stat-1 as major transcriptional targets of human papillomavirus type 31. *J. Virol.*, **74**, 4174–4182
- Chang, F., Syrjänen, S., Shen, Q., Wang, L., Wang, D. & Syrjänen, K. (1992) Human papillomavirus involvement in esophageal precancerous lesions and squamous cell carcinomas as evidenced by microscopy and different DNA techniques. *Scand. J. Gastroenterol.*, **27**, 553–563
- Chang, F., Lipponen, P., Tervahauta, A., Syrjänen, S. & Syrjänen, K. (1994) Transitional cell carcinoma of the bladder: Failure to demonstrate human papillomavirus deoxyribonucleic acid by in situ hybridization and polymerase chain reaction. *J. Urol.*, **152**, 1429–1433
- Chang, F., Syrjänen, S., Shen, Q., Cintonino, M., Santopietro, R., Tosi, P. & Syrjänen, K. (2000) Human papillomavirus involvement in esophageal carcinogenesis in the high-incidence area of China. A study of 700 cases by screening and type-specific in situ hybridization. *Scand. J. Gastroenterol.*, **35**, 123–130
- Chang, J.-L., Tsao, Y.-P., Liu, D.-W., Huang, S.-J., Lee, W.-H. & Chen, S.-L. (2001) The expression of HPV-16 E5 protein in squamous neoplastic changes in the uterine cervix. *J. biomed. Sci.*, **8**, 206–213
- Chang, J.Y.-F., Lin, M.-C. & Chiang, C.-P. (2003) High-risk human papillomaviruses may have an important role in non-oral habits-associated oral squamous cell carcinomas in Taiwan. *Am. J. clin. Pathol.*, **120**, 909–916
- Chatterjee, R., Mukhopadhyay, D., Murmu, N. & Mitra, P.K. (1998) Correlation between human papillomavirus DNA detection in maternal cervical smears and buccal swabs of infants. *Indian J. exp. Biol.*, **36**, 199–202

- Chee, Y.H., Namkoong, S.E., Kim, D.H., Kim, S.J. & Park, J.S. (1995) Immunologic diagnosis and monitoring of cervical cancers using *in vitro* translated HPV proteins. *Gynecol. Oncol.*, **57**, 226–231
- Chellappan, S., Kraus, V.B., Kroger, B., Munger, K., Howley, P.M., Phelps, W.C. & Nevins, J.R. (1992) Adenovirus E1A, simian virus 40 tumor antigen, and human papillomavirus E7 protein share the capacity to disrupt the interaction between transcription factor E2F and the retinoblastoma gene product. *Proc. natl Acad. Sci. USA*, **89**, 4549–4553
- Chen, S.-L. & Mounts, P. (1990) Transforming activity of E5a protein of human papillomavirus type 6 in NIH 3T3 and C127 cells. *J. Virol.*, **64**, 3226–3233
- Chen, L.P., Thomas, E.K., Hu, S.-L., Hellström, I. & Hellström, K.E. (1991) Human papillomavirus type 16 nucleoprotein E7 is a tumor rejection antigen. *Proc. natl Acad. Sci. USA*, **88**, 110–114
- Chen, S., Slavin, J., Fairley, C.K., Tabrizi, S.N., Borg, A.J., Billson, V. & Garland, S.M. (1993) The absence of HPV DNA in genital specimens from infants. *Genitourin. Med.*, **69**, 270–272
- Chen, M., Wang, H., Woodworth, C.D., Lusso, P., Berneman, Z., Kingma, D., Delgado, G. & DiPaolo, J.A. (1994) Detection of human herpesvirus 6 and human papillomavirus 16 in cervical carcinoma. *Am. J. Pathol.*, **145**, 1509–1516
- Chen, J.J., Reid, C.E., Band, V. & Androphy, E.J. (1995) Interaction of papillomavirus E6 oncoproteins with a putative calcium-binding protein. *Science*, **269**, 529–531
- Chen, Y.-H., Huang, L.-H. & Chen, T.-M. (1996) Differential effects of progestins and estrogens on long control regions of human papillomavirus types 16 and 18. *Biochem. biophys. Res. Commun.*, **224**, 651–659
- Chen, J.J., Hong, Y., Rustamzadeh, E., Baleja, J.D. & Androphy, E.J. (1998) Identification of an α helical motif sufficient for association with papillomavirus E6. *J. biol. Chem.*, **273**, 13537–13544
- Chen, T.R., Chan, P.J., Seraj, I.M. & King, A. (1999) Absence of human papillomavirus E6–E7 transforming genes from HPV 16 and 18 in malignant ovarian carcinoma. *Gynecol. Oncol.*, **72**, 180–182
- Chen, C.-H., Wang, T.-L., Hung, C.-F., Yang, Y., Young, R.A., Pardoll, D.M. & Wu, T.-C. (2000) Enhancement of DNA vaccine potency by linkage of antigen gene to an HSP70 gene. *Cancer Res.*, **60**, 1035–1042
- Chen, X.S., Garcea, R.L., Goldberg, I., Casini, G. & Harrison, S.C. (2000) Structure of small virus-like particles assembled from the L1 protein of human papillomavirus 16. *Mol. Cell*, **5**, 557–567
- Chen, Y.-C., Chen, J.-H., Richard, K., Chen, P.-Y. & Christiani, D.C. (2004) Lung adenocarcinoma and human papillomavirus infection. *Cancer*, **101**, 1428–1436
- Chen, R., Sehr, P., Waterboer, T., Leivo, I., Pawlita, M., Vaheri, A. & Aaltonen, L.-M. (2005) Presence of DNA of human papillomavirus 16 but no other types in tumor-free tonsillar tissue. *J. clin. Microbiol.*, **43**, 1408–1410
- Cheng, J.-Y., Meng, C.-L., Chao, C.-F., Gau, S.-D. & Lin, J.-C. (1991) Human papillomavirus type-related DNA and *c-myc* oncogene alterations in colon cancer cell lines. *Dis. Colon Rectum*, **34**, 469–474
- Cheng, J.-Y., Meng, C.-L., Chao, C.-F., Gau, S.-D. & Lin, J.-C. (1993) Human papillomavirus 16 DNA in NIH3T3 cells transformed by colonic cancer cellular DNA. *Gut*, **34**, 1710–1713

- Cheng, S., Schmidt-Grimminger, D.-C., Murant, T., Broker, T.R. & Chow, L.T. (1995) Differentiation-dependent up-regulation of the human papillomavirus E7 gene reactivates cellular DNA replication in suprabasal differentiated keratinocytes. *Genes Dev.*, **9**, 2335–2349
- Cheng, Y.-W., Chiou, H.-L., Sheu, G.-T., Hsieh, L.-L., Chen, J.-T., Chen, C.-Y., Su, J.-M. & Lee, H. (2001) The association of human papillomavirus 16/18 infection with lung cancer among nonsmoking Taiwanese women. *Cancer Res.*, **61**, 2799–2803
- Cheng, Y.-W., Chiou, H.-L., Chen, J.-T., Chou, M.-C., Lin, T.-S., Lai, W.-W., Chen, C.-Y., Tsai, Y.-Y. & Lee, H. (2004) Gender difference in human papillomavirus infection for non-small cell lung cancer in Taiwan. *Lung Cancer*, **46**, 165–170
- Chesebro, M.J., Everett, W.D. & Löroincz, A. (1997) High-risk human papillomavirus testing of women with cytological low-grade squamous intraepithelial lesions. *J. lower genit. Tract Dis.*, **1**, 234–239
- Chetsanga, C., Malmström, P.-U., Gyllensten, U., Moreno-Lopez, J., Dinter, Z. & Pettersson, U. (1992) Low incidence of human papillomavirus type 16 DNA in bladder tumor detected by the polymerase chain reaction. *Cancer*, **69**, 1208–1211
- Chiasson, M.A., Ellerbrock, T.V., Bush, T.J., Sun, X.-W. & Wright, T.C., Jr (1997) Increased prevalence of vulvovaginal condyloma and vulvar intraepithelial neoplasia in women infected with the human immunodeficiency virus. *Obstet. Gynecol.*, **89**, 690–694
- Chien, W.-M., Parker, J.N., Schmidt-Grimminger, D.-C., Broker, T.R. & Chow, L.T. (2000) Casein kinase II phosphorylation of the human papillomavirus-18 E7 protein is critical for promoting S-phase entry. *Cell Growth Differ.*, **11**, 425–435
- Chien, W.-M., Noya, F., Benedict-Hamilton, H.M., Broker, T.R. & Chow, L.T. (2002) Alternative fates of keratinocytes transduced by human papillomavirus type 18 E7 during squamous differentiation. *J. Virol.*, **76**, 2964–2972
- Childers, J.M., Chu, J., Voigt, L.F., Feigl, P., Tamimi, H.K., Franklin, E.W., Alberts, D.S. & Meyskens, F.L.L., Jr (1995) Chemoprevention of cervical cancer with folic acid: A phase III Southwest Oncology Group Intergroup Study. *Cancer Epidemiol. Biomarkers Prev.*, **4**, 155–159
- Chin-Hong, P.V., Vittinghoff, E., Cranston, R.D., Buchbinder, S., Cohen, D., Colfax, G., Da Costa, M., Darragh, T., Hess, E., Judson, F., Koblin, B., Madison, M. & Palefsky, J.M. (2004) Age-specific prevalence of anal human papillomavirus infection in HIV-negative sexually active men who have sex with men: The EXPLORE Study. *J. infect. Dis.*, **190**, 2070–2076
- Chiou, H.-L., Wu, M.-F., Liaw, Y.-C., Cheng, Y.-W., Wong, R.-H., Chen, C.-Y. & Lee, H. (2003) The presence of human papillomavirus type 16/18 DNA in blood circulation may act as a risk marker of lung cancer in Taiwan. *Cancer*, **97**, 1558–1563
- Chirenje, Z.M., Loeb, L., Mwale, M., Nyamapfeni, P., Kamba, M. & Padian, N. (2002) Association of cervical SIL and HIV-1 infection among Zimbabwean women in an HIV/STI prevention study. *Int. J. STD AIDS*, **13**, 765–768
- Choi, B.-S., Kim, O., Park, M.S., Kim, K.S., Jeong, J.K. & Lee, J.-S. (2003) Genital human papillomavirus genotyping by HPV oligonucleotide microarray in Korean commercial sex workers. *J. med. Virol.*, **71**, 440–445
- Chong, T., Apt, D., Gloss, B., Isa, M. & Bernard, H.-U. (1991) The enhancer of human papillomavirus type 16: Binding sites for the ubiquitous transcription factors oct-1, NFA, TEF-2, NF1, and AP-1 participate in epithelial cell-specific transcription. *J. Virol.*, **65**, 5933–5943

- Chow, V.T.K. & Leong, P.W. (1999) Complete nucleotide sequence, genomic organization and phylogenetic analysis of a novel genital human papillomavirus type, HLT7474-S. *J. gen. Virol.*, **80**, 2923–2929
- Christensen, N.D. & Kreider, J.W. (1990) Antibody-mediated neutralization in vivo of infectious papillomaviruses. *J. Virol.*, **64**, 3151–3156
- Christensen, N.D., Kreider, J.W., Cladel, N.M. & Galloway, D.A. (1990) Immunological cross-reactivity to laboratory-produced HPV-11 virions of polysera raised against bacterially derived fusion proteins and synthetic peptides of HPV-6b and HPV-16 capsid proteins. *Virology*, **175**, 1–9
- Christensen, N.D., Kreider, J.W., Kan, N.C. & DiAngelo, S.L. (1991) The open reading frame L2 of cottontail rabbit papillomavirus contains antibody-inducing neutralizing epitopes. *Virology*, **181**, 572–579
- Christensen, N.D., Kimbauer, R., Schiller, J.T., Ghim, S.-J., Schlegel, R., Jenson, A.B. & Kreider, J.W. (1994) Human papillomavirus types 6 and 11 have antigenically distinct strongly immunogenic conformationally dependent neutralizing epitopes. *Virology*, **205**, 329–335
- Christensen, N.D., Cladel, N.M. & Reed, C.A. (1995) Postattachment neutralization of papillomaviruses by monoclonal and polyclonal antibodies. *Virology*, **207**, 136–142
- Christensen, N.D., Dillner, J., Eklund, C., Carter, J.J., Wipf, G.C., Reed, C.A., Cladel, N.M. & Galloway, D.A. (1996a) Surface conformational and linear epitopes on HPV-16 and HPV-18 L1 virus-like particles as defined by monoclonal antibodies. *Virology*, **223**, 174–184
- Christensen, N.D., Reed, C.A., Cladel, N.M., Hall, K. & Leiserowitz, G.S. (1996b) Monoclonal antibodies to HPV-6 L1 virus-like particles identify conformational and linear neutralizing epitopes on HPV-11 in addition to type-specific epitopes on HPV-6. *Virology*, **224**, 477–486
- Christensen, N.D., Reed, C.A., Cladel, N.M., Han, R. & Kreider, J.W. (1996c) Immunization with viruslike particles induces long-term protection of rabbits against challenge with cottontail rabbit papillomavirus. *J. Virol.*, **70**, 960–965
- Christensen, N.D., Cladel, N.M., Reed, C.A. & Han, R. (2000) Rabbit oral papillomavirus complete genome sequence and immunity following genital infection. *Virology*, **269**, 451–461
- Christensen, N.D., Cladel, N.M., Reed, C.A., Budgeon, L.R., Embers, M.E., Skulsky, D.M., McClements, W.L., Ludmerer, S.W. & Jansen, K.U. (2001) Hybrid papillomavirus L1 molecules assemble into virus-like particles that reconstitute conformational epitopes and induce neutralizing antibodies to distinct HPV types. *Virology*, **291**, 324–334
- Ciccolini, F., Di Pasquale, G., Carlotti, F., Crawford, L. & Tommasino, M. (1994) Functional studies of E7 proteins from different HPV types. *Oncogene*, **9**, 2633–2638
- Cid, A., Auewarakul, P., Garcia-Carranca, A., Ovseiovich, R., Gaissert, H. & Gissmann, L. (1993) Cell-type-specific activity of the human papillomavirus type 18 upstream regulatory region in transgenic mice and its modulation by tetradecanoyl phorbol acetate and glucocorticoids. *J. Virol.*, **67**, 6742–6752
- Cirisano, F.D. (1999) Management of pre-invasive disease of the cervix. *Semin. surg. Oncol.*, **16**, 222–227
- Claas, E.C.J., Quint, W.G.V., Pieters, W.J.L.M., Burger, M.P.M., Oosterhuis, W.J. & Lindeman, J. (1992) Human papillomavirus and the three group metaphase figure as markers of an increased risk for the development of cervical carcinoma. *Am. J. Pathol.*, **140**, 497–502

- Classon, M., Salama, S., Gorka, C., Mulloy, R., Braun, P. & Harlow, E. (2000) Combinatorial roles for pRB, p107, and p130 in E2F-mediated cell cycle control. *Proc. natl Acad. Sci. USA*, **97**, 10820–10825
- Clavel, C.E., Nawrocki, B., Bosseaux, B., Poitevin, G., Putaud, I.C., Mangeonjean, C.C., Monteau, M. & Birembaut, P.L. (2000) Detection of human papillomavirus DNA in bronchopulmonary carcinomas by Hybrid Capture II. A study of 185 tumors. *Cancer*, **88**, 1347–1352
- Clavel, C., Masure, M., Bory, J.-P., Putaud, I., Mangeonjean, C., Lorenzato, M., Nazeyrollas, P., Gabriel, R., Quereux, C. & Birembaut, P. (2001) Human papillomavirus testing in primary screening for the detection of high-grade cervical lesions: A study of 7932 women. *Br. J. Cancer*, **89**, 1616–1623
- Clavel, C., Cucherousset, J., Lorenzato, M., Caudroy, S., Nou, J.M., Nazeyrollas, P., Polette, M., Bory, J.-P., Gabriel, R., Quereux, C. & Birembaut, P. (2004) Negative human papillomavirus testing in normal smears selects a population at low risk for developing high-grade cervical lesions. *Br. J. Cancer*, **90**, 1803–1808
- Clifford, G.M., Smith, J.S., Aguado, T. & Franceschi, S. (2003a) Comparison of HPV type distribution in high-grade cervical lesions and cervical cancer: A meta-analysis. *Br. J. Cancer*, **89**, 101–105
- Clifford, G.M., Smith, J.S., Plummer, M., Muñoz, N. & Franceschi, S. (2003b) Human papillomavirus types in invasive cervical cancer worldwide: A meta-analysis. *Br. J. Cancer*, **88**, 63–73
- Clifford, G.M., Rana, R.K., Franceschi, S., Smith, J.S., Gough, G. & Pimenta, J.M. (2005) Human papillomavirus genotype distribution in low-grade cervical lesions: Comparison by geographic region and with cervical cancer. *Cancer Epidemiol. Biomarkers Prev.*, **14**, 1157–1164
- Cohn, J.A., Gagnon, S., Spence, M.R., Harrison, D.D., Kluzak, T.R., Langenberg, P., Brinson, C., Stein, A., Hellinger, J. & the Cervical Disease Study Group of the American Foundation for AIDS Research Community Based Clinical Trials Network (2001) The role of human papillomavirus deoxyribonucleic acid assay and repeated cervical cytologic examination in the detection of cervical intraepithelial neoplasia among human immunodeficiency virus-infected women. *Am. J. Obstet. Gynecol.*, **184**, 322–330
- Coker, A.L., Russell, R.B., Bond, S.M., Pirisi, L., Liu, Y., Mane, M., Kokorina, N., Gerasimova, T. & Hermonat, P.L. (2001) Adeno-associated virus is associated with a lower risk of high-grade cervical neoplasia. *Exp. mol. Pathol.*, **70**, 83–89
- Coleman, N. & Stanley, M.A. (1994) Analysis of HLA-DR expression on keratinocytes in cervical neoplasia. *Int. J. Cancer*, **56**, 314–319
- Coleman, N., Birley, H.D.L., Renton, A.M., Hanna, N.F., Ryait, B.K., Byrne, M., Taylor-Robinson, D. & Stanley, M.A. (1994) Immunological events in regressing genital warts. *Am. J. clin. Pathol.*, **102**, 768–774
- Collins, S.I., Mazloomzadeh, S., Winter, H., Rollason, T.P., Blomfield, P., Young, L.S. & Woodman, C.B.J. (2005) Proximity of first intercourse to menarche and the risk of human papillomavirus infection: A longitudinal study. *Int. J. Cancer*, **114**, 498–500
- Combata, A.-L., Bravo, M.-M., Touzé, A., Orozco, O. & Coursaget, P. (2002) Serologic response to human oncogenic papillomavirus types 16, 18, 31, 33, 39, 58 and 59 virus-like particles in Colombian women with invasive cervical cancer. *Int. J. Cancer*, **97**, 796–803
- Conley, L.J., Ellerbrock, T.V., Bush, T.J., Chiasson, M.A., Sawo, D. & Wright, T.C. (2002) HIV-1 infection and risk of vulvovaginal and perianal condylomata acuminata and intraepithelial neoplasia: A prospective cohort study. *Lancet*, **359**, 108–113

- Connor, J.P., Ferrer, K., Kane, J.P. & Goldberg, J.M. (1999) Evaluation of Langerhans' cells in the cervical epithelium of women with cervical intraepithelial neoplasia. *Gynecol. Oncol.*, **75**, 130–135
- Conrad, M., Bubb, V.J. & Schlegel, R. (1993) The human papillomavirus type 6 and 16 E5 proteins are membrane-associated proteins which associate with the 16-kilodalton pore-forming protein. *J. Virol.*, **67**, 6170–6178
- Conrad, M., Goldstein, D., Andresson, T. & Schlegel, R. (1994) The E5 protein of HPV-6, but not HPV-16, associates efficiently with cellular growth factor receptors. *Virology*, **200**, 796–800
- Cook, J.R., Hill, D.A., Humphrey, P.A., Pfeifer, J.D. & El-Mofty, S.K. (2000) Squamous cell carcinoma arising in recurrent respiratory papillomatosis with pulmonary involvement: Emerging common pattern of clinical features and human papillomavirus serotype association. *Mod. Pathol.*, **13**, 914–918
- Cooper, K., Haffajee, Z. & Taylor, L. (1997) Human papillomavirus and schistosomiasis associated bladder cancer. *J. clin. Pathol. mol. Pathol.*, **50**, 145–148
- Coppleson, M. (1991) Colposcopic features of papillomaviral infection and premalignancy in the female lower genital tract. *Dermatol. Clin.*, **9**, 251–266
- Corbitt, G., Zarod, A.P., Arrand, J.R., Longson, M. & Farrington, W.T. (1988) Human papillomavirus (HPV) genotypes associated with laryngeal papilloma. *J. clin. Pathol.*, **41**, 284–288
- Cordiner, J.W., Sharp, F. & Briggs, J.D. (1980) Cervical intraepithelial neoplasia in immunosuppressed women after renal transplantation. *Scott. med. J.*, **25**, 275–277
- Costa, S., Rotola, A., Terzano, P., Secchiero, P., Di Luca, D., Poggi, M.G., Masotti, P., Martinelli, G. & Cassai, E. (1991) Is vestibular papillomatosis associated with human papillomavirus? *J. med. Virol.*, **35**, 7–13
- Coulombeau, B., Nusa Naiman, A., Ceruse, P. & Froehlich, P. (2002) [The place of anti-viral injection (Cidofovir) in the treatment of laryngeal papillomatosis.] *Rev. Laryngol. Otol. Rhinol.*, **123**, 315–320 (in French)
- Coursen, J.D., Bennett, W.P., Gollahon, L., Shay, J.W. & Harris, C.C. (1997) Genomic instability and telomerase activity in human bronchial epithelial cells during immortalization by human papillomavirus-16 E6 and E7 genes. *Exp. Cell Res.*, **235**, 245–253
- Coussens, L.M., Hanahan, D. & Arbeit, J.M. (1996) Genetic predisposition and parameters of malignant progression in K14-HPV16 transgenic mice. *Am. J. Pathol.*, **149**, 1899–1917
- Couto, E. & Hemminki, K. (2006) Heritable and environmental components in cervical tumors. *Int. J. Cancer*, **119**, 2699–2701
- Cox, J.T., Schiffman, M. & Solomon, D. & ASCUS-LSIL Triage Study (ALTS) Group (2003) Prospective follow-up suggests similar risk of subsequent cervical intraepithelial neoplasia grade 2 or 3 among women with cervical intraepithelial neoplasia grade 1 or negative colposcopy and directed biopsy. *Am. J. obstet. Gynecol.*, **188**, 1406–1412
- Cox, J.T., Petry, K.-U., Rylander, E. & Roy, M. (2004) Using imiquimod for genital warts in female patients. *J. Womens Health*, **13**, 265–271
- Creek, K.E., Jenkins, G.R., Khan, M.A., Batova, A., Hodam, J.R., Tolleson, W.H. & Pirisi, L. (1994) Retinoic acid suppresses human papillomavirus type 16 (HPV16)-mediated transformation of human keratinocytes and inhibits the expression of HPV16 oncogenes. *Adv. exp. med. Biol.*, **354**, 19–35
- Cress, R.D. & Holly, E.A. (2003) Incidence of anal cancer in California: Increased incidence among men in San Francisco, 1973–1999. *Prev. Med.*, **36**, 555–560

- Cripe, T.P., Haugen, T.H., Turk, J.P., Tabatabai, F., Schmid, P.G., Dürst, M., Gissmann, L., Roman, A. & Turek, L.P. (1987) Transcriptional regulation of the human papillomavirus-16 E6-E7 promoter by a keratinocyte-dependent enhancer, and by viral E2 *trans*-activator and repressor gene products: Implications for cervical carcinogenesis. *EMBO J.*, **6**, 3745–3753
- Cripe, T.P., Alderborn, A., Anderson, R.D., Parkkinen, S., Bergman, P., Haugen, T.H., Pettersson, U. & Turek, L.P. (1990) Transcriptional activation of the human papillomavirus-16 P97 promoter by an 88-nucleotide enhancer containing distinct cell-dependent and AP-1-responsive modules. *New Biologist*, **2**, 450–463
- Critchlow, C.W., Surawicz, C.M., Holmes, K.K., Kuypers, J., Daling, J.R., Hawes, S.E., Goldbaum, G.M., Sayer, J., Hurt, C., Dunphy, C. & Kiviat, N.B. (1995) Prospective study of high grade anal squamous intraepithelial neoplasia in a cohort of homosexual men: Influence of HIV infection, immunosuppression and human papillomavirus infection. *AIDS*, **9**, 1255–1262
- Critchlow, C.W., Hawes, S.E., Kuypers, J.M., Goldbaum, G.M., Holmes, K.K., Surawicz, C.M. & Kiviat, N.B. (1998) Effect of HIV infection on the natural history of anal human papillomavirus infection. *AIDS*, **12**, 1177–1184
- Cromme, F.V., Meijer, C.J.L.M., Snijders, P.J.F., Uyterlinde, A., Kenemans, P., Helmerhorst, T., Stern, P.L., van den Brule, A.J.C. & Walboomers, J.M.M. (1993) Analysis of MHC class I and II expression in relation to presence of HPV genotypes in premalignant and malignant cervical lesions. *Br. J. Cancer*, **67**, 1372–1380
- Cromme, F.V., Airey, J., Heemels, M.-T., Ploegh, H.L., Keating, P.J., Stern, P.L., Meijer, C.J.L.M. & Walboomers, J.M.M. (1994) Loss of transporter protein encoded by the TAP-1 gene is highly correlated with loss of HLA expression in cervical carcinomas. *J. exp. Med.*, **179**, 335–340
- Cronjé, H.S., Parham, G.P., Cooreman, B.F., de Beer, A., Divall, P. & Bam, R.H. (2003) A comparison of four screening methods for cervical neoplasia in a developing country. *Am. J. Obstet. Gynecol.*, **188**, 395–400
- Crook, T., Storey, A., Almond, N., Osborn, K. & Crawford, L. (1988) Human papillomavirus type 16 cooperates with activated *ras* and *fos* oncogenes in the hormone-dependent transformation of primary mouse cells. *Proc. natl Acad. Sci. USA*, **85**, 8820–8824
- Crook, T., Morgenstern, J.P., Crawford, L. & Banks, L. (1989) Continued expression of HPV-16 E7 protein is required for maintenance of the transformed phenotype of cells co-transformed by HPV-16 plus EJ-*ras*. *EMBO J.*, **8**, 513–519
- Crum, C.P., Barber, S., Symbula, M., Snyder, K., Saleh, A.M. & Roche, J.K. (1990) Coexpression of the human papillomavirus type 16 E4 and L1 open reading frames in early cervical neoplasia. *Virology*, **178**, 238–246
- Crum, C.P., Barber, S. & Roche, J.K. (1991) Pathobiology of papillomavirus-related cervical diseases: Prospects for immunodiagnosis. *Clin. Microbiol. Rev.*, **4**, 270–285
- Crusius, K., Auvinen, E. & Alonso, A. (1997) Enhancement of EGF- and PMA-mediated MAP kinase activation in cells expressing the human papillomavirus type 16 E5 protein. *Oncogene*, **15**, 1437–1444
- Crusius, K., Auvinen, E., Steuer, B., Gaissert, H. & Alonso, A. (1998) The human papillomavirus type 16 E5-protein modulates ligand-dependent activation of the EGF receptor family in the human epithelial cell line HaCaT. *Exp. Cell Res.*, **241**, 76–83
- Cubie, H.A., Seagar, A.L., Beattie, G.J., Monaghan, S. & Williams, A.R.W. (2000) A longitudinal study of HPV detection and cervical pathology in HIV infected women. *Sex transm. Infect.*, **76**, 257–261

- Cuesta, K.H., Palazzo, J.P. & Mittal, K.R. (1998) Detection of human papillomavirus in verrucous carcinoma from HIV-seropositive patients. *J. cutan. Pathol.*, **25**, 165–170
- Cullen, A.P., Reid, R., Champion, M. & Lörincz, A.T. (1991) Analysis of the physical state of different human papillomavirus DNAs in intraepithelial and invasive cervical neoplasm. *J. Virol.*, **65**, 606–612
- Culp, T.D. & Christensen, N.D. (2003) Quantitative RT-PCR assay for HPV infection in cultured cells. *J. virol. Meth.*, **111**, 135–144
- Cupp, M.R., Malek, R.S., Goellner, J.R., Espy, M.J. & Smith, T.F. (1996) Detection of human papillomavirus DNA in primary squamous cell carcinoma of the male urethra. *Urology*, **48**, 551–555
- Cuschieri, K.S., Whitley, M.J. & Cubie, H.A. (2004a) Human papillomavirus type specific DNA and RNA persistence — Implications for cervical disease progression and monitoring. *J. med. Virol.*, **73**, 65–70
- Cuschieri, K.S., Cubie, H.A., Whitley, M.W., Seagar, A.L., Arends, M.J., Moore, C., Gilkisson, G. & McGoogan E. (2004b) Multiple high risk HPV infections are common in cervical neoplasia and young women in a cervical screening population. *J. clin. Pathol.*, **57**, 68–72.
- Cuschieri, K.S., Beattie, G., Hassan, S., Robertson, K. & Cubie, H. (2005) Assessment of human papillomavirus mRNA detection over time in cervical specimens collected in liquid based cytology medium. *J. virol. Meth.*, **124**, 211–215
- Cusimano, R., Dardanoni, G., Dardanoni, L., La Rosa, M., Pavone, G., Tumino, R. & Gafa, L. (1989) Risk factors of female cancers in Ragusa population (Sicily) — 1. Endometrium and cervix uteri cancers. *Eur. J. Epidemiol.*, **5**, 363–371
- Cu-Uvin, S., Hogan, J.W., Warren, D., Klein, R.S., Peipert, J., Schuman, P., Holmberg, S., Anderson, J., Schoenbaum, E., Vlahov, D. & Mayer, K.H. for the HIV Epidemiology Research Study Group (1999) Prevalence of lower genital tract infections among human immunodeficiency virus (HIV)-seropositive and high-risk HIV-seronegative women. *Clin. infect. Dis.*, **29**, 1145–1150
- Cuzick, J., Szarewski, A., Terry, G., Ho, L., Hanby, A., Maddox, P., Anderson, M., Kocjan, G., Steele, S.T. & Guillebaud, J. (1995) Human papillomavirus testing in primary cervical screening. *Lancet*, **345**, 1533–1536
- Cuzick, J., Beverley, E., Ho, L., Terry, G., Sapper, H., Mielzynska, I., Lorincz, A., Chan W.-K., Krausz T. & Soutter, P. (1999) HPV testing in primary screening of older women. *Br. J. Cancer*, **81**, 554–558
- Cuzick, J., Terry, G., Ho, L., Monaghan, J., Lopes, A., Clarkson, P. & Duncan, I. (2000) Association between high-risk HPV types, HLA DRB1* and DQB1* alleles and cervical cancer in British women. *Br. J. Cancer*, **82**, 1348–1352
- Cuzick, J., Szarewski, A., Cubie, H., Hulman, G., Kitchener, H., Luesley, D., McGoogan, E., Menon, U., Terry, G., Edwards, R., Brooks, C., Desai, M., Gie, C., Ho, L., Jacobs, I., Pickles, C. & Sasieni, P. (2003) Management of women who test positive for high-risk types of human papillomavirus: The HART study. *Lancet*, **362**, 1871–1876
- Czerwenka, K., Heuss, F., Hosmann, J.W., Manavi, M., Lu, Y., Jelincic, D. & Kubista, E. (1996) Human papilloma virus DNA: A factor in the pathogenesis of mammary Paget's disease? *Breast Cancer Res. Treat.*, **41**, 51–57
- Da, J., Chen, L. & Hu, Y. (1996) Human papillomavirus infection and p53 gene mutation in primary lung cancer. *Chin. J. Oncol.*, **18**, 27–29

- Dahlgren, L., Dahlstrand, H.M., Lindquist, D., Högmo, A., Björnestål, L., Lindholm, J., Lundberg, B., Dalianis, T. & Munck-Wikland, E. (2004) Human papillomavirus is more common in base of tongue than in mobile tongue cancer and is a favorable prognostic factor in base of tongue cancer patients. *Int. J. Cancer*, **112**, 1015–1019
- Dahlstrom, K.R., Adler-Storthz, K., Etzel, C.J., Liu, Z., Dillon, L., El-Naggar, A.K., Spitz, M.R., Schiller, J.T., Wei, Q. & Sturgis, E.M. (2003) Human papillomavirus type 16 infection and squamous cell carcinoma of the head and neck in never-smokers: A matched pair analysis. *Clin. Cancer Res.*, **9**, 2620–2626
- Dai, M., Clifford, G.M., le Calvez, F., Castellsagué, X., Snijders, P.J.F., Pawlita, M., Herrero, R., Hainaut, P. & Franceschi, S. for the IARC Multicenter Oral Cancer Study Group (2004) Human papillomavirus type 16 and *TP53* mutation in oral cancer: Matched analysis of the IARC Multicenter Study. *Cancer Res.*, **64**, 468–471
- Dal Maso, L., Franceschi, S., Polesel, J., Braga, C., Piselli, P., Crocetti, E., Falcini, F., Guzzinati, S., Zanetti, R., Vercelli, M. & Rezza, G. for the Cancer and AIDS Registry Linkage Study (2003) Risk of cancer in persons with AIDS in Italy, 1985–1998. *Br. J. Cancer*, **89**, 94–100
- Dalal, S., Gao, Q., Androphy, E.J. & Band, V. (1996) Mutational analysis of human papillomavirus type 16 E6 demonstrates that p53 degradation is necessary for immortalization of mammary epithelial cells. *J. Virol.*, **70**, 683–688
- Daling, J.R., Madeleine, M.M., McKnight, B., Carter, J.J., Wipf, G.C., Ashley, R., Schwartz, S.M., Beckmann, A.M., Hagensee, M.E., Mandelson, M.T. & Galloway, D.A. (1996) The relationship of human papillomavirus-related cervical tumors to cigarette smoking, oral contraceptive use, and prior herpes simplex virus type 2 infection. *Cancer Epidemiol. Biomarkers Prev.*, **5**, 541–548
- Daling, J.R., Madeleine, M.M., Schwartz, S.M., Shera, K.A., Carter, J.J., McKnight, B., Porter, P.L., Galloway, D.A., McDougall, J.K. & Tamimi, H. (2002) A population-based study of squamous cell vaginal cancer: HPV and cofactors. *Gynecol. Oncol.*, **84**, 263–270
- Daling, J.R., Madeleine, M.M., Johnson, L.G., Schwartz, S.M., Shera, K.A., Wurscher, M.A., Carter, J.J., Porter, P.L., Galloway, D.A. & McDougall, J.K. (2004) Human papillomavirus, smoking, and sexual practices in the etiology of anal cancer. *Cancer*, **101**, 270–280
- Damin, A.P.S., Karam, R., Zettler, C.G., Caleffi, M. & Alexandre, C.O.P. (2004) Evidence for an association of human papillomavirus and breast carcinomas. *Breast Cancer Res. Treat.*, **84**, 131–137
- Danos, O., Georges, E., Orth, G. & Yaniv, M. (1985) Fine structure of the cottontail rabbit papillomavirus mRNAs expressed in the transplantable VX2 carcinoma. *J. Virol.*, **53**, 735–741
- Dargent, D., Martin, X., Sacchetoni, A. & Mathevet, P. (2000) Laparoscopic vaginal radical trachelectomy. A treatment to preserve the fertility of cervical carcinoma patients. *Cancer*, **88**, 1877–1882
- David, M., Sohl, S., Krause, H., Farkic, M. & Neuhaus, R. (1993) Changes in cervix cytology in women with liver transplants treated with immunosuppressive therapy. *Zentralbl. Gynakol.*, **115**, 362–365
- Davidson, E.J., Boswell, C.M., Sehr, P., Pawlita, M., Tomlinson, A.E., McVey, R.J., Dobson, J., Roberts, J.S.C., Hickling, J., Kitchener, H.C. & Stern, P.L. (2003) Immunological and clinical responses in women with vulval intraepithelial neoplasia vaccinated with a vaccinia virus encoding human papillomavirus 16/18 oncoproteins. *Cancer Res.*, **63**, 6032–6041

- Davidson, E.J., Faulkner, R.L., Sehr, P., Pawlita, M., Smyth, L.J.C., Burt, D.J., Tomlinson, A.E., Hickling, J., Kitchener, H.C. & Stern, P.L. (2004) Effect of TA-CIN (HPV 16 L2E6E7) booster immunisation in vulval intraepithelial neoplasia patients previously vaccinated with TA-HPV (vaccinia virus encoding HPV 16/18 E6E7). *Vaccine*, **22**, 2722–2729
- Davies, R., Hicks, R., Crook, T., Morris, J. & Vousden, K. (1993) Human papillomavirus type 16 E7 associates with a histone H1 kinase and with p107 through sequences necessary for transformation. *J. Virol.*, **67**, 2521–2528
- Davis, D.B. & Kingsbury, D.T. (1976) Quantitation of the viral DNA present in cells transformed by UV-irradiated herpes simplex virus. *J. Virol.*, **17**, 788–793
- Davis, G., Wentworth, J. & Richard, J. (2000) Self-administered topical imiquimod treatment of vulvar intraepithelial neoplasia. A report of four cases. *J. reprod. Med.*, **45**, 619–623
- Davison, J.M. & Marty, J.J. (1994) Detecting premalignant cervical lesions. Contribution of screening colposcopy to cytology. *J. reprod. Med.*, **39**, 388–392
- Davy, C.E., Jackson, D.J., Wang, Q., Raj, K., Masterson, P.J., Fenner, N.F., Southern, S., Cuthill, S., Millar, J.B.A. & Doorbar, J. (2002) Identification of a G₂ arrest domain in the E1[^]E4 protein of human papillomavirus type 16. *J. Virol.*, **76**, 9806–9818
- Day, P.M., Roden, R.B.S., Lowy, D.R. & Schiller, J.T. (1998) The papillomavirus minor capsid protein, L2, induces localization of the major capsid protein, L1, and the viral transcription/replication protein, E2, to PML oncogenic domains. *J. Virol.*, **72**, 142–150
- Day, P.M., Lowy, D.R. & Schiller, J.T. (2003) Papillomaviruses infect cells via a clathrin-dependent pathway. *Virology*, **307**, 1–11
- Day, P.M., Baker, C.C., Lowy, D.R. & Schiller, J.T. (2004) Establishment of papillomavirus infection is enhanced by promyelocytic leukemia protein (PML) expression. *Proc. natl. Acad. Sci. USA*, **101**, 14252–14257
- D'Costa, J., Saranath, D., Dedhia, P., Sanghvi, V. & Mehta, A.R. (1998) Detection of HPV-16 genome in human oral cancers and potentially malignant lesions from India. *Oral Oncol.*, **34**, 413–420
- Deacon, J.M., Evans, C.D., Yule, R., Desai, M., Binns, W., Taylor, C. & Peto, J. (2000) Sexual behaviour and smoking as determinants of cervical HPV infection and of CIN3 among those infected: A case-control study nested within the Manchester cohort. *Br. J. Cancer*, **83**, 1565–1572
- Deau, M.-C., Favre, M. & Orth, G. (1991) Genetic heterogeneity among human papillomaviruses (HPV) associated with epidermodysplasia verruciformis: Evidence for multiple allelic forms of HPV 5 and HPV 8 E6 genes. *Virology*, **184**, 492–503
- De Cicco, C., Sideri, M., Bartolomei, M., Grana, C., Cremonesi, M., Fiorenza, M., Maggioni, A., Boccione, L., Mangioni, C., Colombo, N. & Paganelli, G. (2000) Sentinel node biopsy in early vulvar cancer. *Br. J. Cancer*, **82**, 295–299
- De Clercq, E. (2003) Clinical potential of the acyclic nucleoside phosphonates cidofovir, adefovir, and tenofovir in treatment of DNA virus and retrovirus infections. *Clin. Microbiol. Rev.*, **16**, 569–596
- De Gaetani, C., Ferrari, G., Righi, E., Bettelli, S., Migaldi, M., Ferrari, P. & Trentini, G.P. (1999) Detection of human papillomavirus DNA in urinary bladder carcinoma by in situ hybridisation. *J. clin. Pathol.*, **52**, 103–106
- Degenhardt, Y.Y. & Silverstein, S.J. (2001) Gps2, a protein partner for human papillomavirus E6 proteins. *J. Virol.*, **75**, 151–160

- Delius, H., van Ranst, M.A., Jenson, A.B., zur Hausen, H. & Sundberg, J.P. (1994) Canine oral papillomavirus genomic sequence: A unique 1.5-kb intervening sequence between the E2 and L2 open reading frames. *Virology*, **204**, 447–452
- Della Torre, G., Pilotti, S., de Palo, G. & Rilke, F. (1978) Viral particles in cervical condylomatous lesions. *Tumori*, **64**, 549–553
- Delmas, M.-C., Larsen, C., van Benthem, B., Hamers, F.F., Bergeron, C., Poveda, J.-D., Anzén, B., van den Hoek, A., Meier, F., Peña, J.M., Savonius, H., Sperandio, D., Suligoj, B., Vernazza, P., Brunet, J.B. & De Vincenzi, I. for the European Study Group on Natural History of HIV Infection in Women (2000) Cervical squamous intraepithelial lesions in HIV-infected women: Prevalence, incidence and regression. *AIDS*, **14**, 1775–1784
- Del Mistro, A., Braunstein, J.D., Halwer, M. & Koss, L.G. (1987) Identification of human papillomavirus types in male urethral condylomata acuminata by in situ hybridization. *Hum. Pathol.*, **18**, 936–940
- Demers, G.W., Espling, E., Harry, J.B., Etscheid, B.G. & Galloway, D.A. (1996) Abrogation of growth arrest signals by human papillomavirus type 16 E7 is mediated by sequences required for transformation. *J. Virol.*, **70**, 6862–6869
- Deng, S.-J., Pearce, K.H., Dixon, E.P., Hartley, K.A., Stanley, T.B., Lobe, D.C., Garvey, E.P., Kost, T.A., Petty, R.L., Rocque, W.J., Alexander, K.A. & Underwood, M.R. (2004) Identification of peptides that inhibit the DNA binding, *trans*-activator, and DNA replication functions of the human papillomavirus type 11 E2 protein. *J. Virol.*, **78**, 2637–2641
- Denny, L., Kuhn, L., Pollack, A., Wainwright, H. & Wright, T.C., Jr (2000) Evaluation of alternative methods of cervical cancer screening for resource-poor settings. *Cancer*, **89**, 826–833
- Denny, L., Kuhn, L., Pollack, A. & Wright, T.C., Jr (2002) Direct visual inspection for cervical cancer screening. An analysis of factors influencing test performance. *Cancer*, **94**, 1699–1707
- Dersimonian, R. & Laird, N.M. (1986) Meta-analysis in clinical trials. *Controlled Clin. Trials*, **7**, 177–188
- Desaintes, C. & Demeret, C. (1996) Control of papillomavirus DNA replication and transcription. *Semin. Cancer Biol.*, **7**, 339–347
- De Vuyst, H., Steyaert, S., Van Renterghem, L., Claeys, P., Muchiri, L., Sitati, S., Vansteelandt, S., Quint, W., Kleter, B., Van Marck, E. & Temmerman, M. (2003) Distribution of human papillomavirus in a family planning population in Nairobi, Kenya. *Sex. transm. Dis.*, **30**, 137–142
- Dhanwada, K.R., Garrett, L., Smith, P., Thompson, K.D., Doster, A. & Jones, C. (1993) Characterization of human keratinocytes transformed by high risk human papillomavirus types 16 or 18 and herpes simplex virus type 2. *J. gen. Virol.*, **74**, 955–963
- Diaz-Arrastia, C., Arany, I., Robazetti, S.C., Dinh, T.V., Gatalica, Z., Tying, S.K. & Hannigan, E. (2001) Clinical and molecular responses in high-grade intraepithelial neoplasia treated with topical imiquimod 5%. *Clin. Cancer Res.*, **7**, 3031–3033
- Dillner, J. (1990) Mapping of linear epitopes of human papillomavirus type 16: The E1, E2, E4, E5, E6 and E7 open reading frames. *Int. J. Cancer*, **46**, 703–711
- Dillner, J. (1999) The serological response to papillomaviruses. *Semin. Cancer Biol.*, **9**, 423–430
- Dillner, J., Dillner, L., Robb, J., Willems, J., Jones, I., Lancaster, W., Smith, R. & Lerner, R. (1989) A synthetic peptide defines a serologic IgA response to a human papillomavirus-encoded nuclear antigen expressed in virus-carrying cervical neoplasia. *Proc. natl Acad. Sci. USA*, **86**, 3838–3841

- Dillner, L., Heino, P., Moreno-Lopez, J. & Dillner, J. (1991) Antigenic and immunogenic epitopes shared by human papillomavirus type 16 and bovine, canine, and avian papillomaviruses. *J. Virol.*, **65**, 6862–6871
- Dillner, J., Lenner, P., Lehtinen, M., Eklund, C., Heino, P., Wiklund, F., Hallmans, G. & Stendahl, U. (1994) A population-based seroepidemiological study of cervical cancer. *Cancer Res.*, **54**, 134–141
- Dillner, J., Wiklund, F., Lenner, P., Eklund, C., Frederiksson-Shanazarian, V., Schiller, J.T., Hibma, M., Hallmans, G. & Stendahl, U. (1995a) Antibodies against linear and conformational epitopes of human papillomavirus type 16 that independently associate with incident cervical cancer. *Int. J. Cancer*, **60**, 377–382
- Dillner, J., Knekt, P., Schiller, J.T. & Hakulinen, T. (1995b) Prospective seroepidemiological evidence that human papillomavirus type 16 infection is a risk factor for oesophageal squamous cell carcinoma. *Br. med. J.*, **311**, 1346
- Dillner, J., Kallings, I., Brihmer, C., Sikström, B., Koskela, P., Lehtinen, M., Schiller, J.T., Sapp, M. & Mårdh, P.A. (1996) Seropositivities to human papillomavirus types 16, 18, or 33 capsids and to *Chlamydia trachomatis* are markers of sexual behaviour. *J. infect. Dis.*, **173**, 1394–1398
- Dillner, J., Lehtinen, M., Björge, T., Luostarinen, T., Youngman, L., Jellum, E., Koskela, P., Gislefoss, R.E., Hallmans, G., Paavonen, J., Sapp, M., Schiller, J.T., Hakulinen, T., Thoresen, S. & Hakama, M. (1997) Prospective seroepidemiologic study of human papillomavirus infection as a risk factor for invasive cervical cancer. *J. natl Cancer Inst.*, **89**, 1293–1299
- Dillner, J., Knekt, P., Boman, J., Lehtinen, M., Af Geijersstam, V., Sapp, M., Schiller, J., Maatela, J. & Aromaa, A. (1998) Sero-epidemiological association between human-papillomavirus infection and risk of prostate cancer. *Int. J. Cancer*, **75**, 564–567
- Dillner, J., Andersson-Ellström, A., Hagmar, B. & Schiller, J. (1999) High risk genital papillomavirus infections are *not* spread vertically. *Rev. med. Virol.*, **9**, 23–29
- Dillner, J., Arbyn, M. & Dillner, L. (2007) Translational mini-review series on vaccines: Monitoring of human papillomavirus vaccination. *Clin. exp. Immunol.*, **148**, 199–207
- Di Lonardo, A., Venuti, A. & Marcante, M.L. (1992) Human papillomavirus in breast cancer. *Breast Cancer Res. Treat.*, **21**, 95–100
- DiLorenzo, T.P., Tamsen, A., Abramson, A.L. & Steinberg, B.M. (1992) Human papillomavirus type 6a DNA in the lung carcinoma of a patient with recurrent laryngeal papillomatosis is characterized by a partial duplication. *J. gen. Virol.*, **73**, 423–428
- DiMaio, D. & Mattoon, D. (2001) Mechanisms of cell transformation by papillomavirus E5 proteins. *Oncogene*, **20**, 7866–7873
- DiMaio, D., Guralski, D. & Schiller, J.T. (1986) Translation of open reading frame E5 of bovine papillomavirus is required for its transforming activity. *Proc. natl Acad. Sci. USA*, **83**, 1797–1801
- DiPaolo, J.A., Woodworth, C.D., Popescu, N.C., Koval, D.L., Lopez, J.V. & Doniger, J. (1990) HSV-2-induced tumorigenicity in HPV16-immortalized human genital keratinocytes. *Virology*, **177**, 777–779
- DiPaolo, J.A., Woodworth, C.D., Coutlée, F., Zimonic, D.B., Bryant, J. & Kessous, A. (1998) Relationship of stable integration of herpes simplex virus-2 Bg/II N subfragment Xho2 to malignant transformation of human papillomavirus-immortalized cervical keratinocytes. *Int. J. Cancer*, **76**, 865–871

- Doan, T., Chambers, M., Street, M., Fernando, G.J.P., Herd, K., Lambert, P. & Tindle, R. (1998) Mice expressing the E7 oncogene of HPV16 in epithelium show central tolerance, and evidence of peripheral anergising tolerance, to E7-encoded cytotoxic T-lymphocyte epitopes. *Virology*, **244**, 352–364
- Doan, T., Herd, K.A., Lambert, P.F., Fernando, G.J.P., Street, M.D. & Tindle, R.W. (2000) Peripheral tolerance to human papillomavirus E7 oncoprotein occurs by cross-tolerization, is largely Th-2-independent, and is broken by dendritic cell immunization. *Cancer Res.*, **60**, 2810–2815
- Dodd, J.G., Paraskevas, M. & McNicol, P.J. (1993) Detection of human papillomavirus 16 transcription in human prostate tissue. *J. Urol.*, **149**, 400–402
- Dong, S.M., Kim, H.-S., Rha, S.-H. & Sidransky, D. (2001) Promoter hypermethylation of multiple genes in carcinomas of the uterine cervix. *Clin. Cancer Res.*, **7**, 1982–1986
- Doniger, J., Muralidhar, S. & Rosenthal, L.J. (1999). Human cytomegalovirus and human herpesvirus 6 genes that transform and transactivate. *Clin. Microbiol. Rev.*, **12**, 367–382
- Doorbar, J., Ely, S., Sterling, J., McLean, C. & Crawford, L. (1991) Specific interaction between HPV-16 E1-E4 and cytokeratins results in collapse of the epithelial cell intermediate filament network. *Nature*, **352**, 824–827
- Doorbar, J., Foo, C., Coleman, N., Medcalf, L., Hartley, O., Prospero, T., Naphthine, S., Sterling, J., Winter, G. & Griffin, H. (1997) Characterization of events during the late stages of HPV16 infection *in vivo* using high-affinity synthetic Fabs to E4. *Virology*, **238**, 40–52
- van Doorn, L.-J., Quint, W., Kleter, B., Molijn, A., Colau, B., Martin, M.-T., Kravang-In, Torrez-Martinez, N., Peyton, C.L. & Wheeler, C.M. (2002) Genotyping of human papillomavirus in liquid cytology cervical specimens by the PGMY line blot assay and the SPF₁₀ line probe assay. *J. clin. Microbiol.*, **40**, 979–983
- Dorrucchi, M., Suligoi, B., Serraino, D., Tirelli, U. & Rezza, G. for the Italian HIV-Seroconversion Study (2001) Incidence of invasive cervical cancer in a cohort of HIV-seropositive women before and after the introduction of highly active antiretroviral therapy. *J. Acquir. Immune Defic. Syndr.*, **26**, 377–380
- Dostatni, N., Lambert, P.F., Sousa, R., Ham, J., Howley, P.M. & Yaniv, M. (1991) The functional BPV-1 E2 *trans*-activating protein can act as a repressor by preventing formation of the initiation complex. *Genes Dev.*, **5**, 1657–1671
- Downs, A.M.R., Ward, K.A. & Peachey, R.D.G. (1997) Subungual squamous cell carcinoma in Darier's disease. *Clin. exp. Dermatol.*, **22**, 277–279
- Doyle, D.J., Gianoli, G.J., Espinola, T. & Miller, R.H. (1994) Recurrent respiratory papillomatosis: Juvenile versus adult forms. *Laryngoscope*, **104**, 523–527
- Drapkin, A.L., Livingston, E.G., Dodge, R., Coogan, A.C. & Herbert, W.N. (1997) Cervical intraepithelial neoplasia in HIV-infected women in a southeastern US population. *South. med. J.*, **90**, 893–896
- van Driel, W.J., Rensing, M.E., Kenter, G.G., Brandt, R.M.P., Krul, E.J.T., van Rossum, A.B., Schuurin, E., Offringa, R., Bauknecht, T., Tamm-Hermelink, A., van Dam, P.A., Fleuren, G.J., Kast, W.M., Melief, C.J.M. & Trimbos, J.B. (1999) Vaccination with HPV16 peptides of patients with advanced cervical carcinoma: Clinical evaluation of a phase I-II trial. *Eur. J. Cancer*, **35**, 946–952
- Drobacheff, C., Dupont, P., Mouglin, C., Bourezane, Y., Challier, B., Fantoli, M., Bettinger, D. & Laurent, R. (2003) Anal human papillomavirus DNA screening by Hybrid Capture IITM in

- human immunodeficiency virus-positive patients with or without anal intercourse. *Eur. J. Dermatol.*, **13**, 367–371
- Drobni, P., Mistry, N., McMillan, N. & Evander, M. (2003) Carboxy-fluorescein diacetate, succinimidyl ester labeled papillomavirus virus-like particles fluoresce after internalization and interact with heparan sulfate for binding and entry. *Virology*, **310**, 163–172
- Duensing, S. & Münger, K. (2001) Centrosome abnormalities, genomic instability and carcinogenic progression. *Biochim. biophys. Acta*, **1471**, M81–M88
- Duensing, S. & Münger, K. (2002) The human papillomavirus type 16 E6 and E7 oncoproteins independently induce numerical and structural chromosome instability. *Cancer Res.*, **62**, 7075–7082
- Duensing, S. & Münger, K. (2003) Human papillomavirus type 16 E7 oncoprotein can induce abnormal centrosome duplication through a mechanism independent of inactivation of retinoblastoma protein family members. *J. Virol.*, **77**, 12331–12335
- Duensing, S., Lee, L.Y., Duensing, A., Basile, J., Piboonnuyom, S.-O., Gonzalez, S., Crum, C.P. & Münger, K. (2000) The human papillomavirus type 16 E6 and E7 oncoproteins cooperate to induce mitotic defects and genomic instability by uncoupling centrosome duplication from the cell division cycle. *Proc. natl Acad. Sci. USA*, **97**, 10002–10007
- Duensing, S., Duensing, A., Crum, C.P. & Münger, K. (2001a) Human papillomavirus type 16 E7 oncoprotein-induced abnormal centrosome synthesis is an early event in the evolving malignant phenotype. *Cancer Res.*, **61**, 2356–2360
- Duensing, S., Duensing, A., Flores, E.R., Do, A., Lambert, P.F. & Münger, K. (2001b) Centrosome abnormalities and genomic instability by episomal expression of human papillomavirus type 16 in raft cultures of human keratinocytes. *J. Virol.*, **75**, 7712–7716
- Duerr, A., Kieke, B., Warren, D., Shah, K., Burk, R., Peipert, J.F., Schuman, P. & Klein, R.S. for the Human Immunodeficiency Virus Epidemiology Research (HER) Study (2001) Human papillomavirus-associated cervical cytologic abnormalities among women with or at risk of infection with human immunodeficiency virus. *Am. J. Obstet. Gynecol.*, **184**, 584–590
- Duff, R. (1975) Quantitative transformation of Swiss/3T3 cells by UV-irradiated herpes simplex virus type 2. In: de-Thé, G., Epstein, M.A. & zur Hausen, H., eds, *Oncogenesis and Herpesviruses II* (IARC Scientific Publications No. 11), Lyon, pp. 421–427
- Duff, R. & Rapp, F. (1971a) Oncogenic transformation of hamster cells after exposure to herpes simplex virus type 2. *Nat. new Biol.*, **233**, 48–50
- Duff, R. & Rapp, F. (1971b) Properties of hamster embryo fibroblasts transformed in vitro after exposure to ultraviolet-irradiated herpes simplex virus type 2. *J. Virol.*, **8**, 469–477
- Duff, R. & Rapp, F. (1973) Oncogenic transformation of hamster embryo cells after exposure to inactivated herpes simplex virus type 1. *J. Virol.*, **12**, 209–217
- Duggan-Keen, M.F., Keating, P.J., Stevens, F.R.A., Sinnott, P., Snijders, P.J.F., Walboomers, J.M.M., Davidson, S., Hunter, R.D., Dyer, P.A. & Stern, P.L. (1996) Immunogenetic factors in HPV-associated cervical cancer: influence on disease progression. *K. Immunogen.*, **23**, 275–284
- van Duin, M., Snijders, P.J.F., Schrijnemakers, H.F.J., Voorhorst, F.J., Rozendaal, L., Nobbenhuis, M.A.E., van den Brule, A.J.C., Verheijen, R.H.M., Helmerhorst, T.J. & Meijer, C.J.L.M. (2002) Human papillomavirus 16 load in normal and abnormal cervical scrapes: An indicator of CIN II/III and viral clearance. *Int. J. Cancer*, **98**, 590–595

- Dunn, L.A., Evander, M., Tindle, R.W., Bulloch, A.L., de Kluyver, R.L., Fernando, G.J.P., Lambert, P.F. & Frazer, I.H. (1997) Presentation of the HPV16E7 protein by skin grafts is insufficient to allow graft rejection in an E7-primed animal. *Virology*, **235**, 94–103
- Durante, A.J., Williams, A.B., Da Costa, M., Darragh, T.M., Khoshnood, K. & Palefsky, J.M. (2003) Incidence of anal cytological abnormalities in a cohort of human immunodeficiency virus-infected women. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 638–642
- Dürst, M., Kleinheinz, A., Hotz, M. & Gissmann, L. (1985) The physical state of human papillomavirus type 16 DNA in benign and malignant genital tumours. *J. gen. Virol.*, **66**, 1515–1522
- Dürst, M., Dzarlieva-Petrusevska, R.T., Boukamp, P., Fusenig, N.E., & Gissmann, L. (1987a) Molecular and cytogenetic analysis of immortalized human primary keratinocytes obtained after transfection with human papillomavirus type 16 DNA. *Oncogene*, **1**, 251–256
- Dürst, M., Croce, C.M., Gissmann, L., Schwarz, E. & Huebner, K. (1987b) Papillomavirus sequences integrate near cellular oncogenes in some cervical carcinomas. *Proc. natl Acad. Sci. USA*, **84**, 1070–1074
- Dürst, M., Seagon, S., Wanschura, S., zur Hausen, H. & Bullerdiek, J. (1995) Malignant progression of an HPV 16-immortalized human keratinocyte cell line (HPK IA) in vitro. *Cancer Genet. Cytogenet.*, **85**, 105–112
- Dyall-Smith, D., Trowell, H., Mark, A. & Dyall-Smith, M. (1991) Cutaneous squamous cell carcinomas and papillomaviruses in renal transplant recipients: A clinical and molecular biological study. *J. dermatol. Sci.*, **2**, 139–146
- Dybikowska, A., Licznarski, P. & Podhajska, A. (2002) HPV detection in cervical cancer patients in northern Poland. *Oncol. Rep.*, **9**, 871–874
- Dyson, N., Howley, P.M., Münger, K. & Harlow, E. (1989) The human papilloma virus-16 E7 oncoprotein is able to bind to the retinoblastoma gene product. *Science*, **243**, 934–937
- Dyson, N., Guida, P., Münger, K. & Harlow, E. (1992) Homologous sequences in adenovirus E1A and human papillomavirus E7 proteins mediate interaction with the same set of cellular proteins. *J. Virol.*, **66**, 6893–6902
- Dyson, N., Dembski, M., Fattaey, A., Ngwu, C., Ewen, M. & Helin, K. (1993) Analysis of p107-associated proteins: p107 Associates with a form of E2F that differs from pRB-associated E2F-1. *J. Virol.*, **67**, 7641–7647
- Eckert, R.L., Agarwal, C., Hembree, J.R., Choo, C.K., Sizemore, N., Andreatta-van Leyen, S., & Rorke, E.A. (1995) Human cervical cancer. Retinoids, interferon and human papillomavirus. *Adv. exp. med. Biol.*, **375**, 31–44
- Eckert, L.O., Watts, D.H., Koutsky, L.A., Hawes, S.E., Stevens, C.E., Kuypers, J. & Kiviat, N.B. (1999) A matched prospective study of human immunodeficiency virus serostatus, human papillomavirus DNA, and cervical lesions detected by cytology and colposcopy. *Infect. Dis. Obstet. Gynecol.*, **7**, 158–164
- Edwards, S. & Carne, C. (1998) Oral sex and the transmission of viral STIs. *Sex. transm. Infect.*, **74**, 6–10
- Edwards, A., Atma-Ram, A. & Thin, R.N. (1988) Podophyllotoxin 0.5% v. podophyllin 20% to treat penile warts. *Genitourin. Med.*, **64**, 263–265
- Edwards, L., Ferenczy, A., Eron, L., Baker, D., Owens, M.L., Fox, T.L., Hougham, A.J., Schmitt, K.A. & the HPV Study Group (1998) Self-administered topical 5% imiquimod cream for external anogenital warts. *Arch. Dermatol.*, **134**, 25–30

- Effert, P.J., Frye, R.A., Neubauer, A., Liu, E.T. & Walther, P.J. (1992) Human papillomavirus types 16 and 18 are not involved in human prostate carcinogenesis: Analysis of archival human prostate cancer specimens by differential polymerase chain reaction. *J. Urol.*, **147**, 192–196
- Egawa, K., Inaba, Y., Yoshimura, K. & Ono, T. (1993a) Varied clinical morphology of HPV-1-induced warts, depending on anatomical factors. *Br. J. Dermatol.*, **128**, 271–276
- Egawa, K., Shibasaki, Y. & de Villiers, E.-M. (1993b) Double infection with human papillomavirus 1 and human papillomavirus 63 in single cells of a lesion displaying only an human papillomavirus 63-induced cytopathogenic effect. *Lab. Invest.*, **69**, 583–588
- Egawa, K., Honda, Y., Inaba, Y., Kojo, Y., Ono, T. & de Villiers, E.-M. (1994) Multiple plantar epidermoid cysts harboring carcinoembryonic antigen and human papillomavirus DNA sequences. *J. Am. Acad. Dermatol.*, **40**, 494–496
- Egberink, H.F., Berrocal, A., Bax, H.A.D., van den Ingh, T.S.G.A.M., Walter, J.H. & Horzinek, M.C. (1992) Papillomavirus associated skin lesions in a cat seropositive for feline immunodeficiency virus. *Vet. Microbiol.*, **31**, 117–125
- Eichten, A., Westfall, M., Pietenpol, J.A. & Münger, K. (2002) Stabilization and functional impairment of the tumor suppressor p53 by the human papillomavirus type 16 E7 oncoprotein. *Virology*, **295**, 74–85
- Eike, A., Buchwald, C., Rolighed, J. & Lindeberg, H. (1995) Human papillomavirus (HPV) is rarely present in normal oral and nasal mucosa. *Clin. Otolaryngol.*, **20**, 171–173
- Eisemann, C., Fisher, S.G., Gross, G., Müller, M. & Gissmann, L. (1996) Antibodies to human papillomavirus type 11 virus-like particles in sera of patients with genital warts and in control groups. *J. gen. Virol.*, **77**, 1799–1803
- Elbel, M., Carl, S., Spaderna, S. & Iftner, T. (1997) A comparative analysis of the interactions of the E6 proteins from cutaneous and genital papillomaviruses with p53 and E6AP in correlation to their transforming potential. *Virology*, **239**, 132–149
- Elgui de Oliveira, D., Furtado Monteiro, T.A., Alencar de Melo, W., Amaral Reboucas Moreira, M., Alvarenga, M. & Bacchi, C.E. (1999) Lack of Epstein-Barr virus infection in cervical carcinomas. *Arch. Pathol. Lab. Med.*, **123**, 1098–1100
- ELhamidi, A., Hamoudi, R.A., Kocjan, G. & Du, M.-Q. (2004) Cervical intraepithelial neoplasia: Prognosis by combined LOH analysis of multiple loci. *Gynecol. Oncol.*, **94**, 671–679
- Eliezri, Y.D., Silverstein, S.J. & Nuovo, G.J. (1990) Occurrence of human papillomavirus type 16 DNA in cutaneous squamous and basal cell neoplasms. *J. Am. Acad. Dermatol.*, **23**, 836–842
- Ellerbrock, T.V., Chiasson, M.A., Bush, T.J., Sun, X.-W., Sawo, D., Brudney, K. & Wright, T.C., Jr (2000) Incidence of cervical squamous intraepithelial lesions in HIV-infected women. *J. Am. med. Assoc.*, **283**, 1031–1037
- Elson, D.A., Riley, R.R., Lacey, A., Thordarson, G., Talamantes, F.J. & Arbeit, J.M. (2000) Sensitivity of the cervical transformation zone to estrogen-induced squamous carcinogenesis. *Cancer Res.*, **60**, 1267–1275
- El-Tonsy, M.H., Anbar, T.E.-D., El-Domyati, M. & Barakat, M. (1999) Density of viral particles in pre and post Nd:YAG laser hyperthermia therapy and cryotherapy in plantar warts. *Int. J. Dermatol.*, **38**, 393–398
- Eng, H.-L., Lin, T.-M., Chen, S.-Y., Wu, S.-M. & Chen, W.-J. (2002) Failure to detect human papillomavirus DNA in malignant epithelial neoplasms of conjunctiva by polymerase chain reaction. *Am. J. clin. Pathol.*, **117**, 429–436

- Engelberg, R., Carrell, D., Krantz, E., Corey, L. & Wald, A. (2003) Natural history of genital herpes simplex virus type 1 infection. *Sex. transm. Dis.*, **30**, 174–177
- Enzenauer, C., Mengus, G., Lavigne, A.-C., Davidson, I., Pfister, H. & May, M. (1998) Interaction of human papillomavirus 8 regulatory proteins E2, E6 and E7 with components of the TFIID complex. *Intervirology*, **41**, 80–90
- Epinat, J.-C. & Gilmore, T.D. (1999) Diverse agents act at multiple levels to inhibit the Rel/NF- κ B signal transduction pathway. *Oncogene*, **18**, 6896–6909
- Euvrard, S., Chardonnet, Y., Dureau, G., Hermier, C. & Thivolet, J. (1991) Human papillomavirus type 1-associated squamous cell carcinoma in a heart transplant recipient. *Arch. Dermatol.*, **127**, 559–564
- Euvrard, S., Chardonnet, Y., Pouteil-Noble, C., Kanitakis, J., Chignol, M.C., Thivolet, J. & Touraine, J.L. (1993) Association of skin malignancies with various and multiple carcinogenic and non-carcinogenic human papillomaviruses in renal transplant recipients. *Cancer*, **72**, 2198–2206
- Evander, M., Frazer, I.H., Payne, E., Qi, Y.M., Hengst, K. & McMillan, N.A.J. (1997) Identification of the α_6 integrin as a candidate receptor for papillomaviruses. *J. Virol.*, **71**, 2449–2456
- Evans, E.M.-L., Man, S., Evans, A.S. & Borysiewicz, L.K. (1997) Infiltration of cervical cancer tissue with human papillomavirus-specific cytotoxic T-lymphocytes. *Cancer Res.*, **57**, 2943–2950
- Everett, R.D., Earnshaw, W.C., Pluta, A.F., Sternsdorf, T., Ainsztein, A.M., Carmena, M., Ruchaud, S., Hsu, W.-L. & Orr, A. (1999) A dynamic connection between centromeres and ND10 proteins. *J. Cell Sci.*, **112**, 3443–3454
- Eversole, L.R., Laipis, P.J. & Green, T.L. (1987a) Human papillomavirus type 2 DNA in oral and labial verruca vulgaris. *J. cutan. Pathol.*, **14**, 319–325
- Eversole, L.R., Laipis, P.J., Merrell, P. & Choi, E. (1987b) Demonstration of human papillomavirus DNA in oral condyloma acuminatum. *J. oral Pathol.*, **16**, 266–272
- Faccini, A.M., Cairney, M., Ashrafi, G.H., Finbow, M.E., Campo, M.S. & Pitts, J.D. (1996) The bovine papillomavirus type 4 E8 protein binds to ductin and causes loss of gap junctional intercellular communication in primary fibroblasts. *J. Virol.*, **70**, 9041–9045
- Fairley, C.K., Chen, S., Tabrizi, S.N., McNeil, J., Becker, G., Walker, R., Atkins, R.C., Thomson, N., Allan, P., Woodburn, C. & Garland, S.M. (1994a) Prevalence of HPV DNA in cervical specimens in women with renal transplants: A comparison with dialysis-dependent patients and patients with renal impairment. *Nephrol. Dial. Transplant.*, **9**, 416–420
- Fairley, C.K., Sheil, A.G.R., McNeil, J.-J., Ugoni, A.M., Disney, A.P.S., Giles, G.G. & Amiss, N. (1994b) The risk of ano-genital malignancies in dialysis and transplant patients. *Clin. Nephrol.*, **41**, 101–105
- Fairley, C.K., Tabrizi, S.N., Chen, S., Baghurst, P., Young, H., Quinn, M., Medley, G., McNeil, J.J. & Garland, S.M. (1996) A randomized clinical trial of beta carotene vs placebo for the treatment of cervical HPV infection. *Int. J. Gynecol. Cancer*, **6**, 225–230
- Fan, T., Lu, H., Hu, H., Shi, L., McClarty, G.A., Nance, D.M., Greenberg, A.H. & Zhong, G. (1998) Inhibition of apoptosis in chlamydia-infected cells: Blockade of mitochondrial cytochrome c release and caspase activation. *J. exp. Med.*, **187**, 487–496
- Fang, L., Ward, M.G., Welsh, P.A., Budgeon, L.R., Neely, E.B. & Howett, M.K. (2003) Suppression of human papillomavirus gene expression in vitro and in vivo by herpes simplex virus type 2 infection. *Virology*, **314**, 147–160

- Farin, F.M., Bigler, L.G., Oda, D., McDougall, J.K. & Omiecinski, C.J. (1995) Expression of cytochrome P450 and microsomal epoxide hydrolase in cervical and oral epithelial cells immortalized by human papillomavirus type 16 E6/E7 genes. *Carcinogenesis*, **16**, 1391–1401
- Farr, A., Wang, H., Kashe, M.S. & Roman, A. (1991) Relative enhancer activity and transforming potential of authentic human papillomavirus type 6 genomes from benign and malignant lesions. *J. gen. Virol.*, **72**, 519–526
- Favre, M., Obalek, S., Jablonska, S. & Orth, G. (1989) Human papillomavirus type 49, a type isolated from flat warts of renal transplant patients. *J. Virol.*, **63**, 4909
- Favre, M., Orth, G., Majewski, S., Baloul, S., Pura, A., & Jablonska, S. (1998a) Psoriasis: A possible reservoir for human papillomavirus type 5, the virus associated with skin carcinomas of epidermodysplasia verruciformis. *J. invest. Dermatol.*, **110**, 311–317
- Favre, M., Majewski, S., De Jesus, N., Malejczyk, M., Orth, G. & Jablonska, S. (1998b) A possible vertical transmission of human papillomavirus genotypes associated with epidermodysplasia verruciformis. *J. invest. Dermatol.*, **111**, 333–336
- Favre, M., Majewski, S., Noszczyk, B., Maienfisch, F., Pura, A., Orth, G. & Jablonska, S. (2000) Antibodies to human papillomavirus type 5 are generated in epidermal repair processes. *J. invest. Dermatol.*, **114**, 403–407
- Fehrmann, F. & Laimins, L.A. (2003) Human papillomaviruses: Targeting differentiating epithelial cells for malignant transformation. *Oncogene*, **22**, 5201–5207
- Fehrmann, F., Klumpp, D.J. & Laimins, L.A. (2003) Human papillomavirus type 31 E5 protein supports cell cycle progression and activates late viral functions upon epithelial differentiation. *J. Virol.*, **77**, 2819–2831
- Feltkamp, M.C., Smits, H.L., Vierboom, M.P.M., Minnaar, R.P., de Jongh, B.M., Drijfhout, J.W., ter Schegget, J., Melief, C.J.M. & Kast, W.M. (1993) Vaccination with cytotoxic T lymphocyte epitope-containing peptide protects against a tumor induced by human papillomavirus type 16-transformed cells. *Eur. J. Immunol.*, **23**, 2242–2249
- Feltkamp, M.C.W., Broer, R., di Summa, F.M., Struijk, L., van der Meijden, E., Verlaan, B.P.J., Westendorp, R.G.J., ter Schegget, J., Spaan, W.J.M. & Bouwes Bavinck, J.N. (2003) Seroreactivity to epidermodysplasia verruciformis-related human papillomavirus types is associated with nonmelanoma skin cancer. *Cancer Res.*, **63**, 2695–2700
- Ferber, M.J., Thorland, E.C., Brink, A.A.T.P., Rapp, A.K., Phillips, L.A., McGovern, R., Gostout, B.S., Cheung, T.H., Chung, T.K.H., Fu, W.Y. & Smith, D.I. (2003a) Preferential integration of human papillomavirus type 18 near the *c-myc* locus in cervical carcinoma. *Oncogene*, **22**, 7233–7242
- Ferber, M.J., Montoya, D.P., Yu, C., Aderca, I., McGee, A., Thorland, E.C., Nagomey, D.M., Gostout, B.S., Burgart, L.J., Boix, L., Bruix, J., McMahon, B.J., Cheung, T.H., Chung, T.K.H., Wong, Y.F., Smith, D.I. & Roberts, L.R. (2003b) Integrations of the hepatitis B virus (HBV) and human papillomavirus (HPV) into the human telomerase reverse transcriptase (hTERT) gene in liver and cervical cancers. *Oncogene*, **22**, 3813–3820
- Ferenczy, A. (1991) Laser treatment of genital human papillomavirus infections in the male patient. *Obstet. Gynecol. Clin. North Am.*, **18**, 525–535
- Ferenczy, A., Bergeron, C. & Richart, R.M. (1990) Carbon dioxide laser energy disperses human papillomavirus deoxyribonucleic acid onto treatment fields. *Am. J. Obstet. Gynecol.*, **163**, 1271–1274

- Ferrara, A., Nonn, M., Sehr, P., Schreckenberger, C., Pawlita, M., Dürst, M., Schneider, A. & Kaufmann, A.M. (2003) Dendritic cell-based tumor vaccine for cervical cancer II: Results of a clinical pilot study in 15 individual patients. *J. Cancer Res. Clin. Oncol.*, **129**, 521–530
- Ferreccio, C., Bratti, M.C., Sherman, M.E., Herrero, R., Wacholder, S., Hildesheim, A., Burk, R.D., Hutchinson, M., Alfaro, M., Greenberg, M.D., Morales, J., Rodriguez, A.C., Schussler, J., Eklund, C., Marshall, G. & Schiffman, M. (2003) A comparison of single and combined visual, cytologic, and virologic tests as screening strategies in a region at high risk of cervical cancer. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 815–823
- Ferreccio, C., Prado, R.B., Luzoro, A.V., Ampuero, S.L., Snijders, P.J.F., Meijer, C.J.L.M., Vaccarella, S.V., Jara, A.T., Puschel, K.I., Robles, S.C., Herrero, R., Franceschi, S.F. & Ojeda, J.M. (2004) Population-based prevalence and age distribution of human papillomavirus among women in Santiago, Chile. *Cancer Epidemiol. Biomarkers Prev.*, **13**, 2271–2276
- Ferrera, A., Baay, M.F.D., Herbrink, P., Figueroa, M., Velema, J.P. & Melchers, W.J.J. (1997a) A sero-epidemiological study of the relationship between sexually transmitted agents and cervical cancer in Honduras. *Int. J. Cancer*, **73**, 781–785
- Ferrera, A., Melchers, W.J.G., Velema, J.P. & Figueroa, M. (1997b) Association of infections with human immunodeficiency virus and human papillomavirus in Honduras. *Am. J. trop. Med. Hyg.*, **57**, 138–141
- Ferrera, A., Velema, J.P., Figueroa, M., Bulnes, R., Toro, L.A., Claros, J.M., De Barahona, O. & Melchers, W.J.G. (1999) Human papillomavirus infection, cervical dysplasia and invasive cervical cancer in Honduras: A case-control study. *Int. J. Cancer*, **82**, 799–803
- Ferreux, E., Lont, A.P., Horenblas, S., Gallee, M.P.W., Raaphorst, F.M., von Knebel Doeberitz, M., Meijer, C.J.L.M. & Snijders, P.J.F. (2003) Evidence for at least three alternative mechanisms targeting the p16^{INK4A}/cyclin D/Rb pathway in penile carcinoma, one of which is mediated by high-risk human papillomavirus. *J. Pathol.*, **201**, 109–118
- Ferson, M., Edwards, A., Lind, A., Milton, G.W. & Hersey, P. (1979) Low natural killer-cell activity and immunoglobulin levels associated with smoking in human subjects. *Int. J. Cancer*, **23**, 603–609
- Fettig, A., Pogrel, M.A., Silverman, S., Jr, Bramanti, T.E., Da Costa, M. & Regezi, J.A. (2000) Proliferative verrucous leukoplakia of the gingiva. *Oral Surg. oral Med. oral Pathol. oral Radiol. Endod.*, **90**, 723–730
- Fiedler, M., Müller-Holzner, E., Viertler, H.-P., Widschwendter, A., Laich, A., Pfister, G., Spoden, G.A., Jansen-Durr, P. & Zwerschke, W. (2004) High level HPV-16 E7 oncoprotein expression correlates with reduced pRb-levels in cervical biopsies. *FASEB J.*, **18**, 1120–1122
- Finan, R.R., Tamim, H. & Almawi, W.Y. (2002) Identification of *Chlamydia trachomatis* DNA in human papillomavirus (HPV) positive women with normal and abnormal cytology. *Arch. Gynecol. Obstet.*, **266**, 168–171
- Fine, B.A., Piver, M.S., McAuley, M. & Driscoll, D. (1996) The curative potential of radiation therapy in the treatment of primary vaginal carcinoma. *Am. J. clin. Oncol.*, **19**, 39–44
- Fioriti, D., Pietropaolo, V., Dal Forno, S., Laurenti, C., Chiarini, F. & Degener, A.M. (2003) Urothelial bladder carcinoma and viral infections: Different association with human polyomaviruses and papillomaviruses. *Int. J. Immunopathol. Pharmacol.*, **16**, 283–288
- Firzlaff, J.M., Kiviati, N.B., Beckmann, A.M., Jenison, S.A. & Galloway, D.A. (1988) Detection of human papillomavirus capsid antigens in various squamous epithelial lesions using antibodies directed against the L1 and L2 open reading frames. *Virology*, **164**, 467–477

- Fisher, S.G., Benitez-Bribiesca, L., Nindl, I., Stockfleth, E., Muller, M., Wolf, H., Perez-Garcia, F., Guzman-Gaona, J., Gutierrez-Delgado, F., Irvin, W. & Gissmann, L. (1996) The association of human papillomavirus type 16 E6 and E7 antibodies with stage of cervical cancer. *Gynecol. Oncol.*, **61**, 73–78
- Flaitz, C.M. & Hicks, M.J. (1998) Molecular piracy: The viral link to carcinogenesis. *Oral Oncol.*, **34**, 448–453
- Flieder, D.B., Koss, M.N., Nicholson, A., Sesterhenn, I.A., Petras, R.E. & Travis, W.D. (1998) Solitary pulmonary papillomas in adults: A clinicopathologic and in situ hybridization study of 14 cases combined with 27 cases in the literature. *Am. J. surg. Pathol.*, **22**, 1328–1342
- Flores, E.R. & Lambert, P.F. (1997) Evidence for a switch in the mode of human papillomavirus type 16 DNA replication during the viral life cycle. *J. Virol.*, **71**, 7167–7179
- Flores, E.R., Allen-Hoffmann, B.L., Lee, D., Sattler, C.A. & Lambert, P.F. (1999) Establishment of the human papillomavirus type 16 (HPV-16) life cycle in an immortalized human foreskin keratinocyte cell line. *Virology*, **262**, 344–354
- Flores, E.R., Allen-Hoffmann, B.L., Lee, D. & Lambert, P.F. (2000) The human papillomavirus type 16 E7 oncogene is required for the productive stage of the viral life cycle. *J. Virol.*, **74**, 6622–6631
- Florin, L., Schäfer, F., Sotlar, K., Streeck, R.E. & Sapp, M. (2002a) Reorganization of nuclear domain 10 induced by papillomavirus capsid protein L2. *Virology*, **295**, 97–107
- Florin, L., Sapp, C., Streeck, R.E. & Sapp, M. (2002b) Assembly and translocation of papillomavirus capsid proteins. *J. Virol.*, **76**, 10009–10014
- Follen, M., Atkinson, E.N., Schottenfeld, D., Maplica, A., West, L., Lippman, S., Zou, C., Hittelman, W.N., Lotan, R. & Hong, W.K. (2001) A randomized clinical trial of 4-hydroxyphenylretinamide for high-grade squamous intraepithelial lesions of the cervix. *Clin. Cancer Res.*, **7**, 3356–3365
- Ford, J.N., Jennings, P.A., Spradbrow, P.B. & Francis, J. (1982) Evidence for papillomaviruses in ocular lesions in cattle. *Res. vet. Sci.*, **32**, 257–259
- Ford, K., Reed, B.D., Wirawan, D.N., Muliawan, P., Sutarga, M. & Gregoire, L. (2003) The Bali STD/AIDS study: Human papillomavirus infection among female sex workers. *Int. J. STD AIDS*, **14**, 681–687
- Forslund, O., Antonsson, A., Nordin, P., Stenquist, B. & Hansson, B.G. (1999) A broad range of human papillomavirus types detected with a general PCR method suitable for analysis of cutaneous tumours and normal skin. *J. gen. Virol.*, **80**, 2437–2443
- Forslund, O., Nordin, P. & Hansson, B.G. (2000) Mucosal human papillomavirus types in squamous cell carcinomas of the uterine cervix and subsequently on fingers. *Br. J. Dermatol.*, **142**, 1148–1153
- Forslund, O., Antonsson, A., Edlund, K., van den Brule, A.J.C., Hansson, B.-G., Meijer, C.J.L.M., Ryd, W., Rylander, E., Strand, A., Wadell, G., Dillner, J. & Johansson, B. (2002) Population-based type-specific prevalence of high-risk human papillomavirus infection in middle-aged Swedish women. *J. med. Virol.*, **66**, 535–541
- Forslund, O., DeAngelis, P.M., Beigi, M., Schjølberg, A.R. & Clausen, O.P.F. (2003a) Identification of human papillomavirus in keratoacanthomas. *J. cutan. Pathol.*, **30**, 423–429
- Forslund, O., Antonsson, A., Higgins, G., Ly, H., Delius, H., Hunziker, A. & de Villiers, E.M. (2003b) Nucleotide sequence and phylogenetic classification of candidate human papilloma virus type 92. *Virology*, **312**, 255–260

- Forslund, O., Ly, H., Reid, C. & Higgins, G. (2003c) A broad spectrum of human papillomavirus types is present in the skin of Australian patients with non-melanoma skin cancers and solar keratosis. *Br. J. Dermatol.*, **149**, 64–73
- Forslund, O., Lindelöf, B., Hradil, E., Nordin, P., Stenquist, B., Kirnbauer, R., Slupetzky, K. & Dillner, J. (2004) High prevalence of cutaneous human papillomavirus DNA on the top of skin tumors but not in 'stripped' biopsies from the same tumors. *J. invest. Dermatol.*, **123**, 388–394
- Fouret, P., Martin, F., Flahault, A. & Lacau Saint-Guilly, J. (1995) Human papillomavirus infection in the malignant and premalignant head and neck epithelium. *Diagn. mol. Pathol.*, **4**, 122–127
- Fox, P.A. & Tung, M.-Y. (2005) Human papillomavirus. Burden of illness and treatment cost considerations. *Am. J. clin. Dermatol.*, **6**, 365–381
- Franceschi, S. & Clifford, G.M. (2005) Re.: A study of the impact of adding HPV types to cervical cancer screening and triage tests. *J. natl Cancer Inst.*, **97**, 938–939
- Franceschi, S., Muñoz, N., Bosch, X.F., Snijders, P.J.F. & Walboomers, J.M.M. (1996) Human papillomavirus and cancers of the upper aerodigestive tract: A review of epidemiological and experimental evidence. *Cancer Epidemiol. Biomarkers Prev.*, **5**, 567–575
- Franceschi, S., Castellsagué, X., Dal Maso, L., Smith, J.S., Plummer, M., Ngelangel, C., Chichareon, S., Eluf-Neto, J., Shah, K.V., Snijders, P.J.F., Meijer, C.J.L.M., Bosch, F.X. & Muñoz, N. (2002) Prevalence and determinants of human papillomavirus genital infection in men. *Br. J. Cancer*, **86**, 705–711
- Franceschi, S., Rajkumar, T., Vaccarella, S., Gajalakshmi, V., Sharmila, A., Snijders, P.J.F., Muñoz, N., Meijer, C.J.L.M. & Herrero, R. (2003) Human papillomavirus and risk factors for cervical cancer in Chennai, India: A case-control study. *Int. J. Cancer*, **107**, 127–133
- Franceschi, S., Rajkumar, R., Snijders, P.J.F., Arslan, A., Mahé, C., Plummer, M., Sankaranarayanan, R., Cherian, J., Meijer, C.J.L.M. & Weiderpass, E. (2005) Papillomavirus infection in rural women in southern India. *Br. J. Cancer*, **92**, 601–606
- Francis, D.A., Schmid, S.I. & Howley, P.M. (2000) Repression of the integrated papillomavirus E6/E7 promoter is required for growth suppression of cervical cancer cells. *J. Virol.*, **74**, 2679–2686
- Franco, E.L. (1991) The sexually transmitted disease model for cervical cancer: Incoherent epidemiologic findings and the role of misclassification of human papillomavirus infection. *Epidemiology*, **2**, 98–106
- Franco, E.L. (1992) Measurement errors in epidemiological studies of human papillomavirus and cervical cancer. In: Muñoz, N., Bosch, F.X., Shah, K.V. & Meheus, A., eds, *The Epidemiology of Cervical Cancer and Human Papillomavirus* (IARC Scientific Publications No. 119), Lyon, pp. 181–197
- Franco, E.L., Villa, L.L., Rahal, P. & Ruiz, A. (1994) Molecular variant analysis as an epidemiological tool to study persistence of cervical human papillomavirus infection. *J. natl Cancer Inst.*, **86**, 1558–1559
- Franco, E.L., Villa, L.L., Ruiz, A. & Costa, M.C. (1995) Transmission of cervical human papillomavirus infection by sexual activity: Differences between low and high oncogenic risk types. *J. infect Dis.*, **172**, 756–763
- Franco, E.L., Villa, L.L., Sobrinho, J.P., Prado, J.M., Rousseau, M.-C., Désy, M. & Rohan, T.E. (1999) Epidemiology of acquisition and clearance of cervical human papillomavirus infection in women from a high-risk area for cervical cancer. *J. infect. Dis.*, **180**, 1415–1423

- Frankel, R.E., Selwyn, P.A., Mezger, J. & Andrews, S. (1997) High prevalence of gynecologic disease among hospitalized women with human immunodeficiency virus infection. *Clin. infect. Dis.*, **25**, 706–712
- Frattini, M.G. & Laimins, L.A. (1994) Binding of the human papillomavirus E1 origin-recognition protein is regulated through complex formation with the E2 enhancer-binding protein. *Proc. natl Acad. Sci. USA*, **91**, 12398–12402
- Frattini, M.G., Lim, H.B. & Laimins, L.A. (1996) *In vitro* synthesis of oncogenic human papillomaviruses requires episomal genomes for differentiation-dependent late expression. *Proc. natl Acad. Sci. USA*, **93**, 3062–3067
- Frazer, I.H., Leippe, D.M., Dunn, L.A., Liem, A., Tindle, R.W., Fernando, G.J.P., Phelps, W.C. & Lambert, P.F. (1995) Immunological responses in human papillomavirus 16 E6/E7-transgenic mice to E7 protein correlate with the presence of skin disease. *Cancer Res.*, **55**, 2635–2639
- Frazer, I.H., Fernando, G.J.P., Fowler, N., Leggatt, G.R., Lambert, P.F., Liem, A., Malcolm, K. & Tindle, R.W. (1998) Split tolerance to a viral antigen expressed in thymic epithelium and keratinocytes. *Eur. J. Immunol.*, **28**, 2791–2800
- Frazer, I.H., De Kluiver, R., Leggatt, G.R., Guo, H.Y., Dunn, L., White, O., Harris, C., Liem, A. & Lambert, P. (2001) Tolerance or immunity to a tumor antigen expressed in somatic cells can be determined by systemic proinflammatory signals at the time of first antigen exposure. *J. Immunol.*, **167**, 6180–6187
- Fredericks, B.D., Balkin, A., Daniel, H.W., Schonrock, J., Ward, B. & Frazer, I.H. (1993) Transmission of human papillomaviruses from mother to child. *Aust. N.Z. J. Obstet. Gynaecol.*, **33**, 30–32
- Frega, A., Stentella, P., Spera, G., Pace, S., Cipriano, L., Di Ruzza, D., Villani, C. & Pachi, A. (1997) Cervical intraepithelial neoplasia and bacterial vaginosis: Correlation or risk factor? *Eur. J. Gynaecol. Oncol.*, **18**, 76–77
- Frega, A., Cenci, M., Stentella, P., Cipriano, L., De Ioris, A., Alderisio, M. & Vecchione, A. (2003) Human papillomavirus in virgins and behaviour at risk. *Cancer Lett.*, **194**, 21–24
- French, A.L., Kirstein, L.M., Massad, L.S., Semba, R.D., Minkoff, H., Landesman, S., Palefsky, J., Young, M., Anastos, K. & Cohen, M.H. (2000) Association of vitamin A deficiency with cervical squamous intraepithelial lesions in human immunodeficiency virus-infected women. *J. infect. Dis.*, **182**, 1084–1089
- Friedman, H.B., Saah, A.J., Sherman, M.E., Busseniers, A.E., Blackwelder, W.C., Kaslow, R.A., Ghaffari, A.M., Daniel, R.W. & Shah, K.V. (1998) Human papillomavirus, anal squamous intraepithelial lesions, and human immunodeficiency virus in a cohort of gay men. *J. infect. Dis.*, **178**, 45–52
- Friedman-Kien, A. (1995) Management of condylomata acuminata with Algeron N infection, interferon alfa-n3 (human leukocyte derived). *Am. J. Obstet. Gynecol.*, **172**, 1359–1368
- Frisch, M. & Melbye, M. (1995) Risk of lung cancer in pre- and post-menopausal women with ano-genital malignancies. *Int. J. Cancer*, **62**, 508–511
- Frisch, M., Glimelius, B., van den Brule, A.J.C., Wohlfahrt, J., Meijer, C.J.L.M., Walboomers, J.M.M., Goldman, S., Svensson, C., Adami, H.-O. & Melbye, M. (1997) Sexually transmitted infection as a cause of anal cancer. *New Engl. J. Med.*, **337**, 1350–1358
- Frisch, M., Fenger, C., van den Brule, A.J.C., Sørensen, P., Meijer, C.J.L.M., Walboomers, J.M.M., Adami, H.-O., Melbye, M. & Glimelius, B. (1999) Variants of squamous cell carcinoma of the

- anal canal and perianal skin and their relation to human papillomaviruses. *Cancer Res.*, **59**, 753–757
- Frisch, M., Biggar, R.J. & Goedert, J.J. for the AIDS–Cancer Match Registry Study Group (2000) Human papillomavirus-associated cancers in patients with human immunodeficiency virus infection and acquired immunodeficiency syndrome. *J. natl Cancer Inst.*, **92**, 1500–1510
- Fu, W. & Cockerell, C.J. (2003) The actinic (solar) keratosis: A 21st-century perspective. *Arch. Dermatol.*, **139**, 66–70
- Fu, Y.S., Reagan, J. & Richart, R.M. (1981) Definition of precursors. *Gynecol. Oncol.*, **12** (Suppl.), S220–S231
- Fu, Y.S., Braun, L., Shah, K.V., Lawrence, W.D. & Robboy, S.J. (1983) Histological, nuclear DNA, and human papillomavirus studies of cervical condylomas. *Cancer*, **52**, 1705–1711
- Fu, Y.S., Huang, I., Beaudenon, S., Ionesco, M., Barrasso, R., de Brux, J. & Orth, G. (1988) Correlative study of human papillomavirus, DNA, histopathology, and morphometry in cervical condyloma and intraepithelial neoplasia. *Int. J. gynecol. Pathol.*, **7**, 297–307
- Fu, B., Quintero, J. & Baker, C.C. (2003) Keratinocyte growth conditions modulate telomerase expression, senescence, and immortalization by human papillomavirus type 16 E6 and E7 oncogenes. *Cancer Res.*, **63**, 7815–7824
- Fujii, T., Crum, C.P., Winkler, B., Fu, Y.S. & Richart, R.M. (1984) Human papillomavirus infection and cervical intraepithelial neoplasia: Histopathology and DNA content. *Obstet. Gynecol.*, **63**, 99–104
- Funk, J.O., Waga, S., Harry, J.B., Espling, E., Stillman, B. & Galloway, D.A. (1997) Inhibition of CDK activity and PCNA-dependent DNA replication by p21 is blocked by interaction with the HPV-16 E7 oncoprotein. *Genes Dev.*, **11**, 2090–2100
- Furihata, M., Inoue, K., Ohtsuki, Y., Hashimoto, H., Terao, N. & Fujita, Y. (1993) High-risk human papillomavirus infections and overexpression of p53 protein as prognostic indicators in transitional cell carcinoma of the urinary bladder. *Cancer Res.*, **53**, 4823–4827
- Furuta, Y., Takasu, T., Asai, T., Shinohara, T., Sawa, H., Nagashima, K. & Inuyama, Y. (1992) Detection of human papillomavirus DNA in carcinomas of the nasal cavities and paranasal sinuses by polymerase chain reaction. *Cancer*, **69**, 353–357
- FUTURE II Study Group (2007) Quadrivalent vaccine against human papillomavirus to prevent high-grade cervical lesions. *New Engl. J. Med.*, **356**, 1915–1927
- Gage, J.R., Meyers, C. & Wettstein, F.O. (1990) The E7 proteins of the nononcogenic human papillomavirus type 6b (HPV-6b) and of the oncogenic HPV-16 differ in retinoblastoma protein binding and other properties. *J. Virol.*, **64**, 723–730
- Gallagher, B., Wang, Z., Schymura, M.J., Kahn, A. & Fordyce, E.J. (2001) Cancer incidence in New York State acquired immunodeficiency syndrome patients. *Am. J. Epidemiol.*, **154**, 544–556
- Galloway, D.A. (1992) Serological assays for the detection of HPV antibodies. In: Muñoz, N., Bosch, F.X., Shah, K.V. & Meheus, A., eds, *The Epidemiology of Cervical Cancer and Human Papillomavirus* (IARC Scientific Publications No. 119), Lyon, pp. 147–161
- Galloway, D.A. (1994) Papillomavirus capsids: A new approach to identify serological markers of HPV infection. *J. natl Cancer Inst.*, **86**, 474–475
- Galloway, D.A. & McDougall, J.K. (1983) The oncogenic potential of herpes simplex viruses: Evidence for a ‘hit-and-run’ mechanism. *Nature*, **302**, 21–24

- Galloway, D.A., Nelson, J.A. & McDougall, J.K. (1984) Small fragments of herpesvirus DNA with transforming activity contain insertion sequence-like structures. *Proc. natl Acad. Sci. USA*, **81**, 4736–4740
- Gao, Q., Srinivasan, S., Boyer, S.N., Wazer, D.E. & Band, V. (1999) The E6 oncoproteins of high-risk papillomaviruses bind to a novel putative GAP protein, E6TP1, and target it for degradation. *Mol. cell. Biol.*, **19**, 733–744
- Gao, Q., Kumar, A., Srinivasan, S., Singh, L., Mukai, H., Ono, Y., Wazer, D.E. & Band, V. (2000) PKN binds and phosphorylates human papillomavirus E6 oncoprotein. *J. biol. Chem.*, **275**, 14824–14830
- Gao, Q., Singh, L., Kumar, A., Srinivasan, S., Wazer, D.E. & Band, V. (2001) Human papillomavirus type 16 E6-induced degradation of E6TP1 correlates with its ability to immortalize human mammary epithelial cells. *J. Virol.*, **75**, 4459–4466
- Gao, Y.-E., Zhang, J., Wu, J., Chen, Z.-C. & Yan, X.-J. (2003) Detection and genotyping of human papillomavirus DNA in cervical cancer tissues with fluorescence polarization. *Acta biochim. biophys. sin.*, **35**, 1029–1034
- García-Corona, C., Vega-Memije, E., Mosqueda-Taylor, A., Yamamoto-Furusho, J.K., Rodríguez-Carreón, A.A., Ruiz-Morales, J.A., Salgado, N. & Granados, J. (2004) Association of HLA-DR4 (DRB1*0404) with human papillomavirus infection in patients with focal epithelial hyperplasia. *Arch. Dermatol.*, **140**, 1227–1231
- García-Milián, R., Hernández, H., Panadé, L., Rodríguez, C., González, N., Valenzuela, C., de J. Araña, M. & Perea, S.E. (1998) Detection and typing of human papillomavirus DNA in benign and malignant tumours of laryngeal epithelium. *Acta otolaryngol.*, **118**, 754–758
- Gardiol, D., Kühne, C., Glaunsinger, B., Lee, S.S., Javier, R. & Banks, L. (1999) Oncogenic human papillomavirus E6 proteins target the discs large tumour suppressor for proteasome-mediated degradation. *Oncogene*, **18**, 5487–5496
- Garland, S.M., Hernandez-Avila, M., Wheeler, C.M., Perez, G., Harper, D.M., Leodolter, S., Tang, G.W.K., Ferris, D.G., Steben, M., Bryan, J., Taddeo, F.J., Railkar, R., Esser, M.T., Sings, H.L., Nelson, M., Boslego, J., Sattler, C., Barr, E. & Koutsky, L.A. for the Females United to Unilaterally Reduce Endo/Ectocervical Disease (FUTURE) I Investigators (2007) Quadrivalent vaccine against human papillomavirus to prevent anogenital diseases. *New Engl. J. Med.*, **356**, 1928–1943
- Garlick, J.A. & Taichman, L.B. (1991) Human papillomavirus infection of the oral mucosa. *Am. J. Dermatopathol.*, **13**, 386–395
- Garrett, L.R., Perez-Reyes, N., Smith, P.P. & McDougall, J.K. (1993) Interaction of HPV-18 and nitrosomethylurea in the induction of squamous cell carcinoma. *Carcinogenesis*, **14**, 329–332
- Garven, T.C., Thelmo, W.L., Victor, J. & Pertschuk, L. (1991) Verrucous carcinoma of the leg positive for human papillomavirus DNA 11 and 18: A case report. *Hum. Pathol.*, **22**, 1170–1173
- Gassenmaier, A. & Hornstein, O.P. (1988) Presence of human papillomavirus DNA in benign and precancerous oral leukoplakias and squamous cell carcinomas. *Dermatologica*, **176**, 224–233
- Gassenmaier, A., Lammel, M. & Pfister, H. (1984) Molecular cloning and characterization of the DNAs of human papillomaviruses 19, 20, and 25 from a patient with epidermodysplasia verruciformis. *J. Virol.*, **52**, 1019–1023
- Gassenmaier, A., Fuchs, P., Schell, H. & Pfister, H. (1986) Papillomavirus DNA in warts of immunosuppressed renal allograft recipients. *Arch. dermatol. Res.*, **278**, 219–223

- Gaukroger, J., Bradley, A., O'Neil, B., Smith, K., Campo, S. & Jarrett, W.F. (1989) Induction of virus-producing tumours in athymic nude mice by bovine papillomavirus type 4. *Vet. Rec.*, **125**, 391–392
- Gaukroger, J., Chandrachud, L., Jarrett, W.F.H., McGarvie, G.E., Yeudall, W.A., McCaffery, R.E., Smith, K.T. & Campo, M.S. (1991) Malignant transformation of a papilloma induced by bovine papillomavirus type 4 in the nude mouse renal capsule. *J. gen. Virol.*, **72**, 1165–1168
- Gaukroger, J.M., Bradley, A., Chandrachud, L., Jarrett, W.F.H. & Campo, M.S. (1993) Interaction between bovine papillomavirus type 4 and cocarcinogens in the production of malignant tumours. *J. gen. Virol.*, **74**, 2275–2280
- Gazzaniga, P., Vercillo, R., Gradilone, A., Silvestri, I., Gandini, O., Napolitano, M., Giuliani, L., Fioravanti, A., Gallucci, M. & Aglianò, A.M. (1998) Prevalence of papillomavirus, Epstein-Barr virus, cytomegalovirus, and herpes simplex virus type 2 in urinary bladder cancer. *J. med. Virol.*, **55**, 262–267
- Genther, S.M., Sterling, S., Duensing, S., Münger, K., Sattler, C. & Lambert, P.F. (2003) Quantitative role of the human papillomavirus type 16 E5 gene during the productive stage of the viral life cycle. *J. Virol.*, **77**, 2832–2842
- Gentile, G., Formelli, G., Orsoni, G., Rinaldi, A.M. & Busacchi, P. (1991) Immunosuppression and human genital papillomavirus infection. *Eur. J. gynaecol. Oncol.*, **12**, 79–81
- Georges, E., Croissant, O., Bonneaud, N. & Orth, G. (1984) Physical state and transcription of the cottontail rabbit papillomavirus genome in warts and transplantable VX2 and VX7 carcinomas of domestic rabbits. *J. Virol.*, **51**, 530–538
- Georg-Fries, B., Biederlack, S., Wolf, J. & zur Hausen, H. (1984) Analysis of proteins, helper dependence, and seroepidemiology of a new human parvovirus. *Virology*, **134**, 64–71
- Georgopoulos, N.T., Proffitt, J.L. & Blair, G.E. (2000) Transcriptional regulation of the major histocompatibility complex (MHC) class I heavy chain, TAP1 and LMP2 genes by the human papillomavirus (HPV) type 6b, 16 and 18 E7 oncoproteins. *Oncogene*, **19**, 4930–4935
- Gervaz, P., Allal, A.S., Villiger, P., Buhler, L. & Morel, P. (2003) Squamous cell carcinoma of the anus: Another sexually transmitted disease. *Swiss med. Wkly*, **133**, 353–359
- Gewin, L. & Galloway, D.A. (2001) E box-dependent activation of telomerase by human papillomavirus type 16 E6 does not require induction of *c-myc*. *J. Virol.*, **75**, 7198–7201
- Gewin, L., Myers, H., Kiyono, T. & Galloway, D.A. (2004) Identification of a novel telomerase repressor that interacts with the human papillomavirus type-16 E6/E6-AP complex. *Genes Dev.*, **18**, 2269–2282
- Gharizadeh, B., Käller, M., Nyrén, P., Andersson, A., Uhlén, M., Lundeberg, J. & Ahmadian, A. (2003) Viral and microbial genotyping by a combination of multiplex competitive hybridization and specific extension followed by hybridization to generic tag arrays. *Nucleic Acids Res.*, **31**, e146
- Gherdovich, S., Barbacci, P., Mitrione, M.P., Farina, U., Muraro, G.B. & Anichini, M. (1997) [Detection of human papillomavirus in hyperplastic and cancerous prostatic tissue by PCR.] *Minerva urol. nefrol.*, **49**, 73–77 (in Italian)
- Giampieri, S., García-Escudero, R., Green, J. & Storey, A. (2004) Human papillomavirus type 77 E6 protein selectively inhibits p53-dependent transcription of proapoptotic genes following UV-B irradiation. *Oncogene*, **23**, 5864–5870

- Giarrè, M., Caldeira, S., Malanchi, I., Ciccolini, F., Leão, M.J. & Tommasino, M. (2001) Induction of pRb degradation by the human papillomavirus type 16 E7 protein is essential to efficiently overcome p16^{INK4a}-imposed G₁ cell cycle arrest. *J. Virol.*, **75**, 4705–4712
- Gibbs, S., Harvey, I., Sterling, J. & Stark, R. (2002) Local treatments for cutaneous warts: Systematic review. *Br. med. J.*, **325**, 461–468
- Gichangi, P., De Vuyst, H., Estambale, B., Rogo, K., Bwayo, J. & Temmerman, M. (2002) HIV and cervical cancer in Kenya. *Int. J. Gynaecol. Obstet.*, **76**, 55–63
- Gichangi, P.B., Bwayo, J., Estambale, B., De Vuyst, H., Ojwang, S., Rogo, K., Abwao, H. & Temmerman, M. (2003) Impact of HIV infection on invasive cervical cancer in Kenyan women. *AIDS*, **17**, 1963–1968
- Gilbert, J.M., Mann, C.V., Scholefield, J. & Domizio, P. (1991) The aetiology and surgery of carcinoma of the anus, rectum and sigmoid colon in Crohn's disease. Negative correlation with human papillomavirus type 16 (HPV 16). *Eur. J. Surg. Oncol.*, **17**, 507–513
- Gillison, M.L. & Shah, K.V. (2001) Human papillomavirus-associated head and neck squamous cell carcinoma: Mounting evidence for an etiologic role for human papillomavirus in a subset of head and neck cancers. *Curr. opin. Oncol.*, **13**, 183–188
- Gillison, M.L. & Shah, K.V. (2003) Role of mucosal human papillomavirus in nongenital cancers. *J. natl Cancer Inst. Monogr.*, **31**, 57–65
- Gillison, M.L., Koch, W.M., Capone, R.B., Spafford, M., Westra, W.H., Wu, L., Zahurak, M.L., Daniel, R.W., Viglione, M., Symer, D.E., Shah, K.V. & Sidransky, D. (2000) Evidence for a causal association between human papillomavirus and a subset of head and neck cancers. *J. natl Cancer Inst.*, **92**, 709–720
- Giroglou, T., Florin, L., Schäfer, F., Streeck, R.E. & Sapp, M. (2001a) Human papillomavirus infection requires cell surface heparan sulfate. *J. Virol.*, **75**, 1565–1570
- Giroglou, T., Sapp, M., Lane, C., Fligge, C., Christensen, N.D., Streeck, R.E. & Rose, R.C. (2001b) Immunological analyses of human papillomavirus capsids. *Vaccine*, **19**, 1783–1793
- Gissmann, L., de Villiers, E.-M. & zur Hausen, H. (1982a) Analysis of human genital warts (condylomata acuminata) and other genital tumors for human papillomavirus type 6 DNA. *Int. J. Cancer*, **29**, 143–146
- Gissmann, L., Diehl, V., Schultz-Coulon, H.-J. & zur Hausen, H. (1982b) Molecular cloning and characterization of human papilloma virus DNA derived from a laryngeal papilloma. *J. Virol.*, **44**, 393–400
- Gissmann, L., Wolnik, L., Ikenberg, H., Koldovsky, U., Schnürch, H.G. & zur Hausen, H. (1983) Human papillomavirus types 6 and 11 DNA sequences in genital and laryngeal papillomas and in some cervical cancers. *Proc. natl Acad. Sci. USA*, **80**, 560–563
- Gitsch, G., Kainz, C., Pohanka, E., Reinhaller, A., Kovarik, J., Tatra, G. & Breitenecker, G. (1992) [Human papillomavirus infection of the uterine cervix in immune suppressed women after kidney transplantation.] *Geburtsh. Frauenheilk.*, **52**, 764–766 (in German)
- Giuliano, A.R., Papenfuss, M., Nour, M., Canfield, L.M., Schneider, A. & Hatch K. (1997) Antioxidant nutrients: Associations with persistent human papillomavirus infection. *Cancer Epidemiol. Biomarkers Prev.*, **6**, 917–923
- Giuliano, A.R., Papenfuss, M., Abrahamsen, M., Denman, C., Guernsey de Zapien, J., Navarro Henze, J.L., Ortega, L., Mendez Brown de Galaz, E., Stephan, J., Feng, J., Baldwin, S., Garcia, F. & Hatch, K. (2001) Human papillomavirus infection at the United States–Mexico border:

- Implications for cervical cancer prevention and control. *Cancer Epidemiol. Biomarkers Prev.*, **10**, 1129–1136
- Giuliano, A.R., Harris, R., Sedjo, R.L., Baldwin, S., Roe, D., Papenfuss, M.R., Abrahamsen, M., Inserra, P., Olvera, S. & Hatch, K. (2002a) Incidence, prevalence, and clearance of type-specific human papillomavirus infections: The Young Women's Health Study. *J. infect. Dis.*, **186**, 462–469
- Giuliano, A.R., Papenfuss, M., Abrahamsen, M. & Inserra, P. (2002b) Differences in factors associated with oncogenic and nononcogenic human papillomavirus infection at the United States–Mexico border. *Cancer Epidemiol. Biomarkers Prev.*, **11**, 930–934
- Giuliano, A.R., Sedjo, R.L., Roe, D.J., Harris, R., Baldwin, S., Papenfuss, M.R., Abrahamsen, M. & Inserra, P. (2002c) Clearance of oncogenic human papillomavirus (HPV) infection: Effect of smoking (United States). *Cancer Causes Control*, **13**, 839–846
- Giuliano, A.R., Siegel, E.M., Roe, D.J., Ferreira, S., Baggio, M.L., Galan, L., Duarte-Franco, E., Villa, L.L., Rohan, T.E., Marshall, J.R. & Franco, E.L. (2003) Dietary intake and risk of persistent human papillomavirus (HPV) infection: The Ludwig-McGill HPV Natural History Study. *J. infect. Dis.*, **188**, 1508–1516
- Giuliano, A.R., Papenfuss, M., Mendez Brown de Galaz, E., Feng, J., Abrahamsen, M., Denman, C., Guernsey de Zapien, J., Navarro Henze, J.L., Garcia, F. & Hatch, K. (2004) Risk factors for squamous intraepithelial lesions (SIL) of the cervix among women residing at the US–Mexico border. *Int. J. Cancer*, **109**, 112–118
- Glaunsinger, B.A., Lee, S.S., Thomas, M., Banks, L. & Javier, R. (2000) Interactions of the PDZ-protein MAGI-1 with adenovirus E4-ORF1 and high-risk papillomavirus E6 oncoproteins. *Oncogene*, **19**, 5270–5280
- Glew, S.S., Duggan-Keen, M., Cabrera, T. & Stern, P.L. (1992) HLA class II antigen expression in human papillomavirus-associated cervical cancer. *Cancer Res.*, **52**, 4009–4016
- Gloss, B., Bernard, H.-U., Seedorf, K. & Klock, G. (1987) The upstream regulatory region of the human papillomavirus-16 contains an E2 protein-independent enhancer which is specific for cervical carcinoma cells and regulated by glucocorticoid hormones. *EMBO J.*, **6**, 3735–3743
- Glover, M., Cerio, R., Corbett, M., Leigh, I. & Hanby, A.M. (1995) Cutaneous squamoproliferative lesions in renal transplant recipients. Differentiation from lesions in immunocompetent patients. *Am. J. Dermatopathol.*, **17**, 551–554
- Godley, M.J., Bradbeer, C.S., Gellan, M. & Thin, R.N.T. (1987) Cryotherapy compared with trichloroacetic acid in treating genital warts. *Genitourin. Med.*, **63**, 390–392
- Goedert, J.J., Coté, T.R., Virgo, P., Scoppa, S.M., Kingma, D.W., Gail, M.H., Jaffe, E.S. & Biggar, R.J. for the AIDS–Cancer Match Study Group (1998) Spectrum of AIDS-associated malignant disorders. *Lancet*, **351**, 1833–1839
- Goldstein, D.J., Finbow, M.E., Andresson, T., McLean, P., Smith, K., Bubb, V. & Schlegel, R. (1991) Bovine papillomavirus E5 oncoprotein binds to the 16K component of vacuolar H⁺-ATPases. *Nature*, **352**, 347–349
- Goldstone, S.E., Winkler, B., Ufford, L.J., Alt, E. & Palefsky, J.M. (2001) High prevalence of anal squamous intraepithelial lesions and squamous-cell carcinoma in men who have sex with men as seen in a surgical practice. *Dis. Colon Rectum*, **44**, 690–698
- Goldstone, S.E., Palefsky, J.M., Winnett, M.T. & Neefe, J.R. (2002) Activity of HspE7, a novel immunotherapy, in patients with anogenital warts. *Dis. Colon Rectum*, **45**, 502–507

- Golijow, C.D., Mourón, S.A., Gómez, M.A. & Dulout, F.N. (1999) Differences in K-*ras* codon 12 mutation frequency between 'high-risk' and 'low-risk' HPV-infected samples. *Gynecol. Oncol.*, **75**, 108–112
- Golijow, C.D., Abba, M.C., Mourón, S.A., Laguens, R.M., Dulout, F.N. & Smith, J.S. (2005) *Chlamydia trachomatis* and human papillomavirus infections in cervical disease in Argentine women. *Gynecol. Oncol.*, **96**, 181–186
- Gollnick, H., Barasso, R., Jappe, U., Ward, K., Eul, A., Carey-Yard, M. & Milde, K. (2001) Safety and efficacy of imiquimod 5% cream in the treatment of penile genital warts in uncircumcised men when applied three times weekly or once per day. *Int. J. STD AIDS*, **12**, 22–28
- Goncalves, M.A.G., Massad, E., Burattini, M.N. & Villa, L.L. (1999) Relationship between human papillomavirus (HPV) genotyping and genital neoplasia in HIV-positive patients of Santos City, São Paulo, Brazil. *Int. J. STD AIDS*, **10**, 803–807
- Gonzalez, S.L., Stremlau, M., He, X., Basile, J.R. & Münger, K. (2001) Degradation of the retinoblastoma tumor suppressor by the human papillomavirus type 16 E7 oncoprotein is important for functional inactivation and is separable from proteasomal degradation of E7. *J. Virol.*, **75**, 7583–7591
- Gonzalez-Ruiz, C., Heartfield, W., Briggs, B., Vukasin, P. & Beart, R.W. (2004) Anorectal pathology in HIV/AIDS-infected patients has not been impacted by highly active antiretroviral therapy. *Dis. Colon Rectum*, **47**, 1483–1486
- Goodman, M.T., McDuffie, K., Hernandez, B., Wikens, L.R., Bertram, C.C., Killeen, J., Le Marchand, L., Selhub, J., Murphy, S., & Donlon, T.A. (2001) Association of methylenetetrahydrofolate reductase polymorphism C677T and dietary folate with the risk of cervical dysplasia. *Cancer Epidemiol. Biomarkers Prev.*, **10**, 1275–1280
- Goodwin, E.C. & DiMaio, D. (2000) Repression of human papillomavirus oncogenes in HeLa cervical carcinoma cells causes the orderly reactivation of dormant tumor suppressor pathways. *Proc. natl Acad. Sci. USA*, **97**, 12513–12518
- Goodwin, E.C., Naeger, L.K., Breiding, D.E., Androphy, E.J. & DiMaio, D. (1998) Transactivation-competent bovine papillomavirus E2 protein is specifically required for efficient repression of human papillomavirus oncogene expression and for acute growth inhibition of cervical carcinoma cell lines. *J. Virol.*, **72**, 3925–3934
- Goodwin, E.C., Yang, E., Lee, C.-J., Lee, H.-W., DiMaio, D. & Hwang, E.-S. (2000) Rapid induction of senescence in human cervical carcinoma cells. *Proc. natl Acad. Sci. USA*, **97**, 10978–10983
- Gopalkrishna, V., Srivastava, A.N., Hedau, S., Sharma, J.K. & Das, B.C. (1995) Detection of human papillomavirus DNA sequences in cancer of the urinary bladder by in situ hybridisation and polymerase chain reaction. *Genitourin. Med.*, **71**, 231–233
- Gopalkrishna, V., Singh, U.R., Sodhani, P., Sharma, J.K., Hedau, S.T., Mandal, A.K. & Das, B.C. (1996) Absence of human papillomavirus DNA in breast cancer as revealed by polymerase chain reaction. *Breast Cancer Res. Treat.*, **39**, 197–202
- Gordon, D.E. & Olson, C. (1968) Meningiomas and fibroblastic neoplasia in calves induced with the bovine papilloma virus. *Cancer Res.*, **28**, 2423–2431
- Gorgoulis, V.G., Zacharatos, P., Kotsinas, A., Kyroudi, A., Rassidakis, A.N., Ikonomopoulos, J.A., Barbatis, C., Herrington, C.S. & Kittas, C. (1999) Human papilloma virus (HPV) is possibly involved in laryngeal but not in lung carcinogenesis. *Hum. Pathol.*, **30**, 274–283

- Gostout, B.S., Poland, G.A., Calhoun, E.S., Sohni, Y.R., Giuntoli, R.L., II, McGovern, R.M., Sloan, J.A., Cha, S.S. & Persing, D.H. (2003) TAP1, TAP2, and HLA-DR2 alleles are predictors of cervical cancer risk. *Gynecol. Oncol.*, **88**, 326–332
- van der Graaf, Y., Molijn, A., Doornwaard, H., Quint, W., van Doorn, L.-J. & van den Tweel, J. (2002) Human papillomavirus and the long-term risk of cervical neoplasia. *Am. J. Epidemiol.*, **156**, 158–164
- Gram, I.T., Macaluso, M., Churchill, J. & Stalsberg, H. (1992) *Trichomonas vaginalis* (TV) and human papillomavirus (HPV) infection and the incidence of cervical intraepithelial neoplasia (CIN) grade III. *Cancer Causes Control*, **3**, 231–236
- Grassmann, K., Rapp, B., Maschek, H., Petry, K.U. & Iftner, T. (1996) Identification of a differentiation-inducible promoter in the E7 open reading frame of human papillomavirus type 16 (HPV-16) in raft cultures of a new cell line containing high copy numbers of episomal HPV-16 DNA. *J. Virol.*, **70**, 2339–2349
- Gravitt, P.E. & Castle, P.E. (2001) *Chlamydia trachomatis* and cervical squamous cell carcinoma (Letter to the Editor). *J. Am. med. Assoc.*, **285**, 1703–1704
- Gravitt, P.E., Peyton, C.L., Apple, R.J. & Wheeler, C.M. (1998) Genotyping of 27 human papillomavirus types by using L1 consensus PCR products by a single hybridization, reverse line blot detection method. *J. clin. Microbiol.*, **36**, 3020–3027
- Gravitt, P.E., Peyton, C.L., Alessi, T.Q., Wheeler, C.M., Coutlée, F., Hildesheim, A., Schiffman, M.H., Scott, D.R. & Apple, R.J. (2000) Improved amplification of genital human papillomaviruses. *J. clin. Microbiol.*, **38**, 357–361
- Gravitt, P.E., Lacey, J.V., Jr, Brinton, L.A., Barnes, W.A., Kornegay, J.R., Greenberg, M.D., Greene, S.M., Hadjimichael, O.C., McGowan, L., Mortel, R., Schwartz, P.E., Zaino, R. & Hildesheim, A. (2001) Evaluation of self-collected cervicovaginal cell samples for human papillomavirus testing by polymerase chain reaction. *Cancer Epidemiol. Biomarkers Prev.*, **10**, 95–100
- Gravitt, P.E., Burk, R.D., Lorincz, A., Herrero, R., Hildesheim, A., Sherman, M.E., Bratti, M.C., Rodriguez, A.C., Helzlsouer, K.J. & Schiffman, M. (2003) A comparison between real-time polymerase chain reaction and Hybrid Capture 2 for human papillomavirus DNA quantitation. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 477–484
- Grce, M., Husnjak, K., Matovina, M., Milutin, N., Magdic, L., Husnjak, O. & Pavelic, K. (2004). Human papillomavirus, cytomegalovirus, and adeno-associated virus infections in pregnant and nonpregnant women with cervical intraepithelial neoplasia. *J. Clin. Microbiol.*, **42**, 1341–1344
- Greenhalgh, D.A., Wang, X.-J., Rothnagel, J.A., Eckhardt, J.N., Quintanilla, M.I., Barber, J.L., Bundman, D.S., Longley, M.A., Schlegel, R. & Roop, D.R. (1994) Transgenic mice expressing targeted HPV-18 E6 and E7 oncogenes in the epidermis develop verrucous lesions and spontaneous, *ras*^{Ha}-activated papillomas. *Cell Growth Differ.*, **5**, 667–675
- Greenhead, P., Hayes, P., Watts, P.S., Laing, K.G., Griffin, G.E. & Shattock, R.J. (2000) Parameters of human immunodeficiency virus infection of human cervical tissue and inhibition by vaginal virucides. *J. Virol.*, **74**, 5577–5586
- Gregoire, L., Lawrence, W.D., Kukuruga, D., Eisenbrey, A.B. & Lancaster, W.D. (1994) Association between HLA-DQB1 alleles and risk for cervical cancer in African-American women. *Int. J. Cancer*, **57**, 504–507
- Gregoire, L., Cubilla, A.L., Reuter, V.E., Haas, G.P. & Lancaster, W.D. (1995) Preferential association of human papillomavirus with high-grade histologic variants of penile-invasive squamous cell carcinoma. *J. natl. Cancer Inst.*, **87**, 1705–1709

- Griep, A.E., Herber, R., Jeon, S., Lohse, J.K., Dubielzig, R.R. & Lambert, P.F. (1993) Tumorigenicity by human papillomavirus type 16 E6 and E7 in transgenic mice correlates with alterations in epithelial cell growth and differentiation. *J. Virol.*, **67**, 1373–1384
- Griep, A.E., Krawcek, J., Lee, D., Liem, A., Albert, D.M., Carabeo, R., Drinkwater, N., McCall, M., Sattler, C., Lasudry, J.G.H. & Lambert, P.F. (1998) Multiple genetic loci modify risk for retinoblastoma in transgenic mice. *Invest. Ophthalmol. vis. Sci.*, **39**, 2723–2732
- Grimmel, M., de Villiers, E.-M., Neumann, C., Pawlita, M. & zur Hausen, H. (1988) Characterization of a new human papillomavirus (HPV 41) from disseminated warts and detection of its DNA in some skin carcinomas. *Int. J. Cancer*, **41**, 5–9
- Grm, H.S. & Banks, L. (2004) Degradation of hDIg and MAGIs by human papillomavirus E6 is E6-AP-independent. *J. gen. Virol.*, **85**, 2815–2819
- Groff, D.E., Sundberg, J.P. & Lancaster, W.D. (1983) Extrachromosomal deer fibromavirus DNA in deer fibromas and virus-transformed mouse cells. *Virology*, **131**, 546–550
- Gross, G., Pfister, H., Hagedorn, M. & Gissmann, L. (1982) Correlation between human papillomavirus (HPV) type and histology of warts. *J. invest. Dermatol.*, **78**, 160–164
- Gross-Mesilaty, S., Reinstein, E., Bercovich, B., Tobias, K.E., Schwartz, A.L., Kahana, C. & Ciechanover, A. (1998) Basal and human papillomavirus E6 oncoprotein-induced degradation of Myc proteins by the ubiquitin pathway. *Proc. natl Acad. Sci. USA*, **95**, 8058–8063
- Growdon, W.A., Fu, Y.S., Lebherz, T.B., Rapkin, A., Mason, G.D. & Parks, G. (1985) Pruritic vulvar squamous papillomatosis: Evidence for human papillomavirus etiology. *Obstet. Gynecol.*, **66**, 564–568
- de Gruijl, T.D., Bontkes, H.J., Stukart, M.J., Walboomers, J.M.M., Remmink, A.J., Verheijen, R.H.M., Helmerhorst, T.J.M., Meijer, C.J.L.M. & Scheper, R.J. (1996) T cell proliferative responses against human papillomavirus type 16 E7 oncoprotein are most prominent in cervical intraepithelial neoplasia patients with a persistent viral infection. *J. gen. Virol.*, **77**, 2183–2191
- Grussendorf-Conen, E.-I., Deutz, F.J. & de Villiers, E.-M. (1987) Detection of human papillomavirus-6 in primary carcinoma of the urethra in men. *Cancer*, **60**, 1832–1835
- Gualco, M., Bonin, S., Foglia, G., Fulcheri, E., Odicino, F., Prefumo, F., Stanta, G. & Ragni, N. (2003) Morphologic and biologic studies on ten cases of verrucous carcinoma of the vulva supporting the theory of a discrete clinico-pathologic entity. *Int. J. Gynecol. Cancer*, **13**, 317–324
- Guerin-Reverchon, I., Chardonnet, Y., Viac, J., Chouvet, B., Chignol, M.C. & Thivolet, J. (1990) Human papillomavirus infection and filaggrin expression in paraffin-embedded biopsy specimens of extragenital Bowen's disease and genital bowenoid papulosis. *J. Cancer Res. clin. Oncol.*, **116**, 295–300
- Guillou, L., Sahli, R., Chaubert, P., Monnier, P., Cuttat, J.-F. & Costa, J. (1991) Squamous cell carcinoma of the lung in a nonsmoking, nonirradiated patient with juvenile laryngotracheal papillomatosis. Evidence of human papillomavirus-11 DNA in both carcinoma and papillomas. *Am. J. surg. Pathol.*, **15**, 891–898
- Guitart, J., Bergfeld, W.F., Tuthill, R.J., Tubbs, R.R., Zienowicz, R. & Fleegler, E.J. (1990) Squamous cell carcinoma of the nail bed: A clinicopathological study of 12 cases. *Br. J. Dermatol.*, **123**, 215–222
- Gulliver, G.A., Herber, R.L., Liem, A. & Lambert, P.F. (1997) Both conserved region 1 (CR1) and CR2 of the human papillomavirus type 16 E7 oncogene are required for induction of epidermal hyperplasia and tumor formation in transgenic mice. *J. Virol.*, **71**, 5905–5914

- Gunter, J. (2003) Genital and perianal warts: New treatment opportunities for human papillomavirus infection. *Am. J. Obstet. Gynecol.*, **189** (Suppl. 3), S3–S11
- Habis, A.H., Vernon, S.D., Lee, D.R., Verma, M. & Unger, E.R. (2004) Molecular quality of exfoliated cervical cells: Implications for molecular epidemiology and biomarker discovery. *Cancer Epidemiol. Biomarkers Prev.*, **13**, 492–496
- Haga, T., Kim, S.-H., Jensen, R.H., Darragh, T. & Palefsky, J.M. (2001) Detection of genetic changes in anal intraepithelial neoplasia (AIN) of HIV-positive and HIV-negative men. *J. Acquir. Immune Defic. Syndr.*, **26**, 256–262
- Hagen, P., Lyons, G.D. & Haindel, C. (1993) Verrucous carcinoma of the larynx: Role of human papillomavirus, radiation, and surgery. *Laryngoscope*, **103**, 253–257
- Hagensee, M.E., Yaegashi, N. & Galloway, D.A. (1993) Self-assembly of human papillomavirus type 1 capsids by expression of the L1 protein alone or by coexpression of the L1 and L2 capsid proteins. *J. Virol.*, **67**, 315–322
- Hagensee, M.E., Olson, N.H., Baker, T.S. & Galloway, D.A. (1994) Three-dimensional structure of vaccinia virus-produced human papillomavirus type 1 capsids. *J. Virol.*, **68**, 4503–4505
- Hagensee, M.E., Koutsky, L.A., Lee, S.-K., Grubert, T., Kuypers, J., Kiviat, N.B. & Galloway, D.A. (2000) Detection of cervical antibodies to human papillomavirus type 16 (HPV-16) capsid antigens in relation to detection of HPV-16 DNA and cervical lesions. *J. Infect. Dis.*, **181**, 1234–1239
- Hajek, Z.F. (1956) Contribution to the etiology of laryngeal papilloma in children. *J. Laryngol. Otol.*, **70**, 166–168
- Hakama, M., Luostarinen, T., Hallmans, G., Jellum, E., Koskela, P., Lehtinen, M., Thoresen, S., Youngman, L. & Hakulinen, T. (2000) Joint effect of HPV16 with *Chlamydia trachomatis* and smoking on risk of cervical cancer: Antagonism or misclassification (Nordic countries). *Cancer Causes Control*, **11**, 783–790
- Halbert, C.L., Demers, G.W. & Galloway, D.A. (1991) The E7 gene of human papillomavirus type 16 is sufficient for immortalization of human epithelial cells. *J. Virol.*, **65**, 473–478
- Halbert, C.L., Demers, G.W. & Galloway, D.A. (1992) The E6 and E7 genes of human papillomavirus type 6 have weak immortalizing activity in human epithelial cells. *J. Virol.*, **66**, 2125–2134
- Haller, K., Stubenrauch, F. & Pfister, H. (1995) Differentiation-dependent transcription of the epidermodysplasia verruciformis-associated human papillomavirus type 5 in benign lesions. *Virology*, **214**, 245–255
- Halpert, R., Fruchter, R.G., Sedlis, A., Butt, K., Boyce, J.G. & Sillman, F.H. (1986) Human papillomavirus and lower genital neoplasia in renal transplant patients. *Obstet. Gynecol.*, **68**, 251–258
- Hameed, M., Fernandes, H., Skurnick, J., Moore, D., Kloser, P. & Heller, D. (2001) Human papillomavirus typing in HIV-positive women. *Infect. Dis. Obstet. Gynecol.*, **9**, 89–93
- Hammouda, D., Muñoz, N., Herrero, R., Arslan, A., Bouhadeh, A., Oublil, M., Djedeat, B., Fontanière, B., Snijders, P., Meijer, C. & Franceschi, S. (2005) Cervical carcinoma in Algiers, Algeria: Human papillomavirus and lifestyle risk factors. *Int. J. Cancer*, **113**, 483–489
- Hamsikova, E., Hofmannova, N.V., Muñoz, N., Bosch, F.X., De Sanjose, S., Shah, K., Roth, Z. & Vonka, V. (1994) Presence of antibodies to seven human papillomavirus type 16-derived peptides in cervical cancer patients and healthy controls. *J. Infect. Dis.*, **170**, 1424–1431
- Han, R., Breitburd, F., Marche, P.N. & Orth, G. (1992) Linkage of regression and malignant conversion of rabbit viral papillomas to MHC class II genes. *Nature*, **356**, 66–68

- Han, R., Breitbart, F., Marche, P.N. & Orth, G. (1994) Analysis of the nucleotide sequence variation of the antigen-binding domain of DR α and DQ α molecules as related to the evolution of papillomavirus-induced warts in rabbits. *J. invest. Dermatol.*, **103**, 376–380
- Han, C.-P., Tsao, Y.-P., Sun, C.-A., Ng, H.-T. & Chen, S.-L. (1997) Human papillomavirus, cytomegalovirus and herpes simplex virus infections for cervical cancer in Taiwan. *Cancer Lett.*, **120**, 217–221
- Han, R., Cladel, N.M., Reed, C.A., Peng, X. & Christensen, N.D. (1999) Protection of rabbits from viral challenge by gene gun-based intracutaneous vaccination with a combination of cottontail rabbit papillomavirus E1, E2, E6, and E7 genes. *J. Virol.*, **73**, 7039–7043
- Handsfield, H.H. (1997) Clinical presentation and natural course of anogenital warts. *Am. J. Med.*, **102**, 16–20
- Hankins, C., Coutlée, F., Lapointe, N., Simard, P., Tran, T., Samson, J., Hum, L. & the Canadian Women's HIV Study Group (1999) Prevalence of risk factors associated with human papillomavirus infection in women living with HIV. *Can. med. Assoc. J.*, **160**, 185–191
- Harper, D.M., Franco, E.L., Wheeler, C., Ferris, D.G., Jenkins, D., Schuind, A., Zahaf, T., Innis, B., Naud, P., De Carvalho, N.S., Roteli-Martins, C.M., Teixeira, J., Blatter, M.M., Korn, A. P., Quint, W. & Dubin, G. for the GlaxoSmithKline HPV Vaccine Group (2004) Efficacy of a bivalent L1 virus-like particle vaccine in prevention of infection with human papillomavirus types 16 and 18 in young women: A randomised controlled trial. *Lancet*, **364**, 1757–1765
- Harper, D.M., Franco, E.L., Wheeler, C.M., Moscicki, A.-B., Romanowski, B., Roteli-Martins, C.M., Jenkins, D., Schuind, A., Costa Clemens, S.A. & Dubin, G. on behalf of the HPV Vaccine Study Group (2006) Sustained efficacy up to 4.5 years of a bivalent L1 virus-like particle vaccine against human papillomavirus types 16 and 18: Follow-up from a randomised control trial. *Lancet*, **367**, 1247–1255
- Harris, A.J., Purdie, K., Leigh, I.M., Proby, C. & Burge, S. (1997) A novel human papillomavirus identified in epidermodysplasia verruciformis. *Br. J. Dermatol.*, **136**, 587–591
- Harris, M.O., Beck, J.C., Lancaster, W., Gregoire, L., Carey, T.E. & Bradford, C.R. (1998a) The HPV 6 E6/E7 transforming genes are expressed in inverted papilloma. *Otolaryngol. Head Neck Surg.*, **118**, 312–318
- Harris, M.O., Beck, J.C., Terrell, J.E., McClatchey, K.D., Carey, T.E. & Bradford, C.R. (1998b) Expression of human papillomavirus 6 in inverted papilloma arising in a renal transplant recipient. *Laryngoscope*, **108**, 115–119
- Harris, T.G., Kulasingam, S.L., Kiviat, N.B., Mao, C., Agoff, S.N., Feng, Q. & Koutsky L.A. (2004) Cigarette smoking, oncogenic human papillomavirus, Ki-67 antigen, and cervical intraepithelial neoplasia. *Am. J. Epidemiol.*, **159**, 834–842
- Harvey, S.B., Cladel, N.M., Budgeon, L.R., Welsh, P.A., Griffith, J.W., Lang, C.M. & Christensen, N.D. (1998) Rabbit genital tissue is susceptible to infection by rabbit oral papillomavirus: An animal model for a genital tissue-targeting papillomavirus. *J. Virol.*, **72**, 5239–5244
- Harwood, C.A. & Proby, C.M. (2002) Human papillomaviruses and non-melanoma skin cancer. *Curr. Opin. infect. Dis.*, **15**, 101–114
- Harwood, C.A., Spink, P.A., Suretheran, T., Leigh, I.M., de Villiers, E.-M., McGregor, J.M., Proby, C.M. & Breuer, J. (1999) Degenerate and nested PCR: A highly sensitive and specific method for detection of human papillomavirus infection in cutaneous warts. *J. clin. Microbiol.*, **37**, 3545–3555

- Harwood, C.A., Suretheran, T., McGregor, J.M., Spink, P.J., Leigh, I.M., Breuer, J. & Proby, C.M. (2000) Human papillomavirus infection and non-melanoma skin cancer in immunosuppressed and immunocompetent individuals. *J. med. Virol.*, **61**, 289–297
- Harwood, C.A., Suretheran, T., Sasieni, P., Proby, C.M., Bordea, C., Leigh, I.M., Wojnarowska, F., Breuer, J. & McGregor, J.M. (2004) Increased risk of skin cancer associated with the presence of epidermodysplasia verruciformis human papillomavirus types in normal skin. *Br. J. Dermatol.*, **150**, 949–957
- Hashida, T. & Yasumoto, S. (1991) Induction of chromosome abnormalities in mouse and human epidermal keratinocytes by the human papillomavirus type 16 E7 oncogene. *J. gen. Virol.*, **72**, 1569–1577
- zur Hausen, H. (1999) immortalization of human cells and their malignant conversion by high risk human papillomavirus genotypes. *Semin. Cancer Biol.*, **9**, 405–411
- Haverkos, H.W., Soon, G., Steckley, S.L. & Pickworth, W. (2003) Cigarette smoking and cervical cancer: Part I: A meta-analysis. *Biomed. Pharmacother.*, **57**, 67–77
- Havre, P.A., Yuan, J., Hedrick, L., Cho, K.R. & Glazer, P.M. (1995) p53 Inactivation by HPV16 E6 results in increased mutagenesis in human cells. *Cancer Res.*, **55**, 4420–4424
- Hawes, S.E., Critchlow, C.W., Faye Niang, M.A., Diouf, M.B., Diop, A., Touré, P., Aziz Kasse, A., Dembele, B., Salif Sow, P., Coll-Seck, A.M., Kuypers, J.M. & Kiviat, N.B. (2003) Increased risk of high-grade cervical squamous intraepithelial lesions and invasive cervical cancer among African women with human immunodeficiency virus type 1 and 2 infections. *J. infect. Dis.*, **188**, 555–563
- Hawkins, C.D., Swan, R.A. & Chapman, H.M. (1981) The epidemiology of squamous cell carcinoma of the perineal region of sheep. *Aust. vet. J.*, **57**, 455–457
- Hawley-Nelson, P., Vousden, K.H., Hubbert, N.L., Lowy, D.R. & Schiller, J.T. (1989) HPV16 E6 and E7 proteins cooperate to immortalize human foreskin keratinocytes. *EMBO J.*, **8**, 3905–3910
- Hayes, R.B., Pottern, L.M., Strickler, H., Rabkin, C., Pope, V., Swanson, G.M., Greenberg, R.S., Schoenberg, J.B., Liff, J., Schwartz, A.G., Hoover, R.N. & Fraumeni, J.F., Jr (2000) Sexual behaviour, STDs and risks for prostate cancer. *Br. J. Cancer*, **82**, 718–725
- Hayward, M.L.R., Baird, P.J. & Meischke, H.R.C. (1993) Filiform viral squamous papillomas on sheep. *Vet. Rec.*, **132**, 86–88
- Heard, I., Bergeron, C., Jeannel, D., Henrion, R. & Kazatchkine, M.D. (1995) Papanicolaou smears in human immunodeficiency virus-seropositive women during follow-up. *Obstet. Gynecol.*, **86**, 749–753
- Heard, I., Schmitz, V., Costagliola, D., Orth, G. & Kazatchkine, M.D. (1998) Early regression of cervical lesions in HIV-seropositive women receiving highly active antiretroviral therapy. *AIDS*, **12**, 1459–1464
- Heard, I., Tassie, J.-M., Schmitz, V., Mandelbrot, L., Kazatchkine, M.D. & Orth, G. (2000) Increased risk of cervical disease among human immunodeficiency virus-infected women with severe immunosuppression and high human papillomavirus load. *Obstet. Gynecol.*, **96**, 403–409
- Heard, I., Tassie, J.-M., Kazatchkine, M.D. & Orth, G. (2002) Highly active antiretroviral therapy enhances regression of cervical intraepithelial neoplasia in HIV-seropositive women. *AIDS*, **16**, 1799–1802
- Heck, D.V., Yee, C.L., Howley, P.M. & Münger, K. (1992) Efficiency of binding the retinoblastoma protein correlates with the transforming capacity of the E7 oncoproteins of the human papillomaviruses. *Proc. natl Acad. Sci. USA*, **89**, 4442–4446

- Hei, T.K., Piao, C.Q., Willey, J.C., Thomas, S. & Hall, E.J. (1994) Malignant transformation of human bronchial epithelial cells by radon-simulated alpha-particles. *Carcinogenesis*, **15**, 431–437
- Heim, K., Christensen, N.D., Hoepfl, R., Wartusch, B., Pinzger, G., Zeimet, A., Baumgartner, P., Kreider, J.W. & Dapunt, O. (1995) Serum IgG, IgM, and IgA reactivity to human papillomavirus types 11 and 6 virus-like particles in different gynecologic patient groups. *J. infect. Dis.*, **172**, 395–402
- Heino, P., Zhou, J. & Lambert, P.F. (2000) Interaction of the papillomavirus transcription/replication factor, E2, and the viral capsid protein, L2. *Virology*, **276**, 304–314
- Helfrich, I., Chen, M., Schmidt, R., Fürstenberger, G., Kopp-Schneider, A., Trick, D., Gröne, H.-J., zur Hausen, H. & Rösl, F. (2004) Increased incidence of squamous cell carcinomas in *Mastomys natalensis* papillomavirus E6 transgenic mice during two-stage skin carcinogenesis. *J. Virol.*, **78**, 4797–4805
- Helland, A., Børresen, A.L., Kaern, J., Rønningen, K.S. & Thorsby, E. (1992) HLA antigens and cervical carcinoma (Letter to the Editor). *Nature*, **356**, 23
- Hellberg, D., Nilsson, S., Haley, N.J., Hoffman, D. & Wynder, E. (1988) Smoking and cervical intraepithelial neoplasia: Nicotine and cotinine in serum and cervical mucus in smokers and nonsmokers. *Am. J. Obstet. Gynecol.*, **158**, 910–913
- Helt, A.-M., Funk, J.O. & Galloway, D.A. (2002) Inactivation of both the retinoblastoma tumor suppressor and p21 by the human papillomavirus type 16 E7 oncoprotein is necessary to inhibit cell cycle arrest in human epithelial cells. *J. Virol.*, **76**, 10559–10568
- Hemminki, K., Dong, C. & Vaittinen, P. (1999) Familial risks in cervical cancer: Is there a hereditary component? *Int. J. Cancer*, **82**, 775–781
- Hengge, U.R. & Cusini, M. (2003) Topical immunomodulators for the treatment of external genital warts, cutaneous warts and molluscum contagiosum. *Br. J. Dermatol.*, **149** (Suppl. 66), 15–19
- Hennet, T., Perhans, E. & Stocker, R. (1992) Alterations in antioxidant defences in lung and liver of mice infected with influenza-A virus. *J. gen. Virol.*, **73**, 39–46
- Hennig, E.M., Suo, Z., Karlsen, F., Holm, R., Thoresen, S. & Nesland, J.M. (1999a) HPV positive bronchopulmonary carcinomas in women with previous high-grade cervical intraepithelial neoplasia (CIN III). *Acta oncol.*, **38**, 639–647
- Hennig, E.M., Suo, Z., Thoresen, S., Holm, R., Kvinnsland, S. & Nesland, J.M. (1999b) Human papillomavirus 16 in breast cancer of women treated for high grade cervical intraepithelial neoplasia (CIN III). *Breast Cancer Res. Treat.*, **53**, 121–135
- Hepburn, D.J., Divakar, D., Bailey, R.R. & Macdonald, K.J.S. (1994) Cutaneous manifestations of renal transplantation in a New Zealand population. *N. Z. med. J.*, **107**, 497–499
- Herber, R., Liem, A., Pitot, H. & Lambert, P.F. (1996) Squamous epithelial hyperplasia and carcinoma in mice transgenic for the human papillomavirus type 16 E7 oncogene. *J. Virol.*, **70**, 1873–1881
- Herd, K., Fernando, G.J.P., Dunn, L.A., Frazer, I.H., Lambert, P. & Tindle, R.W. (1997) E7 oncoprotein of human papillomavirus type 16 expressed constitutively in the epidermis has no effect on E7-specific B- or Th-repertoires or on the immune response induced or sustained after immunization with E7 protein. *Virology*, **231**, 155–165
- Hering, B., Horn, L.-C., Nenning, H. & Kühndel, K. (2000) Predictive value of DNA cytometry in CIN 1 and 2. Image analysis of 193 cases. *Anal. quant. Cytol. Histol.*, **22**, 333–337

- Hermonat, P.L. (1989) The adeno-associated virus Rep78 gene inhibits cellular transformation induced by bovine papillomavirus. *Virology*, **172**, 253–261
- Hermonat, P.L. (1992) Inhibition of bovine papillomavirus plasmid DNA replication by adeno-associated virus. *Virology*, **189**, 329–333
- Hermonat, P.L. (1994a) Adeno-associated virus inhibits human papillomavirus type 16: A viral interaction implicated in cervical cancer. *Cancer Res.*, **54**, 2278–2281
- Hermonat, P.L. (1994b) Down-regulation of the human *c-fos* and *c-myc* proto-oncogene promoters by adeno-associated virus Rep78. *Cancer Lett.*, **81**, 129–136
- Hermonat, P.L., Meyers, C., Parham, G.P. & Santin, A.D. (1998) Inhibition/stimulation of bovine papillomavirus by adeno-associated virus is time as well as multiplicity dependent. *Virology*, **247**, 240–250
- Herrero, R. (2003) Human papillomavirus and cancer of the upper aerodigestive tract. *J. natl Cancer Inst. Monogr.*, **31**, 47–51
- Herrero, R., Hildesheim, A., Bratti, C., Sherman, M.E., Hutchinson, M., Morales, J., Balmaceda, I., Greenberg, M.D., Alfaro, M., Burk, R.D., Wacholder, S., Plummer, M. & Schiffman, M. (2000) Population-based study of human papillomavirus infection and cervical neoplasia in rural Costa Rica. *J. natl Cancer Inst.*, **92**, 464–474
- Herrero, R., Castellsagué, X., Pawlita, M., Lissowska, J., Kee, F., Balaram, P., Rajkumar, T., Sridhar, H., Rose, B., Pintos, J., Fernández, L., Idris, A., Sánchez, M.J., Nieto, A., Talamini, R., Tavani, A., Bosch, F.X., Reidel, U., Snijders, P.J.F., Meijer, C.J.L.M., Viscidi, R., Muñoz, N. & Franceschi, S. for the IARC Multicenter Oral Cancer Study Group (2003) Human papillomavirus and oral cancer: The International Agency for Research on Cancer Multicenter Study. *J. natl Cancer Inst.*, **95**, 1772–1783
- Herrero, R., Castle, P.E., Schiffman, M., Bratti, M.C., Hildesheim, A., Morales, J., Alfaro, M., Sherman, M.E., Wacholder, S., Chen, S., Rodriguez, A.C. & Burk, R.D. (2005) Epidemiologic profile of type-specific human papillomavirus infection and cervical neoplasia in Guanacaste, Costa Rica. *J. infect. Dis.*, **191**, 1796–1807
- Heselmeyer, K., Schröck, E., du Manoir, S., Blegen, H., Shah, K., Steinbeck, R., Auer, G. & Ried, T. (1996) Gain of chromosome 3q defines the transition from severe dysplasia to invasive carcinoma of the uterine cervix. *Proc. natl Acad. Sci. USA*, **93**, 479–484
- Hesselink, A.T., van den Brule, A.J.C., Brink, A.A.T.P., Berkhof, J., van Kemenade, F.J., Verheijen, R.H.M. & Snijders, P.J.F. (2004) Comparison of Hybrid Capture 2 with in situ hybridization for the detection of high-risk human papillomavirus in liquid-based cervical samples. *Cancer*, **102**, 11–18
- Higgins, G.D., Phillips, G.E., Smith, L.A., Uzelin, D.M. & Burrell, C.J. (1992) High prevalence of human papillomavirus transcripts in all grades of cervical intraepithelial glandular neoplasia. *Cancer*, **70**, 136–146
- Higo, H., Duan, C., Clemmons, D.R. & Herman, B. (1997) Retinoic acid inhibits cell growth in HPV negative cervical carcinoma cells by induction of insulin-like growth factor binding protein-5 (IGFBP-5) secretion. *Biochem. biophys. Res. Commun.*, **239**, 706–709
- Hildesheim, A., Mann, V., Brinton, L.A., Szklo, M., Reeves, W.C. & Rawls, W.E. (1991) Herpes simplex virus type 2: A possible interaction with human papillomavirus types 16/18 in the development of invasive cervical cancer. *Int. J. Cancer*, **49**, 335–340
- Hildesheim, A., Schiffman, M.H., Gravitt, P.E., Glass, A.G., Greer, C.E., Zhang, T., Scott, D.R., Rush, B.B., Lawler, P., Sherman, M.E., Kurman, R.J. & Manos, M.M. (1994) Persistence of

- type-specific human papillomavirus infection among cytologically normal women. *J. infect. Dis.*, **169**, 235–240
- Hildesheim, A., Han, C.-L., Brinton, L.A., Kurman, R.J. & Schiller, J.T. (1997a) Human papillomavirus type 16 and risk of preinvasive and invasive vulvar cancer: Results from a seroepidemiological case-control study. *Obstet. Gynecol.*, **90**, 748–754
- Hildesheim, A., Han, C.-L., Brinton, L.A., Nasca, P.C., Richart, R.M., Jones, R.B., Ashley, R.L., Ziegler, R.G. & Schiller, J.T. (1997b) Sexually transmitted agents and risk of carcinoma of the vagina. *Int. J. Gynecol. Cancer*, **7**, 251–255
- Hildesheim, A., Schiffman, M., Scott, D.R., Marti, D., Kissner, T., Sherman, M.E., Glass, A.G., Manos, M.M., Lorincz, A.T., Kurman, R.J., Buckland, J., Rush, B.B. & Carrington, M. (1998) Human leukocyte antigen class I/II alleles and development of human papillomavirus-related cervical neoplasia: Results from a case-control study conducted in the United States. *Cancer Epidemiol. Biomarkers Prev.*, **7**, 1035–1041
- Hildesheim, A., Hadjimichael, O., Schwartz, P.E., Wheeler, C.M., Barnes, W., Lowell, D.M., Willett, J. & Schiffman, M. (1999) Risk factors for rapid-onset cervical cancer. *Am. J. Obstet. Gynecol.*, **180**, 571–577
- Hildesheim, A., Herrero, R., Castle, P.E., Wacholder, S., Bratti, M.C., Sherman, M.E., Lorincz, A.T., Burk, R.D., Morales, J., Rodriguez, A.C., Helgesen, K., Alfaro, M., Hutchinson, M., Balmaceda, I., Greenberg, M. & Schiffman, M. (2001) HPV co-factors related to the development of cervical cancer: Results from a population-based study in Costa Rica. *Br. J. Cancer*, **84**, 1219–1226
- Hilditch-Maguire, P.A., Lippie, D.M., West, D., Lambert, P.F. & Frazer, I.H. (1999) T cell-mediated and non-specific inflammatory mechanisms contribute to the skin pathology of HPV 16 E6E7 transgenic mice. *Intervirology*, **42**, 43–50
- Hilgarth, M. & Menton, M. (1996) The colposcopic screening. *Eur. J. Obstet. Gynecol. reprod. Biol.*, **65**, 65–69
- Hillemanns, P., Ellerbrock, T.V., McPhillips, S., Dole, P., Alperstein, S., Johnson, D., Sun, X.-W., Chiasson, M.A. & Wright, T.C., Jr (1996) Prevalence of anal human papillomavirus infection and anal cytologic abnormalities in HIV-seropositive women. *AIDS*, **10**, 1641–1647
- Hines, J.F., Ghim, S.J., Christensen, N.D., Kreider, J.W., Barnes, W.A., Schlegel, R. & Jensen, A.B. (1994) Role of conformational epitopes expressed by human papillomavirus major capsid proteins in the serologic detection of infection and prophylactic vaccination. *Gynecol. Oncol.*, **55**, 13–20
- Hinselmann, H. (1925) [Improvement of possibility of inspection of vulva, vagina and cervix uteri.] *München med. Wschr.*, **77**, 1733 (in German).
- Hirayasu, T., Iwamasa, T., Kamada, Y., Koyanagi, Y., Usuda, H. & Genka, K. (1996) Human papillomavirus DNA in squamous cell carcinoma of the lung. *J. clin. Pathol.*, **49**, 810–817
- Hirono, I. (1986) Carcinogenic principles isolated from bracken fern. *Crit. Rev. Toxicol.*, **17**, 1–22
- Hiroshima, K., Toyozaki, T., Iyoda, A., Ohwada, H., Kado, S., Shirasawa, H. & Fujisawa, T. (1999) Ultrastructural study of intranuclear inclusion bodies of pulmonary adenocarcinoma. *Ultrastruct. Pathol.*, **23**, 383–389
- Hisada, M., Rabkin, C.S., Strickler, H.D., Wright, W.E., Christianson, R.E. & van den Berg, B.J. (2000) Human papillomavirus antibody and risk of prostate cancer (Letter to the Editor). *J. Am. med. Assoc.*, **283**, 340–341

- Hisada, M., van den Berg, B.J., Strickler, H.D., Christianson, R.E., Wright, W.E., Waters, D.J. & Rabkin, C.S. (2001) Prospective study of antibody to human papilloma virus type 16 and risk of cervical, endometrial, and ovarian cancers (United States). *Cancer Causes Control*, **12**, 335–341
- Ho, L., Chan, S.-Y., Burk, R.D., Das, B.C., Fujinaga, K., Icenogle, J.P., Kahn, T., Kiviat, N., Lancaster, W., Mavromara-Nazos, P., Labropoulou, V., Mitrani-Rosenbaum, S., Norrild, B., Pillai, M.R., Stoerker, J., Syrjaenen, K., Syrjaenen, S., Tay, S.-K., Villa, L.L., Wheeler, C.M., Williamson, A.-L. & Bernard, U.-H. (1993a) The genetic drift of human papillomavirus type 16 is a means of reconstructing prehistoric viral spread and the movement of ancient human populations. *J. Virol.*, **67**, 6413–6423
- Ho, L., Tay, S.-K., Chan, S.-Y. & Bernard, H.-U. (1993b) Sequence variants of human papillomavirus type 16 from couples suggest sexual transmission with low infectivity and polyclonality in genital neoplasia. *J. infect. Dis.*, **168**, 803–809
- Ho, G.Y.F., Burk, R.D., Klein, S., Kadish, A.S., Chang, C.J., Palan, P., Basu, J., Tachezy, R., Lewis, R. & Romney, S. (1995) Persistent genital human papillomavirus infection as a risk factor for persistent cervical dysplasia. *J. natl Cancer Inst.*, **87**, 1365–1371
- Ho, G.Y.F., Bierman, R., Beardsley, L., Chang, C.J. & Burk, R.D. (1998a) Natural history of cervicovaginal papillomavirus infection in young women. *New Engl. J. Med.*, **338**, 423–428
- Ho, G.Y.F., Kadish, A.S., Burk R.D., Basu, J., Palan, P.R., Mikhail, M. & Romney, S.L. (1998b) HPV 16 and cigarette smoking as risk factors for high-grade cervical intra-epithelial neoplasia. *Int. J. Cancer*, **78**, 281–285
- Ho, G.Y.F., Palan, P.R., Basu, J., Romney, S.L., Kadish, A.S., Mikhail, M., Wassertheil-Smoller, S., Runowicz, C. & Burk, R.D. (1998c) Viral characteristics of human papillomavirus infection and antioxidant levels as risk factors for cervical dysplasia. *Int. J. Cancer*, **78**, 594–599
- Ho, G.Y.F., Studentsov, Y.Y., Bierman, R. & Burk, R.D. (2004) Natural history of human papillomavirus type 16 virus-like particle antibodies in young women. *Cancer Epidemiol. Biomarkers Prev.*, **13**, 110–116
- Hoffmann, J.A. & Reichhart, J.-M. (2002) *Drosophila* innate immunity: An evolutionary perspective. *Nat. Immunol.*, **3**, 121–126
- Hoffmann, M., Kahn, T., Mahnke, C.G., Goeroegh, T., Lippert, B.M. & Werner, J.A. (1998) Prevalence of human papillomavirus in squamous cell carcinoma of the head and neck determined by polymerase chain reaction and Southern blot hybridization: Proposal for optimized diagnostic requirements. *Acta otolaryngol.*, **118**, 138–144
- Hogan, R.J., Mathews, S.A., Mukhopadhyay, S., Summersgill, J.T. & Timms, P. (2004) Chlamydial persistence: Beyond the biphasic paradigm. *Infect. Immun.*, **72**, 1843–1855
- Holly, E.A., Petrakis, N.L., Friend, N.F., Sarles, D.L., Lee, R.E. & Flander, L.B. (1986) Mutagenic mucus in the cervix of smokers. *J. natl Cancer Inst.*, **76**, 983–986
- Holly, E.A., Ralston, M.L., Darragh, T.M., Greenblatt, R.M., Jay, N. & Palefsky, J.M. (2001) Prevalence and risk factors for anal squamous intraepithelial lesions in women. *J. natl Cancer Inst.*, **93**, 843–849
- Holmgren, S.C., Patterson, N.A., Ozbun, M.A. & Lambert, P.F. (2005) The minor capsid protein L2 contributes to two steps in the human papillomavirus type 31 life cycle. *J. Virol.*, **79**, 3938–3948
- Hong, K., Greer, C.E., Ketter, N., Van Nest, G. & Paliard, X. (1997) Isolation and characterization of human papillomavirus type 6-specific T cells infiltrating genital warts. *J. Virol.*, **71**, 6427–6432

- Hook, C.E., Telyatnikova, N., Goodall, J.C., Braud, V.M., Carmichael, A.J., Wills, M.R. & Gaston, J.S.H. (2004) Effects of *Chlamydia trachomatis* infection on the expression of natural killer (NK) cell ligands and susceptibility to NK cell lysis. *Clin. exp. Immunol.*, **138**, 54–60
- Höpfl, R., Bens, G., Wieland, U., Petter, A., Zelger, B., Fritsch, P. & Pfister, H. (1997) Human papillomavirus DNA in non-melanoma skin cancers of a renal transplant recipient: Detection of a new sequence related to epidermodysplasia verruciformis associated types. *J. invest. Dermatol.*, **108**, 53–56
- Hopkins, M.P. & Morley, G.W. (1991) Radical hysterectomy versus radiation therapy for Stage IB squamous cell cancer of the cervix. *Cancer*, **68**, 272–277
- Hopman, A.H.N., Smedts, F., Dignef, W., Ummelen, M., Sonke, G., Mravunac, M., Vooijs, G.P., Speel, E.-J.M. & Ramaekers, F.C.S. (2004) Transition of high-grade cervical intraepithelial neoplasia to micro-invasive carcinoma is characterized by integration of HPV 16/18 and numerical chromosome abnormalities. *J. Pathol.*, **202**, 23–33
- Hørding, U., Junge, J., Daugaard, S., Lundvall, F., Poulsen, H. & Bock, J.E. (1994) Vulvar squamous cell carcinoma and papillomaviruses: Indications for two different etiologies. *Gynecol. Oncol.*, **52**, 241–246
- Horster, S., Thoma-Greber, E., Siebeck, M. & Bogner, J.R. (2003) Is anal carcinoma a HAART-related problem? *Eur. J. med. Res.*, **8**, 142–146
- van Houten, V.M.M., Snijders, P.J.F., van den Brekel, M.W.M., Kummer, J.A., Meijer, C.J.L.M., van Leeuwen, B., Denkers, F., Smeele, L.E., Snow, G.B. & Brakenhoff, R.H. (2001) Biological evidence that human papillomaviruses are etiologically involved in a subgroup of head and neck squamous cell carcinomas. *Int. J. Cancer*, **93**, 232–235
- Howes, K.A., Ransom, N., Papermaster, D.S., Lasudry, J.G., Albert, D.M. & Windle, J.J. (1994) Apoptosis or retinoblastoma: Alternative fates of photoreceptors expressing the HPV-16 E7 gene in the presence or absence of p53. *Genes Dev.*, **8**, 1300–1310
- Howley, P.M. & Lowy, D.R. (2001) Papillomaviruses and their replication. In: Knipe, D.N. & Howley, P.M., eds, *Field's Virology*, Philadelphia, PA, Lippincott, Williams & Wilkins, pp. 2197–2229
- Hsi, E.D., Svoboda-Newman, S.M., Stern, R.A., Nickoloff, B.J. & Frank, T.S. (1997) Detection of human papillomavirus DNA in keratoacanthomas by polymerase chain reaction. *Am. J. Dermatopathol.*, **19**, 10–15
- Hsieh, L.L., Wainfan, E., Hoshina, S., Dizik, M. & Weinstein, I.B. (1989) Altered expression of retrovirus-like sequences and cellular oncogenes in mice fed methyl-deficient diets. *Cancer Res.*, **49**, 3795–3799
- Huang, S., Afonina, I., Miller, B.A. & Beckmann, A.M. (1997) Human papillomavirus types 52 and 58 are prevalent in cervical cancers from Chinese women. *Int. J. Cancer*, **70**, 408–411
- Hubert, W.G. & Laimins, L.A. (2002) Human papillomavirus type 31 replication modes during the early phases of the viral life cycle depend on transcriptional and posttranscriptional regulation of E1 and E2 expression. *J. Virol.*, **76**, 2263–2273
- Hudelist, G., Manavi, M., Pischinger, K.I.D., Watkins-Riedel, T., Singer, C.F., Kubista, E. & Czerwenka, K.F. (2004) Physical state and expression of HPV DNA in benign and dysplastic cervical tissue: Different levels of viral integration are correlated with lesion grade. *Gynecol. Oncol.*, **92**, 873–880

- Hudson, J.B., Bedell, M.A., McCance, D.J., & Laimins, L.A. (1990) Immortalization and altered differentiation of human keratinocytes *in vitro* by the E6 and E7 open reading frames of human papillomavirus type 18. *J. Virol.*, **64**, 519–526
- Hughes, F.J. & Romanos, M.A. (1993) E1 protein of human papillomavirus is a DNA helicase/ATPase. *Nucleic Acids Res.*, **21**, 5817–5823
- Hughes, J.P., Garnett, G.P. & Koutsky, L. (2002) The theoretical population-level impact of a prophylactic human papilloma virus vaccine. *Epidemiology*, **13**, 631–639
- Huibregtse, J.M., Scheffner, M. & Howley, P.M. (1991) A cellular protein mediates association of p53 with the E6 oncoprotein of human papillomavirus types 16 or 18. *EMBO J.*, **10**, 4129–4135
- Huibregtse, J.M., Scheffner, M. & Howley, P.M. (1993) Localization of the E6-AP regions that direct human papillomavirus E6 binding, association with p53, and ubiquitination of associated proteins. *Mol. cell. Biol.*, **13**, 4918–4927
- Hukku, B., Mally, M., Cher, M.L., Peehl, D.M., Kung, H.F. & Rhim, J.S. (2000) Stepwise genetic changes associated with progression of nontumorigenic HPV-18 immortalized human prostate cancer-derived cell line to a malignant phenotype. *Cancer Genet. Cytogenet.*, **120**, 117–126
- de Hullu, J.A., Hollema, H., Piers, D.A., Verheijen, R.H.M., van Diest, P.J., Mourits, M.J.E., Aalders, J.G. & van der Zee, A.G.J. (2000) Sentinel lymph node procedure is highly accurate in squamous cell carcinoma of the vulva. *J. clin. Oncol.*, **18**, 2811–2816
- Hummel, M., Lim, H.B. & Laimins, L.A. (1995) Human papillomavirus type 31b late gene expression is regulated through protein kinase C-mediated changes in RNA processing. *J. Virol.*, **69**, 3381–3388
- Hurlin, P.J., Kaur, P., Smith, P.P., Perez-Reyes, N., Blanton, R.A. & McDougall, J.K. (1991) Progression of human papillomavirus type 18-immortalized human keratinocytes to a malignant phenotype. *Proc. natl. Acad. Sci. USA*, **88**, 570–574
- Hwang, T. (1999) Detection and typing of human papillomavirus DNA by PCR using consensus primers in various cervical lesions of Korean women. *J. Korean med. Sci.*, **14**, 593–599
- Hwang, E.-S., Riese, D.J., II, Settleman, J., Nilson, L.A., Honig, J., Flynn, S. & DiMaio, D. (1993) Inhibition of cervical carcinoma cell line proliferation by the introduction of a bovine papillomavirus regulatory gene. *J. Virol.*, **67**, 3720–3729
- Hwang, E.-S., Nottoli, T. & DiMaio, D. (1995) The HPV16 E5 protein: Expression, detection, and stable complex formation with transmembrane proteins in COS cells. *Virology*, **211**, 227–233
- Hwang, T.S., Jeong, J.K., Park, M., Han, H.S., Choi, H.K. & Park, T.S. (2003) Detection and typing of HPV genotypes in various cervical lesions by HPV oligonucleotide microarray. *Gynecol. Oncol.*, **90**, 51–56
- Hwang, H.-S., Park, M., Lee, S.-Y., Kwon, K.-H. & Pang, M.-G. (2004) Distribution and prevalence of human papillomavirus genotypes in routine pap smear of 2,470 Korean women determined by DNA Chip. *Cancer Epidemiol. Biomarkers Prev.*, **13**, 2153–2156
- IARC (1988) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 44, *Alcohol Drinking*, Lyon
- IARC (1992) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 55, *Solar and Ultraviolet Radiation*, Lyon
- IARC (1994) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 59, *Hepatitis Viruses*, Lyon
- IARC (1995) *IARC Monographs on the evaluation of Carcinogenic Risks to Humans*, Vol. 64, *Human Papillomaviruses*, Lyon

- IARC (2002) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 80, *Non-ionizing Radiation, Part 1: Static and Extremely Low-frequency (ELF) Electric and Magnetic Fields*, Lyon
- IARC (2004) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 83, *Tobacco Smoke and Involuntary Smoking*, Lyon
- IARC (2005) *IARC Handbook on Cancer Prevention*, Vol. 10, *Cervix Cancer Screening*, Lyon, pp. 1–302
- IARC (2007) *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*, Vol. 89, *Smokeless Tobacco Products*, Lyon
- Ibrahim, G.K., Gravitt, P.E., Dittrich, K.L., Ibrahim, S.N., Melhus, O., Anderson, S.M. & Robertson, C.N. (1992) Detection of human papillomavirus in the prostate by polymerase chain reaction and in situ hybridization. *J. Urol.*, **148**, 1822–1826
- Iftner, T. & Villa, L.L. (2003) Human papillomavirus technologies. *J. natl Cancer Inst. Monogr.*, **31**, 80–88
- Iftner, T., Elbel, M., Schopp, B., Hiller, T., Loizou, J.I., Caldecott, K.W. & Stubenrauch, F. (2002) Interference of papillomavirus E6 protein with single-brand break repair by interaction with XRCC1. *EMBO J.*, **21**, 4741–4748
- Iftner, A., Klug, S.J., Garbe, C., Blum, A., Stancu, A., Wilczynski, S.P. & Iftner, T. (2003) The prevalence of human papillomavirus genotypes in nonmelanoma skin cancers of nonimmunosuppressed individuals identifies high-risk genital types as possible risk factors. *Cancer Res.*, **63**, 7515–7519
- Ikenberg, H., Gissmann, L., Gross, G., Grussendorf-Conen, E.-I. & zur Hausen, H. (1983) Human papillomavirus type-16-related DNA in genital Bowen's disease and in Bowenoid papulosis. *Int. J. Cancer*, **32**, 563–565
- Iives, I., Kivi, S. & Ustav, M. (1999) Long-term episomal maintenance of bovine papillomavirus type 1 plasmids is determined by attachment to host chromosomes, which is mediated by the viral E2 protein and its binding sites. *J. Virol.*, **73**, 4404–4412
- Inaba, Y., Egawa, K., Yoshimura, K. & Ono, T. (1993) Demonstration of human papillomavirus type 1 DNA in a wart with bowenoid histologic changes. *Am. J. Dermatopathol.*, **15**, 172–175
- Indinnimeo, M., Cicchini, C., Stazi, A., Giarnieri, E., French, D., Limiti, M.R., Ghini, C. & Vecchione, A. (1999) Human papillomavirus infection and p53 nuclear overexpression in anal canal carcinoma. *J. exp. clin. Cancer Res.*, **18**, 47–52
- Ingoldby, C.J.M., McWhinney, N.A., Wachtel, E. & Castro, J.E. (1980) Serial urinary and cervical cytological studies in women undergoing renal transplantation. *J. clin. Pathol.*, **33**, 990–992
- International Collaboration on HIV and Cancer (2000) Highly active antiretroviral therapy and incidence of cancer in human immunodeficiency virus-infected adults. *J. natl Cancer Inst.*, **92**, 1823–1830
- Ip, S.M., Wong, L.C., Xu, C.M., Cheung, A.N.Y., Tsang, P.C.K. & Ngan, H.Y.S. (2002) Detection of human papillomavirus DNA in malignant lesions from Chinese women with carcinomas of the upper genital tract. *Gynecol. Oncol.*, **87**, 104–111
- Irwin, B.C., Hendrickse, W.A., Pincott, J.R., Bailey, C.M. & Evans, J.N.G. (1986) Juvenile laryngeal papillomatosis. *J. Laryngol. Otol.*, **100**, 435–445
- Ishibashi, T., Tsunokawa, Y., Matsushima, S., Nomura, Y., Sugimura, T. & Terada, M. (1990) Presence of human papillomavirus type-6-related sequences in inverted nasal papillomas. *Eur. Arch. Otorhinolaryngol.*, **247**, 296–299

- Ishiji, T., Kawase, M., Honda, M., Niimura, M., Yoshimura, E., Sata, T. & Matsukura, T. (2000) Distinctive distribution of human papillomavirus type 16 and type 20 DNA in the tonsillar and the skin carcinomas of a patient with epidermodysplasia verruciformis. *Br. J. Dermatol.*, **143**, 1005–1010
- Iwamasa, T., Miyagi, J., Tshako, K., Kinjo, T., Kamada, Y., Hirayasu, T. & Genka, K. (2000) Prognostic implication of human papillomavirus infection in squamous cell carcinoma of the lung. *Pathol. Res. Pract.*, **196**, 209–218
- Iwasawa, A., Nieminen, P., Lehtinen, M. & Paavonen, J. (1997) Human papillomavirus in squamous cell carcinoma of the vulva by polymerase chain reaction. *Obstet. Gynecol.*, **89**, 81–84
- Jablonska, S. (1998) Traditional therapies for the treatment of condylomata acuminata (genital warts). *Australas. J. Dermatol.*, **39** (Suppl.), S2–S4
- Jablonska, S. & Majewski, S. (1994) Epidermodysplasia verruciformis: Immunological and clinical aspects. *Curr. Top. Microbiol. Immunol.*, **186**, 157–175
- Jablonska, S. & Orth, G. (1985) Epidermodysplasia verruciformis. *Clin. Dermatol.*, **3**, 83–96
- Jablonska, S., Orth, G., Obalek, S. & Croissant, O. (1985) Cutaneous warts: Clinical, histologic, and virologic correlations. *Clin. Dermatol.*, **3**, 71–82
- Jablonska, S., Majewski, S., Obalek, S. & Orth, G. (1997) Cutaneous warts. *Clin. Dermatol.*, **15**, 309–319
- Jackson, S. & Storey, A. (2000) E6 proteins from diverse cutaneous HPV types inhibit apoptosis in response to UV damage. *Oncogene*, **19**, 592–598
- Jackson, S., Harwood, C., Thomas, M., Banks, L. & Storey, A. (2000) Role of Bak in UV-induced apoptosis in skin cancer and abrogation by HPV E6 proteins. *Genes Dev.*, **14**, 3065–3073
- Jacob, S.E., Sreevidya, S., Chacko, E. & Pillai, M.R. (2002) Cellular manifestations of human papillomavirus infection in laryngeal tissues. *J. surg. Oncol.*, **79**, 142–150
- Jacobs, M.V., de Roda Husman, A.M., van den Brule, A.J.C., Snijders, P.J.F., Meijer, C.J.L.M. & Walboomers, J.M.M. (1995) Group-specific differentiation between high- and low-risk human papillomavirus genotypes by general primer-mediated PCR and two cocktails of oligonucleotide probes. *J. clin. Microbiol.*, **33**, 901–905
- Jacobs, M.V., Snijders, P.J.F., van den Brule, A.J.C., Helmerhorst, T.J.M., Meijer, C.J.L.M. & Walboomers, J.M.M. (1997) A general primer GP5+/GP6+-mediated PCR-enzyme immunoassay method for rapid detection of 14 high-risk and 6 low-risk human papillomavirus genotypes in cervical scrapings. *J. clin. Microbiol.*, **35**, 791–795
- Jacobs, M.V., Snijders, P.J.F., Voorhorst, F.J., Dillner, J., Forslund, O., Johansson, B., von Knebel Doeberitz, M., Meijer, C.J.L.M., Meyer, T., Nindl, I., Pfister, H., Stockfleth, E., Strand, A., Wadell, G. & Walboomers, J.M.M. (1999) Reliable high risk HPV DNA testing by polymerase chain reaction: An intermethod and intramethod comparison. *J. clin. Pathol.*, **52**, 498–503
- Jacobs, M.V., Walboomers, J.M.M., Snijders, P.J.F., Voorhorst, F.J., Verheijen, R.H.M., Franssen-Daalmeijer, N. & Meijer, C.J.L.M. (2000) Distribution of 37 mucosotropic HPV types in women with cytologically normal cervical smears: The age-related patterns for high-risk and low-risk types. *Int. J. Cancer*, **87**, 221–227
- Jacyk, W.K. & de Villiers, E.-M. (1993) Epidermodysplasia verruciformis in Africans. *Int. J. Dermatol.*, **32**, 806–810
- Jacyk, W.K., Dreyer, L. & de Villiers, E.-M. (1993a) Seborrhic keratoses of black patients with epidermodysplasia verruciformis contain human papillomavirus DNA. *Am. J. Dermatopathol.*, **15**, 1–6

- Jacyk, W.K., Hazelhurst, J.A., Dreyer, L. & Coccia-Portugal, M.A. (1993b) Epidermodysplasia verruciformis and malignant thymoma. *Clin. exp. Dermatol.*, **18**, 89–91
- Jalal, H., Sanders, C.M., Prime, S.S., Scully, C. & Maitland, N. (1992) Detection of human papilloma virus type 16 DNA in oral squame from normal young adults. *J. oral Pathol. Med.*, **21**, 465–470
- Jamieson, D.J., Duerr, A., Burk, R., Klein, R.S., Paramsothy, P., Schuman, P., Cu-Uvin, S. & Shah, K. (2002) Characterization of genital human papillomavirus infection in women who have or who are at risk of having HIV infection. *Am. J. Obstet. Gynecol.*, **186**, 21–27
- Janda, P., Leunig, A., Sroka, R., Betz, C.S. & Rasp, G. (2004) Preliminary report of endolaryngeal and endotracheal laser surgery of juvenile-onset recurrent respiratory papillomatosis by Nd:YAG laser and a new fiber guidance instrument. *Otolaryngol. Head Neck Surg.*, **131**, 44–49
- Janssens, S. & Beyaert, R. (2003) Role of Toll-like receptors in pathogen recognition. *Clin. Microbiol. Rev.*, **16**, 637–646
- Jarrard, D.F., Sarkar, S., Shi, Y., Yeager, T.R., Magrane, G., Kinoshita, H., Nassif, N., Meisner, L., Newton, M.A., Waldman, F.M. & Reznikoff, C.A. (1999) p16/pRb Pathway alterations are required for bypassing senescence in human prostate epithelial cells. *Cancer Res.*, **59**, 2957–2964
- Jarrett, W.F.H. (1978) Transformation of warts to malignancy in alimentary carcinoma in cattle. *Bull. Cancer*, **65**, 191–194
- Jarrett, W.F.H. (1985) The natural history of bovine papillomavirus infections. In: Klein, G., ed., *Advances in Viral Oncology*, Vol. 5, New York, Raven Press, pp. 83–102
- Jarrett, W.F.H., McNeil, P.E., Grimshaw, W.T.R., Selman, I.E. & McIntyre, W.I.M. (1978a) High incidence area of cattle cancer with a possible interaction between an environmental carcinogen and a papilloma virus. *Nature*, **274**, 215–217
- Jarrett, W.F.H., Murphy, J., O'Neil, B.W. & Laird, H.M. (1978b) Virus-induced papillomas of the alimentary tract of cattle. *Int. J. Cancer*, **22**, 323–328
- Jarrett, W.F.H., Campo, M.S., Blaxter, M.L., O'Neil, B.W., Laird, H.M., Moar, M.H. & Sartirana, M.L. (1984a) Alimentary fibropapilloma in cattle: A spontaneous tumor, nonpermissive for papillomavirus replication. *J. natl Cancer Inst.*, **73**, 499–504
- Jarrett, W.F.H., Campo, M.S., O'Neil, B.W., Laird, H.M. & Coggins, L.W. (1984b) A novel bovine papillomavirus (BPV-6) causing true epithelial papillomas of the mammary gland skin: A member of a proposed new BPV subgroup. *Virology*, **136**, 255–264
- Jay, N., Berry, J.M., Hogeboom, C.J., Holly, E.A., Darragh, T.M. & Palefsky, J.M. (1997) Colposcopic appearance of anal squamous intraepithelial lesions. Relationship to histopathology. *Dis. Colon Rectum*, **40**, 919–928
- Jayne, C.J. & Kaufman, R.H. (2002) Treatment of vulvar intraepithelial neoplasia 2/3 with imiquimod. *J. reprod. Med.*, **47**, 395–398
- Jenison, S.A., Yu, X.-P., Valentine, J.M., Koutsky, L.A., Christiansen, A.E., Beckmann, A.M. & Galloway, D.A. (1990) Evidence of prevalent genital-type human papillomavirus infections in adults and children. *J. infect. Dis.*, **162**, 60–69
- Jenson, A.B., Rosenthal, J.D., Olson, C., Pass, F., Lancaster, W.D. & Shah, K. (1980) Immunologic relatedness of papillomaviruses from different species. *J. natl Cancer Inst.*, **64**, 495–500
- Jeon, S. & Lambert, P.F. (1995) Integration of human papillomavirus type 16 DNA into the human genome leads to increased stability of E6 and E7 mRNAs: Implications for cervical carcinogenesis. *Proc. natl Acad. Sci. USA*, **92**, 1654–1658

- Jeon, S., Allen-Hoffmann, B.L. & Lambert, P.F. (1995) Integration of human papillomavirus type 16 into the human genome correlates with a selective growth advantage of cells. *J. Virol.*, **69**, 2989–2997
- Jha, P.K.S., Beral, V., Peto, J., Hack, S., Hermon, C., Deacon, J., Mant, D., Chilvers, C., Vessey, M.P., Pike, M.C., Müller, M. & Gissmann, L. (1993) Antibodies to human papillomavirus and to other genital infectious agents and invasive cervical cancer risk. *Lancet*, **341**, 1116–1118
- Jin, X.W., Cowsert, L., Marshall, D., Reed, D., Pilacinski, W., Lim, L.Y. & Jenson, A.B. (1990) Bovine serological response to a recombinant BPV-1 major capsid protein vaccine. *Inter-virology*, **31**, 345–354
- Jochmus-Kudielka, I., Schneider, A., Braun, R., Kimmig, R., Koldovsky, U., Schneeweis, K.E., Seedorf, K. & Gissmann, L. (1989) Antibodies against the human papillomavirus type 16 early proteins in human sera: Correlation of anti-E7 reactivity with cervical cancer. *J. natl Cancer Inst.*, **81**, 1698–1704
- Johnson, J.E., Dehaeck, C.M.C., Soeters, R. & Williamson, A.-L. (1991) Typing and molecular characterization of human papillomaviruses in genital warts from South African women. *J. med. Virol.*, **33**, 39–42
- Jones, C. (1995) Cervical cancer: Is herpes simplex virus type II a cofactor? *Clin. Microbiol. Rev.*, **8**, 549–556
- Jones, R.W. (2006) Microscopes, microbes and molecules: Evolution of our understanding of the cause and natural history of the precursor lesions of squamous lower genital tract neoplasia. *J. Obstet. Gynaecol. Res.*, **32**, 128–134
- Jones, C.J., Schiffman, M.H., Kurman, R., Jacob, P., III & Benowitz, N.L. (1991) Elevated nicotine levels in cervical lavages from passive smokers. *Am. J. public Health*, **81**, 378–379
- Jones, D.L., Thompson, D.A. & Münger, K. (1997a) Destabilization of the RB tumor suppressor protein and stabilization of p53 contribute to HPV type 16 E7-induced apoptosis. *Virology*, **239**, 97–107
- Jones, D.L., Alani, R.M. & Münger, K. (1997b) The human papillomavirus E7 oncoprotein can uncouple cellular differentiation and proliferation in human keratinocytes by abrogating p21^{Cip1}-mediated inhibition of cdk2. *Genes Dev.*, **11**, 2101–2111
- de Jong, A., O'Neill, T., Khan, A.Y., Kwappenberg, K.M.C., Chisholm, S.E., Whittle, N.R., Dobson, J.A., Jack, L.C., St Clair Roberts, J., Offringa, R., van der Burg, S.H. & Hickling, J.K. (2002) Enhancement of human papillomavirus (HPV) type 16 E6 and E7-specific T-cell immunity in healthy volunteers through vaccination with TA-CIN, an HPV 16 L2E7E6 fusion protein vaccine. *Vaccine*, **20**, 3456–3464
- de Jong, A., van Poelgeest, M.I.E., van der Hulst, J.M., Drijfhout, J.W., Fleuren, G.J., Melief, C.J.M., Kenter, G., Offringa, R. & van der Burg, S.H. (2004) Human papillomavirus type 16-positive cervical cancer is associated with impaired CD4+ T-cell immunity against early antigens E2 and E6. *Cancer Res.*, **64**, 5449–5455
- de Jong-Tieben, L.M., Berkhout, R.J., Smits, H.L., Bouwes Bavinck, J.N., Vermeer, B.J., van der Woude, F.J. & ter Schegget, J. (1995) High frequency of detection of epidermodysplasia verruciformis-associated human papillomavirus DNA in biopsies from malignant and premalignant skin lesions from renal transplant recipients. *Invest. Dermatol.*, **105**, 367–371
- de Jong-Tieben, L.M., Berkhout, R.J.M., ter Schegget, J., Vermeer, B.J., de Fijter, J.W., Bruijn, J.A., Westendorp, R.G.J. & Bouwes Bavinck, J.N. (2000) The prevalence of human papillomavirus DNA in benign keratotic skin lesions of renal transplant recipients with and without a

- history of skin cancer is equally high: A clinical study to assess risk factors for keratotic skin lesions and skin cancer. *Transplantation*, **69**, 44–49
- Josefsson, A., Livak, K. & Gyllensten, U. (1999) Detection and quantitation of human papillomavirus by using the fluorescent 5' exonuclease assay. *J. clin. Microbiol.*, **37**, 490–496
- Josefsson, A.M., Magnusson, P.K.E., Ylitalo, N., Sørensen, P., Qwarforth-Tubbin, P., Andersen, P.K., Melbye, M., Adami, H.-O. & Gyllensten, U.B. (2000) Viral load of human papilloma virus 16 as a determinant for development of cervical carcinoma in situ: A nested case-control study. *Lancet*, **355**, 2189–2193
- Joyce, J.G., Tung, J.-S., Przysiecki, C.T., Cook, J.C., Lehman, E.D., Sands, J.A., Jansen, K.U. & Keller, P.M. (1999) The L1 major capsid protein of human papillomavirus type 11 recombinant virus-like particles interacts with heparin and cell-surface glycosaminoglycans on human keratinocytes. *J. biol. Chem.*, **274**, 5810–5822
- Juárez-Figueroa, L.A., Wheeler, C.M., Uribe-Salas, F.J., Conde-Glez, C.J., Zamilpa-Mejía, L.G., García-Cisneros, S. & Hernández-Avila, M. (2001) Human papillomavirus. A highly prevalent sexually transmitted disease agent among female sex workers from Mexico City. *Sex. transm. Dis.*, **28**, 125–130
- Junge, R.E., Sundberg, J.P., & Lancaster, W.D. (1984) Papillomas and squamous cell carcinomas of horses. *J. Am. vet. Med. Assoc.*, **185**, 656–659
- Junge, J., Poulsen, H., Horn, T., Hørding, U. & Lundvall, F. (1995) Human papillomavirus (HPV) in vulvar dysplasia and carcinoma *in situ*. *APMIS*, **103**, 501–510
- Kabsch, K. & Alonso, A. (2002) The human papillomavirus type 16 E5 protein impairs TRAIL- and FasL-mediated apoptosis in HaCaT cells by different mechanisms. *J. Virol.*, **76**, 12162–12172
- Kadish, A.S., Burk, R.D., Kress, Y., Calderin, S. & Romney, S.L. (1986) Human papillomaviruses of different types in precancerous lesions of the uterine cervix: Histologic, immunocytochemical and ultrastructural studies. *Hum. Pathol.*, **17**, 384–392
- Kadish, A.S., Romney, S.L., Ledwidge, R., Tindle, R., Fernando, G.J.P., Zee, S.Y., Van Ranst, M.A. & Burk, R.D. (1994) Cell-mediated immune responses to E7 peptides of human papillomavirus (HPV) type 16 are dependent on the HPV type infecting the cervix whereas serological reactivity is not type-specific. *J. gen. Virol.*, **75**, 2277–2284
- Kadish, A.S., Ho, G.Y.F., Burk, R.D., Wang, Y., Romney, S.L., Ledwidge, R. & Angeletti, R.H. (1997) Lymphoproliferative responses to human papillomavirus (HPV) type 16 proteins E6 and E7: Outcome of HPV infection and associated neoplasia. *J. natl Cancer Inst.*, **89**, 1285–1293
- Kamel, D., Pääkkö, P., Pöllänen, R., Vähäkangas, K., Lehto, V.-P. & Soini, Y. (1995) Human papillomavirus DNA and abnormal p53 expression in carcinoma of the urinary bladder. *APMIS*, **103**, 331–338
- Kanda, R., Tanigaki, T., Kitano, Y., Yoshikawa, K., Yutsudo, M. & Hakura, A. (1989) Types of human papillomavirus isolated from Japanese patients with epidermodysplasia verruciformis. *Br. J. Dermatol.*, **121**, 463–469
- Kang, J.-K., Kim, J.-H., Lee, S.-H., Kim, D.-H., Kim, H.-S., Lee, J.-E. & Seo, J.-S. (2000) Development of spontaneous hyperplastic skin lesions and chemically induced skin papillomas in transgenic mice expressing human papillomavirus type 16 E6/E7 genes. *Cancer Lett.*, **160**, 177–183

- Kansky, A.A., Poljak, M., Seme, K., Kocjan, B.J., Gale, N., Luzar, B. & Golouh, R. (2003) Human papillomavirus DNA in oral squamous cell carcinomas and normal oral mucosa. *Acta virol.*, **47**, 11–16
- Kapiga, S.H., Msamanga, G.I., Spiegelman, D., Mwakyoma, H., Fawzi, W.W. & Hunter, D.J. (1999) Risk factors for cervical squamous intraepithelial lesions among HIV-1 seropositive women in Dar es Salaam, Tanzania. *Int. J. Gynecol. Obstet.*, **67**, 87–94
- Karcioglu, Z.A. & Issa, T.M. (1997) Human papilloma virus in neoplastic and non-neoplastic conditions of the external eye. *Br. J. Ophthalmol.*, **81**, 595–598
- Kashanchi, F., Araujo, J., Doniger, J., Muralidhar, S., Hoch, R., Khleif, S., Mendelson, E., Thompson, J., Azumi, N., Brady, J.N., Luppi, M., Torelli, G. & Rosenthal, L.J. (1997) Human herpesvirus 6 (HHV-6) ORF-1 transactivating gene exhibits malignant transforming activity and its protein binds to p53. *Oncogene*, **14**, 359–367
- Kashima, H.K. & Shah, K. (1982) Recurrent respiratory papillomatosis. Clinical overview and management principles. *Obstet. Gynecol. Clin. N. Am.*, **14**, 581–588
- Kashima, H.K., Shah, F., Lyles, A., Glackin, R., Muhammad, N., Turner, L., Van Zandt, S., Whitt, S. & Shah, K.V. (1992a) A comparison of risk factors in juvenile-onset and adult-onset recurrent respiratory papillomatosis. *Laryngoscope*, **102**, 9–13
- Kashima, H.K., Kessis, T., Hruban, R.H., Wu, T.C., Zinreich, S.J. & Shah, K.V. (1992b) Human papillomavirus in sinonasal papillomas and squamous cell carcinoma. *Laryngoscope*, **102**, 973–976
- Kashyap, V. & Das, B.C. (1998) DNA aneuploidy and infection of human papillomavirus type 16 in preneoplastic lesions of the uterine cervix: Correlation with progression to malignancy. *Cancer Lett.*, **123**, 47–52
- Kast, W.M., Brandt, R.M.P., Drijfhout, J.W. & Melief, C.J.M. (1993) Human leukocyte antigen-A2.1 restricted candidate cytotoxic T lymphocyte epitopes of human papillomavirus type 16 E6 and E7 proteins identified by using the processing-defective human cell line T2. *J. Immunother.*, **14**, 115–120
- Kataoka, A., Claesson, U., Hansson, B.G., Eriksson, M. & Lindh, E. (1991) Human papillomavirus infection of the male diagnosed by Southern blot hybridization and polymerase chain reaction: Comparison between urethra samples and penile biopsy samples. *J. med. Virol.*, **33**, 159–164
- Katiyar, S., Hedau, S., Jain, N., Kar, P., Khuroo, M.S., Mohanta, J., Kumar, S., Gopalkrishna, V., Kumar, N. & Das, B.C. (2005) p53 Gene mutation and human papillomavirus (HPV) infection in esophageal carcinoma from three different endemic geographic regions of India. *Cancer Lett.*, **218**, 69–79
- Kato, N. & Ueno, H. (1992) Two cases of plantar epidermal cyst associated with human papillomavirus. *Clin. exp. Dermatol.*, **17**, 252–256
- Kaufman, R.H., Bornstein, J., Gordon, A.N., Adam, E., Kaplan, A.L. & Adler-Storthz, K. (1987) Detection of human papillomavirus DNA in advanced epithelial ovarian carcinoma. *Gynecol. Oncol.*, **27**, 340–349
- Kaufman, R.H., Adam, E. & Adler-Storthz, K. (1990) Letter to the editor. *Gynecol. Oncol.*, **37**, 148
- Kaufmann, A.M., Nieland, J., Schinz, M., Nonn, M., Gabelsberger, J., Meissner, H., Müller, R.T., Jochmus, I., Gissmann, L., Schneider, A. & Dürst, M. (2001) HPV16 L1E7 chimeric virus-like particles induce specific HLA-restricted T cells in humans after *in vitro* vaccination. *Int. J. Cancer*, **92**, 285–293

- Kaufmann, A.M., Stern, P.L., Rankin, E.M., Sommer, H., Nuessler, V., Schneider, A., Adams, M., Onon, T.S., Bauknecht, T., Wagner, U., Kroon, K., Hickling, J., Boswell, C.M., Stacey, S.N., Kitchener, H.C., Gillard, J., Wanders, J., Roberts, J.S.C. & Zwierzina, H. (2002) Safety and immunogenicity of TA-HPV, a recombinant vaccinia virus expressing modified human papillomavirus (HPV)-16 and HPV-18 *E6* and *E7* genes, in women with progressive cervical cancer. *Clin. Cancer Res.*, **8**, 3676–3685
- Kaur, P., McDougall, J.K. & Cone, R. (1989) Immortalization of primary human epithelial cells by cloned cervical carcinoma DNA containing human papillomavirus type 16 *E6/E7* open reading frames. *J. gen. Virol.*, **70**, 1261–1266
- Kawaguchi, H., Ohno, S., Araki, K., Miyazaki, M., Saeki, H., Watanabe, M., Tanaka, S. & Sugimachi, K. (2000) p53 Polymorphism in human papillomavirus-associated esophageal cancer. *Cancer Res.*, **60**, 2753–2755
- Kawana, K., Yoshikawa, H., Taketani, Y., Yoshiike, K. & Kanda, T. (1998) In vitro construction of pseudovirions of human papillomavirus type 16: Incorporation of plasmid DNA into reassembled L1/L2 capsids. *J. Virol.*, **72**, 10298–10300
- Kawana, K., Yoshikawa, H., Taketani, Y., Yoshiike, K. & Kanda, T. (1999) Common neutralization epitope in minor capsid protein L2 of human papillomavirus types 16 and 6. *J. Virol.*, **73**, 6188–6190
- Kawana, Y., Kawana, K., Yoshikawa, H., Taketani, Y., Yoshiike, K. & Kanda, T. (2001) Human papillomavirus type 16 minor capsid protein L2 N-terminal region containing a common neutralization epitope binds to the cell surface and enters the cytoplasm. *J. Virol.*, **75**, 2331–2336
- Kawana, K., Yasugi, T., Kanda, T., Kino, N., Oda, K., Okada, S., Kawana, Y., Nei, T., Takada, T., Toyoshima, S., Tsuchiya, A., Kondo, K., Yoshikawa, H., Tsutsumi, O. & Taketani, Y. (2003) Safety and immunogenicity of a peptide containing the cross-neutralization epitope of HPV16 L2 administered nasally in healthy volunteers. *Vaccine*, **21**, 4256–4260
- Kawashima, M., Jablonska, S., Favre, M., Obalek, S., Croissant, O. & Orth, G. (1986) Characterization of a new type of human papillomavirus found in a lesion of Bowen's disease of the skin. *J. Virol.*, **57**, 688–692
- Kawashima, M., Favre, M., Obalek, S., Jablonska, S. & Orth, G. (1990) Premalignant lesions and cancers of the skin in the general population: Evaluation of the role of human papillomaviruses. *J. invest. Dermatol.*, **95**, 537–542
- Kay, P., Soeters, R., Nevin, J., Denny, L., Dehaeck, C.M.C. & Williamson, A.-L. (2003) High prevalence of HPV 16 in South African women with cancer of the cervix and cervical intraepithelial neoplasia. *J. med. Virol.*, **71**, 265–273
- Keating, P.J., Cromme, F.V., Duggan-Keen, M., Sniijders, P.J.F., Walboomers, J.M.M., Hunter, R.D., Dyer, P.A. & Stern, P.L. (1995) Frequency of down regulation of individual HLA-A and -B alleles in cervical carcinomas in relation to TAP-1 expression. *Br. J. Cancer*, **72**, 405–411
- Kedzia, H., Gozdzicka-Jozefiak, A., Kedzia, W. & Poreba, E. (1995) The value of the presence of HPV16 in pelvic lymph nodes of cervical cancer patients. *Eur. J. Gynaecol. Oncol.*, **16**, 199–202
- Keefe, M., Al-Ghamdi, A., Coggon, D., Maitland, N.J., Egger, P., Keefe, C.J., Carey, A. & Sanders, C.M. (1994) Butchers' warts: No evidence for person to person transmission of HPV 7. *Br. J. Dermatol.*, **130**, 15–17

- Keefe, K.A., Schell, M.J., Brewer, C., McHale, M., Brewster, W., Chapman, J.A., Rose, G.S., McMeeken, D.S., Lagerberg, W., Peng, Y.-M., Wilczynski, S.P., Anton-Culver, H., Meyskens, F.L. & Berman, M.L. (2001) A randomized, double blind, phase III trial using oral β -carotene supplementation for women with high-grade cervical intraepithelial neoplasia. *Cancer Epidemiol. Biomarkers Prev.*, **10**, 1029–1035
- Kennedy, I.M., Haddow, J.K. & Clements, J.B. (1991) A negative regulatory element in the human papillomavirus type 16 genome acts at the level of late mRNA stability. *J. Virol.*, **65**, 2093–2097
- Kenny, D., Shen, L.-P. & Kolberg, J.A. (2002) Detection of viral infection and gene expression in clinical tissue specimens using branched DNA (bDNA) in situ hybridization. *J. Histochem. Cytochem.*, **50**, 1219–1227
- Kenton-Smith, J. & Tan, S.T. (1999) Pulsed dye laser therapy for viral warts. *Br. J. plast. Surg.*, **52**, 554–558
- Kerley, S.W., Persons, D.L. & Fishback, J.L. (1991) Human papillomavirus and carcinoma of the urinary bladder. *Mod. Pathol.*, **4**, 316–319
- Kersemakers, A.-M., van de Vijver, M.J., Kenter, G.G. & Fleuren, G.J. (1999) Genetic alterations during the progression of squamous cell carcinomas of the uterine cervix. *Genes Chrom. Cancer*, **26**, 346–354
- Kessis, T.D., Slebos, R.J., Nelson, W.G., Kastan, M.B., Plunkett, B.S., Han, S.M., Lörincz, A.T., Hedrick, L. & Cho, K.R. (1993) Human papillomavirus 16 E6 expression disrupts the p53-mediated cellular response to DNA damage. *Proc. natl Acad. Sci. USA*, **90**, 3988–3992
- Kessis, T.D., Connolly, D.C., Hedrick, L. & Cho, K.R. (1996) Expression of HPV16 E6 or E7 increases integration of foreign DNA. *Oncogene*, **13**, 427–431
- Kettler, A.H., Rutlege, M., Tschén, J.A. & Buffone, G. (1990) Detection of human papillomavirus in nongenital Bowen's disease by in situ DNA hybridization. *Arch. Dermatol.*, **126**, 777–781
- Keys, H.M., Bundy, B.N., Stehman, F.B., Muderspach, L.I., Chafe, W.E., Suggs, C.L., III, Walker, J.L. & Gersell, D. (1999) Cisplatin, radiation, and adjuvant hysterectomy compared with radiation and adjuvant hysterectomy for bulky stage IB cervical carcinoma. *New Engl. J. Med.*, **340**, 1154–1161
- Khammanivong, V., Liu, X.S., Liu, W.J., Rodda, S.J., Leggatt, G.R., Tindle, R.W., Frazer, I.H. & Fernando, G.J.P. (2003) Paucity of functional CTL epitopes in the E7 oncoprotein of cervical cancer associated human papillomavirus type 16. *Immunol. Cell Biol.*, **81**, 1–7
- Khan, M.A., Jenkins, G.R., Tolleson, W.H., Creek, K.E. & Pirisi, L. (1993) Retinoic acid inhibition of human papillomavirus type 16-mediated transformation of human keratinocytes. *Cancer Res.*, **53**, 905–909
- Khare, S., Pater, M.M., Tang, S.-C. & Pater, A. (1997) Effect of glucocorticoid hormones on viral gene expression, growth, and dysplastic differentiation in HPV16-immortalized ectocervical cells. *Exp. Cell Res.*, **232**, 353–360
- Khleif, S.N., DeGregori, J., Yee, C.L., Otterson, G.A., Kaye, F.J., Nevins, J.R. & Howley, P.M. (1996) Inhibition of cyclin D-CDK4/CDK6 activity is associated with an E2F-mediated induction of cyclin kinase inhibitor activity. *Proc. natl Acad. Sci. USA*, **93**, 4350–4354
- Kibríté, A., Zeitouni, N.C. & Cloutier, R. (1997) Aggressive giant condyloma acuminatum associated with oncogenic human papilloma virus: A case report. *Can. J. Surg.*, **40**, 143–145
- Kim, Y.-I., Giuliano, A., Hatch, K.D., Schneider, A., Nour, M.A., Dallal, G.E., Selhub, J. & Mason, J.B. (1994) Global DNA hypomethylation increases progressively in cervical dysplasia and carcinoma. *Cancer*, **74**, 893–899

- Kim, J.W., Lee, C.G., Han, S.M., Kim, K.S., Kim, J.O., Lee, J.M., Kim, I.K. & Namkoong, S.E. (1997) Loss of heterozygosity of retinoblastoma and p53 genes in primary cervical carcinomas with human papillomavirus infection. *Gynecol. Oncol.*, **67**, 215–221
- Kim, C.J., Jeong, J.K., Park, M., Park, T.S., Park, T.C., Namkoong, S.E. & Park, J.S. (2003) HPV oligonucleotide microarray-based detection of HPV genotypes in cervical neoplastic lesions. *Gynecol. Oncol.*, **89**, 210–217
- Kim, J., Lee, D., Hwang, S.G., Hwang, E.-S. & Choe, J. (2003) BRCA1 associates with human papillomavirus type 18 E2 and stimulates E2-dependent transcription. *Biochem. biophys. Res. Commun.*, **305**, 1008–1016
- Kim, K., Garner-Hamrick, P.A., Fisher, C., Lee, D. & Lambert, P.F. (2003) Methylation patterns of papillomavirus DNA, its influence on E2 function, and implications in viral infection. *J. Virol.*, **77**, 12450–12459
- Kimberlin, D.W. (2004) Current status of antiviral therapy for juvenile-onset recurrent respiratory papillomatosis. *Antiviral Res.*, **63**, 141–151
- Kinghorn, G.R., McMillan, A., Mulcahy, F., Drake, S., Lacey, C. & Bingham, J.S. (1993) An open, comparative, study of the efficacy of 0.5% podophyllotoxin lotion and 25% podophyllotoxin solution in the treatment of condylomata acuminata in males and females. *Int. J. STD AIDS*, **4**, 194–199
- Kinoshita, I., Dosaka-Akita, H., Shindoh, M., Fujino, M., Akie, K., Kato, M., Fujinaga, K. & Kawakami, Y. (1995) Human papillomavirus type 18 DNA and E6–E7 mRNA are detected in squamous cell carcinoma and adenocarcinoma of the lung. *Br. J. Cancer*, **71**, 344–349
- Kirby, P.K., Kiviat, N., Beckman, A., Wells, D., Sherwin, S. & Corey, L. (1988) Tolerance and efficacy of recombinant human interferon gamma in the treatment of refractory genital warts. *Am. J. Med.*, **85**, 183–188
- Kirgan, D., Manalo, P. & McGregor, B. (1990) Immunohistochemical demonstration of human papilloma virus antigen in human colon neoplasms. *J. surg. Res.*, **48**, 397–402
- Kirnbauer, R., Booy, F., Cheng, N., Lowy, D.R. & Schiller, J.T. (1992) Papillomavirus L1 major capsid protein self-assembles into virus-like particles that are highly immunogenic. *Proc. natl Acad. Sci. USA*, **89**, 12180–12184
- Kirnbauer, R., Taub, J., Greenstone, H., Roden, R., Dürst, M., Gissmann, L., Lowy, D.R. & Schiller, J.T. (1993) Efficient self-assembly of human papillomavirus type 16 L1 and L1-L2 into virus-like particles. *J. Virol.*, **67**, 6929–6936
- Kirnbauer, R., Hubbert, N.L., Wheeler, C.M., Becker, T.M., Lowy, D.R. & Schiller, J.T. (1994) A virus-like particle enzyme-linked immunosorbent assay detects serum antibodies in a majority of women infected with human papillomavirus type 16. *J. natl Cancer Inst.*, **86**, 494–499
- Kirnbauer, R., Chandrachud, L.M., O’Neil, B.W., Wagner, E.R., Grindlay, G.J., Armstrong, A., McGarvie, G.M., Schiller, J.T., Lowy, D.R. & Campo, M.S. (1996) Virus-like particles of bovine papillomavirus type 4 in prophylactic and therapeutic immunization. *Virology*, **219**, 37–44
- Kiviat, N.B. & Koutsky, L.A. (1993) Specific human papillomavirus types as the causal agents of most cervical intraepithelial neoplasia: Implications for current views and treatment. *J. natl Cancer Inst.*, **85**, 934–935
- Kiviat, N.B., Koutsky, L.A., Paavonen, J.A., Galloway, D.A., Critchlow, C.W., Beckmann, A.M., McDougall, J.K., Peterson, M.L., Stevens, C.E., Lipinski, C.M. & Holmes, K.K. (1989) Pre-

- valence of genital papillomavirus infection among women attending a college student health clinic or a sexually transmitted disease clinic. *J. infect. Dis.*, **159**, 293–302
- Kiviat, N.B., Critchlow, C.W. & Kurman, R.J. (1992) Reassessment of the morphological continuum of cervical intraepithelial lesions: Does it reflect different stages in the progression to cervical carcinoma? In: Muñoz, N., Bosch, F.X., Shah, K.V. & Meheus, A., eds, *The Epidemiology of Cervical Cancer and Human Papillomavirus* (IARC Scientific Publications No. 119), Lyon, pp. 59–66
- Kiyono, T., Hiraiwa, A., Fujita, M., Hayashi, Y., Akiyama, T. & Ishibashi, M. (1997) Binding of high-risk human papillomavirus E6 oncoproteins to the human homologue of the *Drosophila* discs large tumor suppressor protein. *Proc. natl Acad. Sci. USA*, **94**, 11612–11616
- Kiyono, T., Foster, S.A., Koop, J.I., McDougall, J.K., Galloway, D.A. & Klingelutz, A.J. (1998) Both Rb/p16^{INK4a} inactivation and telomerase activity are required to immortalize human epithelial cells. *Nature*, **396**, 84–88
- Kjaer, S.K. & Lynge, E. (1989) Incidence, prevalence and time trends of genital HPV infection determined by clinical examination and cytology. In: Muñoz, N., Bosch, F.X., Shah, K.V. & Meheus, A., eds, *The Epidemiology of Cervical Cancer and Human Papillomavirus* (IARC Scientific Publications No. 119), Lyon, pp. 113–124
- Kjaer, S.K., van den Brule, A.J.C., Bock, J.E., Poll, P.A., Engholm, G., Sherman, M.E., Walboomers, J.M.M. & Meijer, C.J.L.M. (1996) Human papillomavirus — The most significant risk determinant of cervical intraepithelial neoplasia. *Int. J. Cancer*, **65**, 601–606
- Kjaer, S.K., van den Brule, A.J.C., Bock, J.E., Poll, P.A., Engholm, G., Sherman, M.E., Walboomers, J.M.M. & Meijer, C.J.L.M. (1997) Determinants for genital human papillomavirus (HPV) infection in 1000 randomly chosen young Danish women with normal Pap smear: Are there different risk profiles for oncogenic and nononcogenic HPV types? *Cancer Epidemiol. Biomarkers Prev.*, **6**, 799–805
- Kjaer, S.K., Svare, E.I., Worm, A.M., Walboomers, J.M., Meijer, C.J. & van den Brule, A.J. (2000) Human papillomavirus infection in Danish female sex workers. Decreasing prevalence with age despite continuously high sexual activity. *Sex. transm. Dis.*, **27**, 438–445
- Kjaer, S.K., Chackerian, B., van den Brule, A.J.C., Svare, E.I., Paull, G., Walboomers, J.M.M., Schiller, J.T., Bock, J.E., Sherman, M.E., Lowy, D.R. & Meijer, C.L.M. (2001) High-risk human papillomavirus is sexually transmitted: Evidence from a follow-up study of virgins starting sexual activity (intercourse). *Cancer Epidemiol. Biomarkers Prev.*, **10**, 101–106
- Kjaer, S.K., van den Brule, A.J.C., Paull, G., Svare, E.I., Sherman, M.E., Thomsen, B.L., Suntum, M., Bock, J.E., Poll, P.A. & Meijer, C.J.L.M. (2002) Type specific persistence of high risk human papillomavirus (HPV) as indicator of high grade cervical squamous intraepithelial lesions in young women: Population based prospective follow up study. *Br. med. J.*, **325**, 572–578
- Kjellberg, L., Wang, Z., Wiklund, F., Edlund, K., Ångström, T., Lenner, P., Sjöberg, I., Hallmans, G., Wallin, K.-L., Sapp, M., Schiller, J.T., Wadell, G., Mählck, C.-G. & Dillner, J. (1999) Sexual behaviour and papillomavirus exposure in cervical intraepithelial neoplasia: A population-based case-control study. *J. gen. Virol.*, **80**, 391–398
- Kjellberg, L., Hallmans, G., Åhren, A.-M., Johansson, R., Bergman, F., Wadell, G., Ångström, T. & Dillner, J. (2000) Smoking, diet, pregnancy and oral contraceptive use as risk factors for cervical intra-epithelial neoplasia in relation to human papillomavirus infection. *Br. J. Cancer*, **82**, 1332–1338

- Klaes, R., Woerner, S.M., Ridder, R., Wentzensen, N., Duerst, M., Schneider, A., Lotz, B., Melsheimer, P. & von Knebel Doeberitz, M. (1999) Detection of high-risk cervical intra-epithelial neoplasia and cervical cancer by amplification of transcripts derived from integrated papillomavirus oncogenes. *Cancer Res.*, **59**, 6132–6136
- Klaes, R., Friedrich, T., Spitkovsky, D., Ridder, R., Rudy, W., Petry, U., Dallenbach-Hellweg, G., Schmidt, D. & von Knebel Doeberitz, M. (2001) Over expression of p16^{INK4A} as a specific marker for dysplastic and neoplastic epithelial cells of the cervix uteri. *Int. J. Cancer*, **92**, 276–284
- Klaes, R., Benner, A., Friedrich, T., Ridder, R., Herrington, S., Jenkins, D., Kurman, R.J., Schmidt, D., Stoler, M. & von Knebel Doeberitz, M. (2002) p16^{INK4a} Immunohistochemistry improves interobserver agreement in the diagnosis of cervical intraepithelial neoplasia. *Am. J. surg. Pathol.*, **26**, 1389–1399
- Klein, R.S., Ho, G.Y.F., Vermund, S.H., Fleming, I. & Burk, R.D. (1994) Risk factors for squamous intraepithelial lesions on Pap smear in women at risk for human immunodeficiency virus infection. *J. infect. Dis.*, **170**, 1404–1409
- Klencke, B., Matijevic, M., Urban, R.G., Lathey, J.L., Hedley, M.L., Berry, M., Thatcher, J., Weinberg, V., Wilson, J., Darragh, T., Jay, N., Da Costa, M. & Palefsky, J.M. (2002) Encapsulated plasmid DNA treatment for human papillomavirus 16-associated anal dysplasia: A Phase I study of ZYC101. *Clin. Cancer Res.*, **8**, 1028–1037
- Kleter, B., van Doorn, L.-J., ter Schegget, J., Schrauwen, L., van Krimpen, K., Burger, M., ter Harmsel, B. & Quint, W. (1998) Novel short-fragment PCR assay for highly sensitive broad-spectrum detection of anogenital human papillomaviruses. *Am. J. Pathol.*, **153**, 1731–1739
- Kleter, B., van Doorn, L.-J., Schrauwen, L., Molijn, A., Sastrowijoto, S., ter Schegget, J., Lindeman, J., ter Harmsel, B., Burger, M. & Quint, W. (1999) Development and clinical evaluation of a highly sensitive PCR-reverse hybridization line probe assay for detection and identification of anogenital human papillomavirus. *J. clin. Microbiol.*, **37**, 2508–2517
- Klingelhutz, A.J., Foster, S.A. & McDougall, J.K. (1996) Telomerase activation by the E6 gene product of human papillomavirus type 16. *Nature*, **380**, 79–82
- Kloster, B.E., Manias, D.A., Ostrow, R.S., Shaver, M.K., McPherson, S.W., Rangen, S.R.S., Uno, H. & Faras, A.J. (1988) Molecular cloning and characterization of the DNA of two papillomaviruses from monkeys. *Virology*, **166**, 30–40
- von Knebel-Doeberitz, M., Rittmüller, C., zur Hausen, H. & Dürst, M. (1992) Inhibition of tumorigenicity of cervical cancer cells in nude mice by HPV E6-E7 anti-sense RNA (Letter to the Editor). *Int. J. Cancer*, **51**, 831–834
- von Knebel-Doeberitz, M., Rittmüller, C., Aengeneyndt, F., Jansen-Dürr, P. & Spitkovsky, D. (1994) Reversible repression of papillomavirus oncogene expression in cervical carcinoma cells: Consequences for the phenotype and E6-p53 and E7-pRB interactions. *J. Virol.*, **68**, 2811–2821
- Knight, G.L., Grainger, J.R., Gallimore, P.H. & Roberts, S. (2004) Cooperation between different forms of the human papillomavirus type 1 E4 protein to block cell cycle progression and cellular DNA synthesis. *J. Virol.*, **78**, 13920–13933
- Knobler, R.M., Schneider, S., Neumann, R.A., Bodemer, W., Radlwimmer, B., Aberer, E., Söltz-Szöts, J. & Gebhart, W. (1989) DNA dot-blot hybridization implicates human papillomavirus type 11-DNA in epithelioma cuniculatum. *J. med. Virol.*, **29**, 33–37

- Knowles, M.A. (1992) Human papillomavirus sequences are not detectable by Southern blotting or general primer-mediated polymerase chain reaction in transitional cell tumours of the bladder. *Urol. Res.*, **20**, 297–301
- Koch, A., Hansen, S.V., Nielsen, N.M., Palefsky, J. & Melbye, M. (1997) HPV detection in children prior to sexual debut. *Int. J. Cancer*, **73**, 621–624
- Köchel, H.G., Sievert, K., Monazahian, M., Mittelstädt-Deterding, A., Teichmann, A. & Thomssen, R. (1991) Antibodies to human papillomavirus type-16 in human sera as revealed by the use of prokaryotically expressed viral gene products. *Virology*, **182**, 644–654
- Kodner, C.M. & Nasratty, S. (2004) Management of genital warts. *Am. fam. Physician*, **70**, 2335–2346
- Koffa, M., Koumantakis, E., Ergazaki, M., Tsatsanis, C. & Spandidos, D.A. (1995) Association of herpesvirus infection with the development of genital cancer. *Int. J. Cancer*, **63**, 58–62
- Kojima, A., Maeda, H., Kurahashi, N., Sakagami, G., Kubo, K., Yoshimoto, H. & Kameyama, Y. (2003) Human papillomaviruses in the normal oral cavity of children in Japan. *Oral Oncol.*, **39**, 821–828
- Kok, T.C., Nooter, K., Tjong-A-Hung, S.P., Smits, H.L. & ter Schegget, J. for the Rotterdam Oesophageal Tumour Study Group, Rotterdam, The Netherlands (1997) No evidence of known types of human papillomavirus in squamous cell cancer of the oesophagus in a low-risk area. *Eur. J. Cancer*, **33**, 1865–1868
- Konya, J. & Dillner, J. (2001) Immunity to oncogenic human papillomaviruses. *Adv. Cancer Res.*, **82**, 205–238
- Koppikar, P., de Villiers, E.-M. & Mulherkar, R. (2005) Identification of human papillomaviruses in tumors of the oral cavity in an Indian community. *Int. J. Cancer*, **113**, 946–950
- Kornegay, J.R., Shepard, A.P., Hankins, C., Franco, E., Lapointe, N., Richardson, H., the Canadian Women's HIV Study Group & Coutlée, F. (2001) Nonisotopic detection of human papillomavirus DNA in clinical specimens using a consensus PCR and a generic probe mix in an enzyme-linked immunosorbent assay format. *J. clin. Microbiol.*, **39**, 3530–3536
- Koskela, P., Anttila, T., Bjorge, T., Brunsvig, A., Dillner, J., Hakama, M., Hakulinen, T., Jellum, E., Lehtinen, M., Lenner, P., Luostarinen, T., Pukkala, E., Saikku, P., Thoresen, S., Youngman, L. & Paavonen, J. (2000) *Chlamydia trachomatis* infection as a risk factor for invasive cervical cancer. *Int. J. Cancer*, **85**, 35–39
- Kosko, J.R. & Derkay, C.S. (1996) Role of cesarean section in prevention of recurrent respiratory papillomatosis — Is there one? *Int. J. pediatr. Otorhinolaryngol.*, **35**, 31–38
- Koss, L.G. & Durfee, G.R. (1955) Cytological changes preceding the appearance of in situ carcinoma of the uterine cervix. *Cancer*, **8**, 295–301
- Kottmeier, H.L. (1961) [Evolution and treatment of epitheliomas.] *Rev. fr. Gynécol. Obstét.*, **56**, 821–826 (in French)
- Kourounis, G., Iatrakis, G., Diakakis, I., Sakellaropoulos, G., Ladopoulos, I. & Prapa, Z. (1999) Treatment results of liquid nitrogen cryotherapy on selected pathologic changes of the uterine cervix. *Clin. exp. Obstet. Gynecol.*, **26**, 115
- Koutsky, L.A., Galloway, D.A. & Holmes, K.K. (1988) Epidemiology of genital human papillomavirus infection. *Epidemiol. Rev.*, **10**, 122–163
- Koutsky, L.A., Holmes, K.K., Critchlow, C.W., Stevens, C.E., Paavonen, J., Beckmann, A.M., DeRouen, T.A., Galloway, D.A., Vernon, D. & Kiviat, N.B. (1992) A cohort study of the risk

- of cervical intraepithelial neoplasia grade 2 or 3 in relation to papillomavirus infection. *New Engl. J. Med.*, **327**, 1272–1278
- Koutsky, L.A., Ault, K.A., Wheeler, C.M., Brown, D.R., Barr, E., Alvarez, F.B., Chiacchierini, L.M. & Jansen, K.U. for the Proof of Principle Study Investigators (2002) A controlled trial of a human papillomavirus type 16 vaccine. *New Engl. J. Med.*, **347**, 1645–1651
- Kraft, M., Simmen, D., Casas, R. & Pfaltz, M. (2001) Significance of human papillomavirus in sinonasal papillomas. *J. Laryngol. Otol.*, **115**, 709–714
- Krebs, H.-B. (1991) Treatment of genital condylomata with topical 5-fluorouracil. *Dermatol. Clin.*, **9**, 333–341
- Kreider, J.W. & Bartlett, G.L. (1981) The Shope papilloma-carcinoma complex of rabbits: A model system of neoplastic progression and spontaneous regression. *Adv. Cancer Res.*, **35**, 81–110
- Kreimer, A.K., Alberg, A.J., Daniel, R., Gravitt, P.E., Viscidi, R., Garrett, E.S., Shah, K.V. & Gillison, M.L. (2004) Oral human papillomavirus infection in adults is associated with sexual behavior and HIV serostatus. *J. infect. Dis.*, **189**, 686–698
- Kreimer, A.R., Clifford, G.M., Boyle, P. & Franceschi, S. (2005) Human papillomavirus types in head and neck squamous cell carcinomas worldwide: A systematic review. *Cancer Epidemiol. Biomarkers Prev.*, **14**, 467–475
- Kremsdorf, D., Favre, M., Jablonska, S., Obalek, S., Rueda, L.A., Lutzner, M.A., Blanchet-Bardon, C., Van Voorst Vader, P.C. & Orth, G. (1984) Molecular cloning and characterization of the genomes of nine newly recognized human papillomavirus types associated with epidermodysplasia verruciformis. *J. Virol.*, **52**, 1013–1018
- Kripke, M.L. & Morison, W.L. (1985) Modulation of immune function by UV radiation. *J. invest. Dermatol.*, **85** (Suppl.), 62S–66S
- von Krogh, G. (2001) Management of anogenital warts (condylomata acuminata). *Eur. J. Dermatol.*, **11**, 598–603
- von Krogh, G. & Longstaff, E. (2001) Podophyllin office therapy against condyloma should be abandoned. *Sex. transm. Infect.*, **77**, 409–412
- Krüger-Kjaer, S., van den Brule, A.J.C., Svare, E.I., Engholm, G., Sherman, M.E., Poll, P.A., Walboomers, J.M.M., Bock, J.E., & Meijer, C.J.L.M. (1998) Different risk factor patterns for high-grade and low-grade intraepithelial lesions on the cervix among HPV-positive and HPV-negative young women. *Int. J. Cancer*, **76**, 613–619
- Krul, E.J.T., Schipper, R.F., Schreuder, G.M.T., Fleuren, G.J., Kenter, G.G. & Melief, C.J.M. (1999) HLA and susceptibility to cervical neoplasia. *Hum. Immunol.*, **60**, 337–342
- Kruse, A.-J., Baak, J.P.A., de Bruin, P.C., Jiwa, M., Snijders, W.P., Boodt, P.J., Fons, G., Houben, P.W.H. & The, H.S. (2001) Ki-67 immunoquantitation in cervical intraepithelial neoplasia (CIN): A sensitive marker for grading. *J. Pathol.*, **193**, 48–54
- Kuck, D., Lau, T., Leuchs, B., Kern, A., Müller, M., Gissmann, L. & Kleinschmidt, J.A. (2006) Intranasal vaccination with recombinant adeno-associated virus type 5 against human papillomavirus type 16 L1. *J. Virol.*, **80**, 2621–2630
- Kühne, C. & Banks, L. (1998) E3-ubiquitin ligase/E6-AP links multicopy maintenance protein 7 to the ubiquitination pathway by a novel motif, the L2G box. *J. Biol. Chem.*, **273**, 34302–34309
- Kukimoto, I., Aihara, S., Yoshiike, K. & Kanda, T. (1998) Human papillomavirus oncoprotein E6 binds to the C-terminal region of human minichromosome maintenance 7 protein. *Biochem. biophys. Res. Commun.*, **249**, 258–262

- Kulasingam, S.L., Hughes, J.P., Kiviat, N.B., Mao, C., Weiss, N.S., Kuypers, J.M. & Koutsky, L.A. (2002) Evaluation of human papillomavirus testing in primary screening cervical abnormalities. Comparison of sensitivity, specificity, and frequency of referral. *J. Am. med. Assoc.*, **288**, 1749–1757
- Kulmala, S.-M., Syrjänen S., Shabalova, I., Petrovichev, N., Kozachenko, V., Podistov, J., Ivanchenko, O., Zakharenko, S., Nerovjna, R., Kljukina, L., Branovskaja, M., Grunberga, V., Juschenko, A., Tosi, P., Santopietro, R., Syrjänen, K. & the NIS Cohort Study Group (2004) Human papillomavirus testing with the Hybrid Capture 2 assay and PCR as screening tools. *J. clin. Microbiol.*, **42**, 2470–2475
- van Kuppeveld, F.J.M., de Jong, A., Dijkman, H.B.P.M., Andino, R. & Melchers, W.J.G. (2002) Studies towards the potential of poliovirus as a vector for the expression of HPV 16 virus-like-particles. *FEMS Immunol. med. Microbiol.*, **34**, 201–208
- Kurose, K., Terai, M., Soedarsono, N., Rabello, D., Nakajima, Y., Burk, R.D. & Takagi, M. (2004) Low prevalence of HPV infection and its natural history in normal oral mucosa among volunteers on Miyako Island, Japan. *Oral Surg. oral Med. oral Pathol. oral Radiol. Endod.*, **98**, 91–96
- Labropoulou, V., Balamotis, A., Tosca, A., Rotola, A. & Mavromara-Nazos, P. (1994) Typing of human papillomaviruses in condylomata acuminata from Greece. *J. med. Virol.*, **42**, 259–263
- Lacey, C.J. (1992). Assessment of exposure to sexually transmitted agents other than human papillomavirus. In: Muñoz, N., Bosch, F.X., Shah, K.V. & Meheus, A., eds, *The Epidemiology of Cervical Cancer and Human Papillomavirus* (IARC Scientific Publications No. 119), Lyon, pp. 93–105
- Lacey, M., Alpert, S. & Hanahan, D. (1986) Bovine papillomavirus genome elicits skin tumours in transgenic mice. *Nature*, **322**, 609–612
- Lacey, C.J.N., Thompson, H.S.G., Monteiro, E.F., O'Neill, T., Davies, M.L., Holding, F.P., Fallon, R.E. & Roberts, J.S.C. (1999) Phase IIa safety and immunogenicity of a therapeutic vaccine, TA-GW, in persons with genital warts. *J. infect. Dis.*, **179**, 612–618
- Lacey, H.B., Wilson, G.E., Tilston, P., Wilkins, E.G.L., Bailey, A.S., Corbitt, G. & Green, P.M. (1999) A study of anal intraepithelial neoplasia in HIV positive homosexual men. *Sex transm. Infect.*, **75**, 172–177
- Lacey, J.V., Jr, Brinton, L.A., Abbas, F.M., Barnes, W.A., Gravitt, P.E., Greenberg, M.D., Greene, S.M., Hadjimichael, O.C., McGowan, L., Mortel, R., Schwartz, P.E., Silverberg, S.G. & Hildesheim, A. (1999) Oral contraceptives as risk factors for cervical adenocarcinomas and squamous cell carcinomas. *Cancer Epidemiol. Biomarkers Prev.*, **8**, 1079–1085
- Lacey, J.V., Jr, Brinton, L.A., Barnes, W.A., Gravitt P.E., Greenberg, M.D., Hadjimichael, O.C., McGowan, L., Mortel, R., Schwartz, P.E., Kurman, R.J. & Hildesheim, A. (2000) Use of hormone replacement therapy and adenocarcinomas and squamous cell carcinomas of the uterine cervix. *Gynecol. Oncol.*, **77**, 149–154
- Lacey, J.V., Jr, Frisch, M., Brinton, L.A., Abbas, F.M., Barnes, W.A., Gravitt, P.E., Greenberg, M.D., Greene, S.M., Hadjimichael, O.C., McGowan, L., Mortel, R., Schwartz, P.E., Zaino, R.J. & Hildesheim, A. (2001) Associations between smoking and adenocarcinomas and squamous cell carcinomas of the uterine cervix (United States). *Cancer Causes Control*, **12**, 153–161
- Lacey, C.J.N., Goodall, R.L., Tennvall, G.R., Maw, R., Kinghorn, G.R., Fisk, P.G., Barton, S. & Byren, I. for the Perstorp Pharma Genital Warts Clinical Trial Group (2003) Randomised

- controlled trial and economic evaluation of podophyllotoxin solution, podophyllotoxin cream, and podophyllin in the treatment of genital warts. *Sex. Transm. Infect.*, **79**, 270–275
- Lagergren, J., Wang, Z., Bergström, R., Dillner, J. & Nyrén, O. (1999) Human papillomavirus infection and esophageal cancer: A nationwide seroepidemiologic case–control study in Sweden. *J. natl Cancer Inst.*, **91**, 156–162
- Lai, C.-H., Wang, C.-Y., Lin, C.-Y. & Pao, C.C. (1994) Detection of human papillomavirus RNA in ovarian and endometrial carcinomas by reverse transcription/polymerase chain reaction. *Gynecol. obstet. Invest.*, **38**, 276–280
- Lai, M.-D., Luo, M.-J., Yao, J.-E. & Chen, P.-H. (1998) Anal cancer in Chinese: Human papillomavirus infection and altered expression of p53. *World J. Gastroenterol.*, **4**, 298–302
- Lam, K.-Y., He, D., Ma, L., Zhang, D., Ngan, H.Y.-S., Wan, T.S.-K. & Tsao, S.-W. (1997) Presence of human papillomavirus in esophageal squamous cell carcinomas of Hong Kong Chinese and its relationship with p53 gene mutation. *Hum. Pathol.*, **28**, 657–663
- Lamarcq, L., Deeds, J., Ginzinger, D., Perry, J., Padmanabha S. & Smith-McCune, K. (2002) Measurements of human papillomavirus transcripts by real time quantitative reverse transcription-polymerase chain reaction in samples collected for cervical cancer screening. *J. mol. Diagn.*, **4**, 97–102
- Lambert, P.F. (1991) Papillomavirus DNA replication. *J. Virol.*, **65**, 3417–3420
- Lambert, P.F., Monk, B.C. & Howley, P.M. (1990) Phenotypic analysis of bovine papillomavirus type 1 E2 repressor mutants. *J. Virol.*, **64**, 950–956
- Lambert, P.F., Pan, H., Pitot, H.C., Liem, A., Jackson, M. & Griep, A.E. (1993) Epidermal cancer associated with expression of human papillomavirus type 16 E6 and E7 oncogenes in the skin of transgenic mice. *Proc. natl Acad. Sci. USA*, **90**, 5583–5587
- Lambropoulos, A.F., Dimitrakopoulos, J., Frangoulides, E., Katopodi, R., Kotsis, A. & Karakasis, D. (1997) Incidence of human papillomavirus 6, 11, 16, 18 and 33 in normal oral mucosa of a Greek population. *Eur. J. oral Sci.*, **105**, 294–297
- Lancaster, W.D., Olson, C. & Meinke, W. (1977) Bovine papillomavirus: Presence of virus specific DNA sequences in naturally occurring equine tumors. *Proc. natl Acad. Sci. USA*, **74**, 524–528
- Landers, R.J., O’Leary, J.J., Crowley, M., Healy, I., Annis, P., Burke, L., O’Brien, D., Hogan, J., Kealy, W.F., Lewis, F.A. & Doyle, C.T. (1993) Epstein-Barr virus in normal, pre-malignant, and malignant lesions of the uterine cervix. *J. clin. Pathol.*, **46**, 931–935
- Landoni, F., Maneo, A., Colombo, A., Placa, F., Milani, R., Perego, P., Favini, G., Ferri, L. & Mangioni, C. (1997) Randomised study of radical surgery versus radiotherapy for stage Ib-IIa cervical cancer. *Lancet*, **350**, 535–540
- Langley, C.L., Benga-De, E., Critchlow, C.W., Ndoye, I., Mbengue-Ly, M.D., Kuypers, J., Woto-Gaye, G., Mboup, S., Bergeron, C., Holmes, K.K. & Kiviat, N.B. (1996) HIV-1, HIV-2, human papillomavirus infection and cervical neoplasia in high-risk African women. *AIDS*, **10**, 413–417
- Lanham, S., Herbert, A., Basarab, A. & Watt, P. (2001) Detection of cervical infections in colposcopy clinic patients. *J. clin. Microbiol.*, **39**, 2946–2950
- Larson, A.A., Liao, S.-Y., Stanbridge, E.J., Cavenee, W.K., & Hampton, G.M. (1997) Genetic alterations accumulate during cervical tumorigenesis and indicate a common origin for multifocal lesions. *Cancer Res.*, **57**, 4171–4176
- La Ruche, G., You, B., Mensah-Ado, I., Bergeron, C., Montcho, C., Ramon, R., Touré-Coulibaly, K., Wellfens-Ekra, C., Dabis, F. & Orth, G. (1998) Human papillomavirus and human

- immunodeficiency virus infections: Relation with cervical dysplasia-neoplasia in African women. *Int. J. Cancer*, **76**, 480–486
- La Roche, G., Leroy, V., Mensah-Ado, I., Ramon, R., You, B., Bergeron, C., Mothebesoane-Anoh, S., Touré-Coulibaly, K. & Dabis, F. for the DYSCER-CI Group (1999) Short-term follow up of cervical squamous intraepithelial lesions associated with HIV and human papillomavirus infections in Africa. *Int. J. STD AIDS*, **10**, 363–368
- LaRue, H., Simoneau, M. & Fradet, Y. (1995) Human papillomavirus in transitional cell carcinoma of the urinary bladder. *Clin. Cancer Res.*, **1**, 435–440
- Laukkanen, P., Koskela, P., Pukkala, E., Dillner, J., Läärä, E., Knekt, P. & Lehtinen, M. (2003) Time trends in incidence and prevalence of human papillomavirus type 6, 11 and 16 infections in Finland. *J. gen Virol.*, **84**, 2105–2109
- Lavergne, D. & de Villiers, E.-M. (1999) Papillomavirus in esophageal papillomas and carcinomas. *Int. J. Cancer*, **80**, 681–684
- Lawton, G., Thomas, S., Schonrock, J., Monsour, F. & Frazer, I. (1992) Human papillomaviruses in normal oral mucosa: A comparison of methods for sample collection. *J. oral Pathol. Med.*, **21**, 265–269
- Layde, P.M. (1989) Smoking and cervical cancer: Cause or coincidence? *J. Am. med. Assoc.*, **261**, 1631–1633
- Lazcano-Ponce, E., Herrero, R., Muñoz, N., Cruz, A., Shah, K.V., Alonso, P., Hernández, P., Salmerón, J. & Hernández, M. (2001) Epidemiology of HPV infection among Mexican women with normal cervical cytology. *Int. J. Cancer*, **91**, 412–420
- Lazo, P.A. (1999) The molecular genetics of cervical carcinoma. *Br. J. Cancer*, **80**, 2008–2018
- Lea, J.S., Coleman, R., Kurien, A., Schorge, J.O., Miller, D.S., Minna, J.D. & Muller, C.Y. (2004) Aberrant *p16* methylation is a biomarker for tobacco exposure in cervical squamous cell carcinogenesis. *Am. J. Obstet. Gynecol.*, **190**, 674–679
- Leachman, S.A., Tigelaar, R.E., Shylankevich, M., Slade, M.D., Irwin, M., Chang, E., Wu, T.C., Xiao, W., Pazhani, S., Zelterman, D. & Brandsma, J.L. (2000) Granulocyte-macrophage colony-stimulating factor priming plus papillomavirus E6 DNA vaccination: Effects on papilloma formation and regression in the cottontail rabbit papillomavirus–rabbit model. *J. Virol.*, **74**, 8700–8708
- Leake, J.F., Woodruff, J.D., Searle, C., Daniel, R., Shah, K.V. & Currie, J.L. (1989) Human papillomavirus and epithelial ovarian neoplasia. *Gynecol. Oncol.*, **34**, 268–273
- Le Cann, P., Coursaget, P., Iochmann, S. & Touze, A. (1994) Self-assembly of human papillomavirus type 16 capsids by expression of the L1 protein in insect cells. *FEMS Microbiol. Lett.*, **117**, 269–274
- Lechner, M.S., Mack, D.H., Finicle, A.B., Crook, T., Vousden, K.H. & Laimins, L.A. (1992) Human papillomavirus E6 proteins bind p53 *in vivo* and abrogate p53-mediated repression of transcription. *EMBO J.*, **11**, 3045–3052
- Lécuru, F., Hoffman, H., Mezan, de Malartic, C. & Taurelle, R. (1997) [Microinvasive cervical cancer.] *J. Gynecol. Obstet. Biol. reprod.*, **26**, 662–670 (in French)
- Lee, S.S., Weiss, R.S. & Javier, R.T. (1997) Binding of human virus oncoproteins to hDlg/SAP97, a mammalian homolog of the *Drosophila* discs large tumor suppressor protein. *Proc. natl Acad. Sci. USA*, **94**, 6670–6675
- Lee, K.-Y., Broker, T.R. & Chow, L.T. (1998) Transcription factor YY1 represses cell-free replication from human papillomavirus origins. *J. Virol.*, **72**, 4911–4917

- Lee, S.S., Glaunsinger, B., Mantovani, F., Banks, L. & Javier, R.T. (2000) Multi-PDZ domain protein MUPP1 is a cellular target for both adenovirus E4-ORF1 and high-risk papillomavirus type 18 E6 oncoproteins. *J. Virol.*, **74**, 9680–9693
- Lee, E.-S., Whang, M.R. & Kang, W.H. (2001) Absence of human papillomavirus DNA in non-genital seborrheic keratosis. *J. Korean med. Sci.*, **16**, 619–622
- Lee, W.T., Lee, J.E., Lee, S.H., Jang, H.S., Giffard, R.G. & Park, K.A. (2001) Human papilloma virus type 16 E7 genes protect astrocytes against apoptotic and necrotic death induced by hydrogen peroxide. *Yonsei med. J.*, **42**, 471–479
- Lee, D., Kim, J.W., Kim, K., Joe, C.O., Schreiber, V., Menissier-De Murcia, J. & Choe, J. (2002) Functional interaction between human papillomavirus type 18 E2 and poly(ADP-ribose) polymerase 1. *Oncogene*, **21**, 5877–5885
- Leechanachai, P., Banks, L., Moreau, F. & Matlashewski, G. (1992) The E5 gene from human papillomavirus type 16 is an oncogene which enhances growth factor-mediated signal transduction to the nucleus. *Oncogene*, **7**, 19–25
- van der Leest, R.J., Zachow, K.R., Ostrow, R.S., Bender, M., Pass, F. & Faras, A.J. (1987) Human papillomavirus heterogeneity in 36 renal transplant recipients. *Arch. Dermatol.*, **123**, 354–357
- Leggatt, G.R., Dunn, L.A., De Kluyver, R.L., Stewart, T. & Frazer, I.H. (2002) Interferon-gamma enhances cytotoxic T lymphocyte recognition of endogenous peptide in keratinocytes without lowering the requirement for surface peptide. *Immunol. Cell Biol.*, **80**, 415–424
- Lehman, C.W. & Botchan, M.R. (1998) Segregation of viral plasmids depends on tethering to chromosomes and is regulated by phosphorylation. *Proc. natl Acad. Sci. USA*, **95**, 4338–4343
- Lehmann, M., Groh, A., Rödel, J., Nindl, I. & Straube, E. (1999) Detection of *Chlamydia trachomatis* DNA in cervical samples with regard to infection by human papillomavirus. *J. Infect.*, **38**, 12–17
- Lehtinen, M., Dillner, J., Knekt, P., Luostarinen, T., Aromaa, A., Kirnbauer, R., Koskela, P., Paavonen, J., Peto, R., Schiller, J.T. & Hakama, M. (1996) Serologically diagnosed infection with human papillomavirus type 16 and risk for subsequent development of cervical carcinoma: Nested case–control study. *Br. med. J.*, **312**, 537–539
- Lehtinen, M., Luostarinen, T., Youngman, L.D., Anttila, T., Dillner, J., Hakulinen, T., Kosekela, P., Lenner, P. & Hallmans, G. (1999) Low levels of serum vitamins A and E in blood and subsequent risk for cervical cancer: Interaction with HPV seropositivity. *Nutr. Cancer*, **34**, 229–234
- Lehtinen, M., Koskela, P., Jellum, E., Bloigu, A., Anttila, T., Hallmans, G., Luukkaala, T., Thoresen, S., Youngman, L., Dillner, J. & Hakama, M. (2002) Herpes simplex virus and risk of cervical cancer: A longitudinal, nested case–control study in the Nordic countries. *Am. J. Epidemiol.*, **156**, 687–692
- Lehtinen, M., Pawlita, M., Zumbach, K., Lie, K., Hakama, M., Jellum, E., Koskela, P., Luostarinen, T., Paavonen, J., Pukkala, E., Sigstad, E., Thoresen, S. & Dillner, J. (2003) Evaluation of antibody response to human papillomavirus early proteins in women in whom cervical cancer developed 1 to 20 years later. *Am. J. Obstet. Gynecol.*, **188**, 49–55
- Leigh, I.M., Buchanan, J.A.G., Harwood, C.A., Cerio, R. & Storey, A. (1999) Role of human papillomaviruses in cutaneous and oral manifestations of immunosuppression. *J. Acquir. Immune Defic. Syndr.*, **21**, S49–S57
- Leis, P.F., Stevens, K.R., Baer, S.C., Kadmon, D., Goldberg, L.H. & Wang, X.-J. (1998) A *c-ras^{Ha}* mutation in the metastasis of a human papillomavirus (HPV)-18 positive penile squamous cell

- carcinoma suggests a cooperative effect between HPV-18 and *c-ras^{Ha}* activation in malignant progression. *Cancer*, **83**, 122–129
- Leiserowitz, G.S., Hall, K.S., Foster, C.A., Hitchcock, M.E., Christensen, N.D., Heim, K. & Smith, L.H. (1997) Detection of serologic neutralizing antibodies against HPV-11 in patients with condyloma acuminata and cervical dysplasia using an *in vitro* assay. *Gynecol. Oncol.*, **66**, 295–299
- Lemmers, M.J. & Barry, J.M. (1990) De novo carcinoma of the lower urinary tract in renal allograft recipients. *J. Urol.*, **144**, 1233–1235
- Leonard, C.J. & Berns, K.I. (1994) Adeno-associated virus type 2: A latent life cycle. *Prog. Nucleic Acid Res. mol. Biol.*, **48**, 29–52
- Leptak, C., Ramon y Cajal, S., Kulke, R., Horwitz, B.H., Riese, D.J., II, Dotto, G.P. & DiMaio, D. (1991) Tumorigenic transformation of murine keratinocytes by the E5 genes of bovine papillomavirus type 1 and human papillomavirus type 16. *J. Virol.*, **65**, 7078–7083
- Leroy, V., Ladner, J., De Clercq, A., Meheus, A., Nyiraziraje, M., Karita, E. & Dabis, F. for the Pregnancy and HIV Study Group (EGE) (1999) Cervical dysplasia and HIV type 1 infection in African pregnant women: A cross sectional study, Kigali, Rwanda. *Sex. transm. Infect.*, **75**, 103–106
- Levi, J.E., Rahal, P., Sarkis, Á.S. & Villa, L.L. (1998) Human papillomavirus DNA and *p53* status in penile carcinomas. *Int. J. Cancer*, **76**, 779–783
- Levi, J.E., Fink, M.C.S., Canto, C.L.M., Carretiero, N., Matsubara, R., Linhares, I., das Dores, G.B., Castelo, A., Segurado, A., Uip, D.E. & Eluf Neto, J. (2002) Human papillomavirus prevalence, viral load and cervical intraepithelial neoplasia in HIV-infected women. *Braz. J. infect. Dis.*, **6**, 129–134
- Levi, J.E., Fernandes, S., Tateno, A.F., Motta, E., Lima, L.P., Eluf-Neto, J. & Pannuti, C.S. (2004) Presence of multiple human papillomavirus types in cervical samples from HIV-infected women. *Gynecol. Oncol.*, **92**, 225–231
- Lewandowsky, F. & Lutz, W. (1922) [One case of skin cancer undescribed until now (epidermodysplasia verruciformis).] *Arch. Dermatol. Syphilol.*, **141**, 193–203 (in German)
- Li, Y., Nichols, M.A., Shay, J.W. & Xiong, Y. (1994) Transcriptional repression of the D-type cyclin-dependent kinase inhibitor p16 by the retinoblastoma susceptibility gene product pRb. *Cancer Res.*, **54**, 6078–6082
- Li, Q., Hu, K., Pan, X., Cao, Z., Yang, J. & Hu, S. (1995) Detection of human papillomavirus types 16, 18 DNA related sequences in bronchogenic carcinoma by polymerase chain reaction. *Chin. med. J.*, **108**, 610–614
- Li, M., Cripe, T.P., Estes, P.A., Lyon, M.K., Rose, R.C. & Garcea, R.L. (1997) Expression of the human papillomavirus type 11 L1 capsid protein in *Escherichia coli*: Characterization of protein domains involved in DNA binding and capsid assembly. *J. Virol.*, **71**, 2988–2995
- Li, S., Labrecque, S., Gauzzi, M.C., Cuddihy, A.R., Wong, A.H.T., Pellegrini, S., Matlashewski, G.J. & Koromilas, A.E. (1999) The human papilloma virus (HPV)-18 E6 oncoprotein physically associates with Tyk2 and impairs Jak-STAT activation by interferon- α . *Oncogene*, **18**, 5727–5737
- Li, T., Lu, Z.-M., Chen, K.-N., Guo, M., Xing, H.-P., Mei, Q., Yang, H.-H., Lechner, J.F. & Ke, Y. (2001) Human papillomavirus type 16 is an important infectious factor in the high incidence of esophageal cancer in Anyang area of China. *Carcinogenesis*, **22**, 929–934

- Li, T., Lu, Z.-M., Guo, M., Wu, Q.-J., Chen, K.-N., Xing, H.-P., Mei, Q. & Ke, Y. (2002) p53 Codon 72 polymorphism (C/G) and the risk of human papillomavirus-associated carcinomas in China. *Cancer*, **95**, 2571–2576
- Li, Y.-H., Gao, X.-H., He, C.-D., Zhang, G., Dong, X. & Chen, H.-D. (2002) Detection of human papillomavirus and response to oral retinoid ethylester in 2 cases of Darier disease. *Arch. Dermatol.*, **138**, 695–696
- Li, J., Gerhard, D.S., Zhang, Z., Huettner, P.C., Wright, J., Nguyen, L., Lu, D. & Rader, J.S. (2003) Denaturing high-performance liquid chromatography for detecting and typing genital human papillomavirus. *J. clin. Microbiol.*, **41**, 5563–5571
- Li, W., Thompson, C.H., Xin, D., Cossart, Y.E., O'Brien, C.J., McNeil, E.B., Gao, K., Scolyer, R.A. & Rose, B.R. (2003) Absence of human papillomavirus in tonsillar squamous cell carcinomas from Chinese patients. *Am. J. Pathol.*, **163**, 2185–2189
- Li, Y.-H., Chen, G., Dong, X.-P. & Chen, H.-D. (2004) Detection of epidermodysplasia verruciformis-associated human papillomavirus DNA in nongenital seborrheic keratosis. *Br. J. Dermatol.*, **151**, 1060–1065
- Liaw, K.-L., Glass, A.G., Manos, M.M., Greer, C.E., Scott D.R., Sherman, M., Burk, R.D., Kurman, R.J., Wacholder, S., Rush, B.B., Cadell, D.M., Lawler, P., Tabor, D. & Schiffman, M. (1999) Detection of human papillomavirus DNA in cytologically normal women and subsequent cervical squamous intraepithelial lesions. *J. natl Cancer Inst.*, **91**, 954–960
- Liaw, K.-L., Hildesheim, A., Burk, R.D., Gravitt, P., Wacholder, S., Manos, M.M., Scott, D.R., Sherman, M.E., Kurman, R.J., Glass, A.G., Anderson, S.M. & Schiffman, M. (2001) A prospective study of human papillomavirus (HPV) type 16 DNA detection by polymerase chain reaction and its association with acquisition and persistence of other HPV types. *J. infect. Dis.*, **183**, 8–15
- Lillo, F.B., Ferrari, D., Veglia, F., Origoni, M., Grasso, M.A., Lodini, S., Mastroiilli, E., Taccagni, G., Lazzarin, A. & Uberti-Foppa, C. (2001) Human papillomavirus infection and associated cervical disease in human immunodeficiency virus-infected women: Effect of highly active antiretroviral therapy. *J. infect. Dis.*, **184**, 547–551
- de Lima Soares, V., de Mesquita, A.M.T.S., Cavalcante, F.G.T., Silva, Z.P., Hora, V., Diedrich, T., de Carvalho Silva, P., de Melo, P.G., Dacal, A.R.C., de Carvalho, E.M.F. & Feldmeier, H. (2003) Sexually transmitted infections in a female population in rural north-east Brazil: Prevalence, morbidity and risk factors. *Trop. Med. int. Health*, **8**, 595–603
- Lin, Y.-L., Borenstein, L.A., Selvakumar, R., Ahmed, R. & Wettstein, F.O. (1992) Effective vaccination against papilloma development by immunization with L1 or L2 structural protein of cottontail rabbit papillomavirus. *Virology*, **187**, 612–619
- Lin, Y.L., Borenstein, L.A., Selvakumar, R., Ahmed, R. & Wettstein, F.O. (1993) Progression from papilloma to carcinoma is accompanied by changes in antibody response to papillomavirus proteins. *J. Virol.*, **67**, 382–389
- Lin, C.-T., Tseng, C.-J., Lai, C.-H., Hsueh, S., Huang, H.-J. & Law K.-S. (2000) High-risk HPV DNA detection by Hybrid Capture II. An adjunctive test for mildly abnormal cytologic smears in women ≥ 50 years of age. *J. reprod. Med.*, **45**, 345–350
- Lin, W.M., Michalopoulos, E.A., Dhurander, N., Cheng, P.C., Robinson, W., Ashfaq, R., Coleman, R.L. & Muller, C.Y. (2000) Allelic loss and microsatellite alterations of chromosome 3p14.2 are more frequent in recurrent cervical dysplasias. *Clin. Cancer Res.*, **6**, 1410–1414

- Lin, P., Koutsky, L.A., Critchlow, C.W., Apple, R.J., Hawes, S.E., Hughes, J.P., Touré, P., Dembele, A. & Kiviat, N.B. (2001) HLA class II DR-DQ and increased risk of cervical cancer among Senegalese women. *Cancer Epidemiol. Biomarkers Prev.*, **10**, 1037–1045
- Lin, H.-T., Steller, M.A., Aish, L., Hanada, T. & Chishti, A.H. (2004) Differential expression of human Dlg in cervical intraepithelial neoplasias. *Gynecol. Oncol.*, **93**, 422–428
- Lina, P.H.C., van Noord, M.J. & de Groot, F.G. (1973) Detection of virus in squamous papillomas of the wild bird species *Fringilla coelebs*. *J. natl Cancer Inst.*, **50**, 567–571
- Lindeberg, H. & Elbrønd, O. (1991) Malignant tumours in patients with a history of multiple laryngeal papillomas: The significance of irradiation. *Clin. Otolaryngol.*, **16**, 149–151
- Lindel, K., Beer, K.T., Laissue, J., Greiner, R.H. & Aebersold, D.M. (2001) Human papillomavirus positive squamous cell carcinoma of the oropharynx. A radiosensitive subgroup of head and neck carcinoma. *Cancer*, **92**, 805–813
- Lindgren, V., Sippola-Thiele, M., Skowronski, J., Wetzel, E., Howley, P.M. & Hanahan, D. (1989) Specific chromosomal abnormalities characterize fibrosarcomas of bovine papillomavirus type 1 transgenic mice. *Proc. natl Acad. Sci. USA*, **86**, 5025–5029
- Lindholm, I., Murphy, J., O'Neil, B.W., Campo, M.S. & Jarrett, W.F.H. (1984) Papillomas of the teats and udder of cattle and their causal viruses. *Vet. Rec.*, **115**, 574–577
- Lioi, M.B., Barbieri, R., Borzacchiello, G., Dezzi, S., Roperto, S., Santoro, A., Russo, V. & Roperto, F. (2004) Chromosome aberrations in cattle with chronic enzootic haematuria. *J. comp. Pathol.*, **131**, 233–236
- List, H.-J., Patzel, V., Zeidler, U., Schopen, A., Rühl, G., Stollwerk, J. & Klock, G. (1994) Methylation sensitivity of the enhancer from the human papillomavirus type 16. *J. biol. Chem.*, **269**, 11902–11911
- Liu, H.-R., Xing, L.-Q. & Si, J.-Y. (1994) [A study of human papillary virus infection by in situ hybridization and histopathology in squamous cell carcinoma of the lung.] *Chin. J. Pathol.*, **23**, 299–301
- Liu, Y., Chen, J.J., Gao, Q., Dalal, S., Hong, Y., Mansur, C.P., Band, V. & Androphy, E.J. (1999) Multiple functions of human papillomavirus type 16 E6 contribute to the immortalization of mammary epithelial cells. *J. Virol.*, **73**, 7297–7307
- Liu, D.-W., Tsao, Y.-P., Kung, J.T., Ding, Y.-A., Sytwu, H.-K., Xiao, X. & Chen, S.-L. (2000) Recombinant adeno-associated virus expressing human papillomavirus type 16 E7 peptide DNA fused with heat shock protein DNA as a potential vaccine for cervical cancer. *J. Virol.*, **74**, 2888–2894
- Liu, Y., You, H., Chiriva-Internati, M., Korourian, S., Lowery, C.L., Carey, M.J., Smith, C.V. & Hermonat, P.L. (2001a) Display of complete life cycle of human papillomavirus type 16 in cultured placental trophoblasts. *Virology*, **290**, 99–105
- Liu, Y., Klimberg, V.S., Andrews, N.R., Hicks, C.R., Peng, H., Chiriva-Internati, M., Henry-Tillman, R. & Hermonat, P.L. (2001b) Human papillomavirus DNA is present in a subset of unselected breast cancers. *J. hum. Virol.*, **4**, 329–334
- Longuet, M., Cassonnet, P. & Orth, G. (1996) A novel genital human papillomavirus (HPV), HPV type 74, found in immunosuppressed patients. *J. clin. Microbiol.*, **34**, 1859–1862
- Longworth, M.S. & Laimins, L.A. (2004) Pathogenesis of human papillomaviruses in differentiating epithelia. *Microbiol. mol. Biol. Rev.*, **68**, 362–372
- Lonky, N.M., Felix, J.C., Naidu, Y.M. & Wolde-Tsadik, G. (2003) Triage of atypical squamous cells of undetermined significance with Hybrid Capture II: Colposcopy and histologic human papillomavirus correlation. *Obstet. Gynecol.*, **101**, 481–489

- Loo, Y.-M. & Melendy, T. (2004) Recruitment of replication protein A by the papillomavirus E1 protein and modulation by single-stranded DNA. *J. Virol.*, **78**, 1605–1615
- Look, K.Y., Blessing, J.A., Nelson, B.E., Johnson, G.A., Fowler, W.C., Jr & Reid, G.C. (1998) A phase II trial of isotretinoin and alpha interferon in patients with recurrent squamous cell carcinoma of the cervix. A Gynecologic Oncology Group Study. *Am. J. clin. Oncol.*, **21**, 591–594
- Lopes, V., Young, L.S. & Murray, P.G. (2003) Epstein-Barr virus-associated cancers: Aetiology and treatment. *Herpes*, **10**, 78–82
- Lopez-Beltran, A. & Muñoz, E. (1995) Transitional cell carcinoma of the bladder: Low incidence of human papillomavirus DNA detected by the polymerase chain reaction and in situ hybridization. *Histopathology*, **26**, 565–569
- Lorenzato, M., Clavel, C., Masure, M., Nou, J.-M., Bouttens, D., Evrard, G., Bory, J.-P., Maugard, B., Quereux, C. & Birembaut, P. (2001) DNA image cytometry and human papillomavirus (HPV) detection help to select smears at high risk of high-grade cervical lesions. *J. Pathol.*, **194**, 171–176
- Lörincz, A. & Anthony, J. (2001) Advances in HPV detection by Hybrid Capture®. *Papillomavirus Rep.*, **12**, 145–154
- Lörincz, A.T. & Richart, R.M. (2003) Human papillomavirus DNA testing as an adjunct to cytology in cervical screening programs. *Arch. Pathol. Lab. Med.*, **127**, 959–968
- Lörincz, A.T., Reid, R., Jenson, A.B., Greenberg, M.D., Lancaster, W. & Kurman, R.J. (1992) Human papillomavirus infection of the cervix: Relative risk associations of 15 common anogenital types. *Obstet. Gynecol.*, **79**, 328–337
- Lorincz, A.T., Castle, P.E., Sherman, M.E., Scott, D.R., Glass, A.G., Wacholder, S., Rush, B.B., Gravitt, P.E., Schussler, J.E. & Schiffman, M. (2002) Viral load of human papillomavirus and risk of CIN3 or cervical cancer. *Lancet*, **360**, 228–229
- Lowy, D.R. & Schiller, J.T. (2006) Prophylactic human papillomavirus vaccines. *J. clin. Invest.*, **116**, 1167–1173
- Lu, J.Z.-J., Sun, Y.-N., Rose, R.C., Bonnez, W. & McCance, D.J. (1993) Two E2 binding sites (E2BS) alone or one E2BS plus an A/T-rich region are minimal requirements for the replication of the human papillomavirus type 11 origin. *J. Virol.*, **67**, 7131–7139
- Lu, Q.L., Lalani E.-N. & Abel, P. (1997) Human papillomavirus 16 and 18 infection is absent in urinary bladder carcinomas. *Eur. Urol.*, **31**, 428–432
- Ludmerer, S.W., Benincasa, D. & Mark, G.E., III (1996) Two amino acid residues confer type specificity to a neutralizing, conformationally dependent epitope on human papillomavirus type 11. *J. Virol.*, **70**, 4791–4794
- Ludmerer, S.W., Benincasa, D., Mark, G.E., III & Christensen, N.D. (1997) A neutralizing epitope of human papillomavirus type 11 is principally described by a continuous set of residues which overlap a distinct linear, surface-exposed epitope. *J. Virol.*, **71**, 3834–3839
- Luesley, D.M., Jordan, J.A., Woodman, C.B.J., Watson, N., Williams, D.R. & Waddell, C. (1987) A retrospective review of adenocarcinoma-*in-situ* and glandular atypia of the uterine cervix. *Br. J. Obstet. Gynaecol.*, **94**, 699–703
- Luff, R.D. (1992) The Bethesda System for reporting cervical/vaginal cytological diagnoses: Report of the 1991 Bethesda Workshop. *Hum. Pathol.*, **23**, 719–721

- Luft, F., Klaes, R., Nees, M., Dürst, M., Heilmann, V., Melsheimer, P. & von Knebel Doeberitz, M. (2001) Detection of integrated papillomavirus sequences by ligation mediated PCR (DIPS-PCR) and molecular characterization in cervical cancer cells. *Int. J. Cancer*, **92**, 9–17
- Lungu, O., Sun, X.W., Felix, J., Richart, R.M., Silverstein, S. & Wright, T.C., Jr (1992) Relationship of human papillomavirus type to grade of cervical intraepithelial neoplasia. *J. Am. med. Assoc.*, **267**, 2493–2496
- Luostarinen, T., af Geijersstam, V.A.F., Bjørge, T., Eklund, C., Hakama, M., Hakulinen, T., Jellum, E., Koskela, P., Paavonen, J., Pukkala, E., Schiller, J.T., Thoresen, S., Youngman, L.D., Dillner, J. & Lehtinen, M. (1999) No excess risk of cervical carcinoma among women seropositive for both HPV16 and HPV6/11. *Int. J. Cancer*, **80**, 818–822
- Luostarinen, T., Lehtinen, M., Bjørge, T., Abeler, V., Hakama, M., Hallmans, G., Jellum, E., Koskela, P., Lenner, P., Lie, A.K., Paavonen, J., Pukkala, E., Saikku, P., Sigstad, E., Thoresen, S., Youngman, L.D., Dillner, J. & Hakulinen, T. (2004) Joint effects of different human papillomaviruses and *Chlamydia trachomatis* infections on risk of squamous cell carcinoma of the cervix uteri. *Eur. J. Cancer*, **40**, 1058–1065
- Luque, A.E., Demeter, L.M. & Reichman, R.C. (1999) Association of human papillomavirus infection and disease with magnitude of human immunodeficiency virus type 1 (HIV-1) RNA plasma level among women with HIV-1 infection. *J. infect. Dis.*, **179**, 1405–1409
- Lüscher-Firzlaff, J.M., Westendorf, J.M., Zwicker, J., Burkhardt, H., Henriksson, M., Müller, R., Pirollet, F. & Lüscher, B. (1999) Interaction of the fork head domain transcription factor MPP2 with the human papilloma virus 16 E7 protein: Enhancement of transformation and transactivation. *Oncogene*, **18**, 5620–5630
- Lutzner, M.A. (1978) Epidermodysplasia verruciformis. An autosomal recessive disease characterized by viral warts and skin cancer. A model for viral oncogenesis. *Bull. Cancer*, **65**, 169–182
- Lutzner, M.A. & Blanchet-Bardon, C. (1985) Epidermodysplasia verucciformis. *Curr. Probl. Dermatol.*, **13**, 164–185
- Lutzner, M., Croissant, O., Ducasse, M.F., Kreis, H., Crosnier, J. & Orth, G. (1980) A potentially oncogenic human papillomavirus (HPV-5) found in two renal allograft recipients. *J. invest. Dermatol.*, **75**, 353–356
- Lutzner, M.A., Blanchet-Bardon, C. & Orth, G. (1984) Clinical observations, virologic studies and treatment trials in patients with epidermodysplasia verruciformis, a disease induced by specific human papillomaviruses. *J. invest. Dermatol.*, **83**, S18–S25
- Luxton, J.C., Rose, R.C., Coletart, T., Wilson, P. & Shepherd, P.S. (1997) Serological and T-helper cell responses to human papillomavirus type 16 L1 in women with cervical dysplasia or cervical carcinoma and in healthy controls. *J. gen. Virol.*, **78**, 917–923
- Ma, X.-L., Ueno, K., Pan, Z.-M., Hi, S.-Z., Ohyama, M. & Eizuru, Y. (1998) Human papillomavirus DNA sequences and p53 over-expression in laryngeal squamous cell carcinomas in Northeast China. *J. med. Virol.*, **54**, 186–191
- Maciag, P.C., Schlecht, N.F., Souza, P.S.A., Franco, E.L., Villa, L.L. & Petzl-Erler, M.L. (2000) Major histocompatibility complex class II polymorphisms and risk of cervical cancer and human papillomavirus infection in Brazilian women. *Cancer Epidemiol. Biomarkers Prev.*, **9**, 1183–1191

- Mackerras, D., Irwig, L., Simpson, J.M., Weisberg, E., Cardona, M., Webster, F., Walton, L. & Ghers, D. (1999) Randomized double-blind trial of beta-carotene and vitamin C in women with minor cervical abnormalities. *Br. J. Cancer*, **79**, 1448–1453
- MacLean, A.B., Lynn, K.L., Bailey, R.R., Swainson, C.P. & Walker, R.J. (1986) Colposcopic assessment of the lower genital tract in female renal transplant recipients. *Clin. Nephrol.*, **26**, 45–47
- Madeleine, M.M., Daling, J.R., Carter, J.J., Wipf, G.C., Schwartz, S.M., McKnight, B., Kurman, R.J., Beckmann, A.M., Hagensee, M.E. & Galloway, D.A. (1997) Cofactors with human papillomavirus in a population-based study of vulvar cancer. *J. natl Cancer Inst.*, **89**, 1516–1523
- Madeleine, M.M., Brumback, B., Cushing-Haugen, K.L., Schwartz, S.M., Daling, J.R., Smith, A.G., Nelson, J.L., Porter, P., Shera, K.A., McDougall, J.K. & Galloway, D.A. (2002) Human leukocyte antigen class II and cervical cancer risk: A population-based study. *J. infect. Dis.*, **186**, 1565–1574
- Madinier, I. & Monteil, R.A. (1987) Human papillomaviruses in oral epithelial lesions. Comparative study between histopathology and immunohistochemistry in routine diagnosis. *J. Biolog. buccale*, **15**, 105–110
- Magee, K.L., Rapini, R.P., Duvic, M. & Adler-Storthz, K. (1989) Human papillomavirus associated with keratoacanthoma (Letter to the Editor). *Arch. Dermatol.*, **125**, 1587–1589
- Magnusson, P.K.E., Lichtenstein, P. & Gyllensten, U.B. (2000) Heritability of cervical tumours. *Int. J. Cancer*, **88**, 698–701
- Mahé, E., Bodemer, C., Descamps, V., Mahé, I., Crickx, B., De Prost, Y. & Favre, M. (2003) High frequency of detection of human papillomaviruses associated with epidermodysplasia verruciformis in children with psoriasis. *Br. J. Dermatol.*, **149**, 819–825
- Mai, K.T., Yazdi, H.M., Bertrand, M.A., LeSaux, N. & Cathcart, L. (1996) Bilateral primary ovarian squamous cell carcinoma associated with human papilloma virus infection and vulvar and cervical intraepithelial neoplasia. A case report with review of the literature. *Am. J. surg. Pathol.*, **20**, 767–772
- Maiman, M., Fruchter, R.G., Sedlis, A., Feldman, J., Chen, P., Burk, R.D. & Minkoff, H. (1998) Prevalence, risk factors, and accuracy of cytologic screening for cervical intraepithelial neoplasia in women with the human immunodeficiency virus. *Gynecol. Oncol.*, **68**, 233–239
- Majewski, S. & Jablonska, S. (1997) Skin autografts in epidermodysplasia verruciformis: Human papillomavirus-associated cutaneous changes need over 20 years for malignant conversion. *Cancer Res.*, **57**, 4214–4216
- Majewski, S. & Jablonska, S. (2003) Possible involvement of epidermodysplasia verruciformis human papillomaviruses in the immunopathogenesis of psoriasis: A proposed hypothesis. *Exp. Dermatol.*, **12**, 721–728
- Majewski, S., Malejczyk, J., Jablonska, S., Misiewicz, J., Rudnicka, L., Obalek, S. & Orth, G. (1990) Natural cell-mediated cytotoxicity against various target cells in patients with epidermodysplasia verruciformis. *J. Am. Acad. Dermatol.*, **22**, 423–427
- Majewski, S., Hunzelmann, N., Nischt, R., Eckes, B., Rudnicka, L., Orth, G., Krieg, T. & Jablonska, S. (1991) TGF β -1 and TNF α expression in the epidermis of patients with epidermodysplasia verruciformis. *J. invest. Dermatol.*, **97**, 862–867

- Majewski, S., Jablonska, S. & Orth, G. (1997) Epidermodysplasia verruciformis. Immunological and nonimmunological surveillance mechanisms: Role in tumor progression. *Clin. Dermatol.*, **15**, 321–334
- Mak, R., Van Renterghem, L. & Cuvelier, C. (2004) Cervical smears and human papillomavirus typing in sex workers. *Sex. transm. Infect.*, **80**, 118–120
- Malanchi, I., Accardi, R., Diehl, F., Smet, A., Androphy, E., Hoheisel, J. & Tommasino, M. (2004) Human papillomavirus type 16 E6 promotes retinoblastoma protein phosphorylation and cell cycle progression. *J. Virol.*, **78**, 13769–13778
- Malcolm, K.M., Gill, J., Leggatt, G.R., Boyd, R., Lambert, P. & Frazer, I.H. (2003) Expression of the HPV16E7 oncoprotein by thymic epithelium is accompanied by disrupted T cell maturation and a failure of the thymus to involute with age. *Clin. dev. Immunol.*, **10**, 91–103
- Maloney, K.E., Wiener, J.S. & Walther, P.J. (1994) Oncogenic human papillomaviruses are rarely associated with squamous cell carcinoma of the bladder: Evaluation by differential polymerase chain reaction. *J. Urol.*, **151**, 360–364
- Malouf, M.A., Hopkins, P.M., Singleton, L., Chhajed, P.N., Plit, M.L. & Glanville, A.R. (2004) Sexual health issues after lung transplantation: Importance of cervical screening. *J. Heart Lung Transplant.*, **23**, 894–897
- Mammas, I.N., Zafiroopoulos, A., Koumantakis, E., Sifakis, S. & Spandidos, D.A. (2004) Transcriptional activation of H- and N-ras oncogenes in human cervical cancer. *Gynecol. Oncol.*, **92**, 941–948
- Mandelson, M.T., Jenison, S.A., Sherman, K.J., Valentine, J.M., McKnight, B., Daling, J.R. & Galloway, D.A. (1992) The association of human papillomavirus antibodies with cervical cancer risk. *Cancer Epidemiol. Biomarkers Prev.*, **1**, 281–286
- Mann, V.M., De Lao, S.L., Brenes, M., Brinton, L.A., Rawls, J.A., Green, M., Reeves, W.C. & Rawls, W.E. (1990) Occurrence of IgA and IgG antibodies to select peptides representing human papillomavirus type 16 among cervical cancer cases and controls. *Cancer Res.*, **50**, 7815–7819
- Mannhardt, B., Weinzimer, S.A., Wagner, M., Fiedler, M., Cohen, P., Jansen-Dürr, P. & Zwerschke, W. (2000) Human papillomavirus type 16 E7 oncoprotein binds and inactivates growth-inhibitory insulin-like growth factor binding protein 3. *Mol. cell Biol.*, **20**, 6483–6495
- Manni, V., Roperto, F., Di Guardo, G., Galati, D., Condoleo, R.U. & Venuti, A. (1998) Presence of papillomavirus-like DNA sequences in cutaneous fibropapillomas of the goat udder. *Vet. Microbiol.*, **61**, 1–6
- Manolitsas, T.P., Lanham, S.A., Hitchcock, A. & Watson, R.H. (1998) Synchronous ovarian and cervical squamous intraepithelial neoplasia: An analysis of HPV status. *Gynecol. Oncol.*, **70**, 428–431
- Manos, M.M., Ting, Y., Wright, D.K., Lewis, A.J., Broker, T.R. & Wolinsky, S.M. (1989) Use of polymerase chain reaction amplification for the detection of genital human papillomaviruses. In: Furth, M. & Greaves, M., eds, *Cancer Cells*, Vol. 7, *Molecular Diagnostics of Human Cancer*, Cold Spring Harbor, NY, Cold Spring Harbor Laboratory Press, pp. 209–214
- Manso-Martínez, R. (1982) Podophyllotoxin poisoning of microtubules at steady-state: Effect of substoichiometric and superstoichiometric concentrations of drug. *Mol. cell. Biochem.*, **45**, 3–11
- Mant, C., Cason, J., Rice, P. & Best, J.M. (2000) Non-sexual transmission of cervical cancer-associated papillomaviruses: An update. *Papillomavirus Rep.*, **11**, 1–5

- Mantovani, F. & Banks, L. (2001) The human papillomavirus E6 protein and its contribution to malignant progression. *Oncogene*, **20**, 7874–7887
- Mäntyjärvi, M., Syrjänen, S., Kaipainen, S., Mäntyjärvi, R., Kahlos, T. & Syrjänen, K. (1989) Detection of human papillomavirus type 11 DNA in a conjunctival squamous cell papilloma by in situ hybridization with biotinylated probes. *Acta ophthalmol.*, **67**, 425–429
- Mao, C., Hughes, J.P., Kiviat, N., Kuypers, J., Lee, S.-K., Adam, D.E. & Koutsky, L.A. (2003). Clinical findings among young women with genital human papillomavirus infection. *Am. J. Obstet. Gynecol.*, **188**, 677–684
- Marais, D.J., Rose, R.C., Lane, C., Kay, P., Nevin, J., Denny, L., Soeters, R., Dehaeck, C.M.C. & Williamson, A.-L. (2000a) Seroresponses to human papillomavirus types 16, 18, 31, 33, and 45 virus-like particles in South African women with cervical cancer and cervical intraepithelial neoplasia. *J. med. Virol.*, **60**, 403–410
- Marais, D.J., Vardas, E., Ramjee, G., Allan, B., Kay, P., Rose, R.C. & Williamson, A.-L. (2000b) The impact of human immunodeficiency virus type 1 status on human papillomavirus (HPV) prevalence and HPV antibodies in serum and cervical secretions. *J. infect. Dis.*, **182**, 1239–1242
- Markowitz, L.E., Dunne, E.F., Saraiya, M., Lawson, H.W., Chesson, H. & Unger, E.R. (2007) Quadrivalent human papillomavirus vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report*, **56** (RR02), 1–24
- Marrazzo, J.M., Stine, K. & Koutsky, L.A. (2000) Genital human papillomavirus infection in women who have sex with women: A review. *Am. J. Obstet. Gynecol.*, **183**, 770–774
- Marrazzo, J.M., Koutsky, L.A., Kiviat, N.B., Kuypers, J.M. & Stine, K. (2001) Papanicolaou test screening and prevalence of genital human papillomavirus among women who have sex with women. *Am. J. public Health*, **91**, 947–952
- Martens, A., De Moor, A., Demeulemeester, J. & Peelman, L. (2001) Polymerase chain reaction analysis of the surgical margins of equine sarcoids for bovine papilloma virus DNA. *Vet. Surg.*, **30**, 460–467
- Masini, C., Fuchs, P.G., Gabrielli, F., Stark, S., Sera, F., Ploner, M., Melchi, C.F., Primavera, G., Pirchio, G., Picconi, O., Petasecca, P., Cattaruzza, M.S., Pfister, H.J. & Abeni, D. (2003) Evidence for the association of human papillomavirus infection and cutaneous squamous cell carcinoma in immunocompetent individuals. *Arch. Dermatol.*, **139**, 890–894
- Masood, S., Rhatigan, R.M., Powell, S., Thompson, J. & Rodenroth, N. (1991) Human papillomavirus in prostatic cancer: No evidence found by in situ DNA hybridization. *South. med. J.*, **84**, 235–236
- Massad, L.S., Riestler, K.A., Anastos, K.M., Fruchter, R.G., Palefsky, J.M., Burk, R.D., Burns, D., Greenblatt, R.M., Muderspach, L.I. & Miotti, P. for the Women's Interagency HIV Study Group (1999) Prevalence and predictors of squamous cell abnormalities in Papanicolaou smears from women infected with HIV-1. *J. Acquir. Immune Defic. Syndr.*, **21**, 33–41
- Massad, L.S., Ahdieh, L., Benning, L., Minkoff, H., Greenblatt, R.M., Watts, H., Miotti, P., Anastos, K., Moxley, M., Muderspach, L.I. & Melnick, S. (2001) Evolution of cervical abnormalities among women with HIV-1: Evidence from surveillance cytology in the Women's Interagency HIV Study. *J. Acquir. Immune Defic. Syndr.*, **27**, 432–442
- Massad, L.S., Evans, C.T., Minkoff, H., Watts, D.H., Strickler, H.D., Darragh, T., Levine, A., Anastos, K., Moxley, M. & Passaro, D.J. (2004a) Natural history of grade 1 cervical intraepithelial neoplasia in women with human immunodeficiency virus. *Obstet. Gynecol.*, **104**, 1077–1085

- Massad, L.S., Silverberg, M.J., Springer, G., Minkoff, H., Hessol, N., Palefsky, J.M., Strickler, H.D., Levine, A.M., Sacks, H.S., Moxley, M. & Watts, H.D. (2004b) Effect of antiretroviral therapy on the incidence of genital warts and vulvar neoplasia among women with the human immunodeficiency virus. *Am. J. Obstet. Gynecol.*, **190**, 1241–1248
- Massimi, P., Pim, D., Storey, A. & Banks, L. (1996) HPV-16 E7 and adenovirus E1a complex formation with TATA box binding protein is enhanced by casein kinase II phosphorylation. *Oncogene*, **12**, 2325–2330
- Massimi, P., Pim, D. & Banks, L. (1997) Human papillomavirus type 16 E7 binds to the conserved carboxy-terminal region of the TATA box binding protein and this contributes to E7 transforming activity. *J. gen. Virol.*, **78**, 2607–2613
- Massimi, P., Gammoh, N., Thomas, M. & Banks, L. (2004) HPV E6 specifically targets different cellular pools of its PDZ domain-containing tumour suppressor substrates for proteasome-mediated degradation. *Oncogene*, **23**, 8033–8039
- Masterson, P.J., Stanley, M.A., Lewis, A.P. & Romanos, M.A. (1998) A C-terminal helicase domain of the human papillomavirus E1 protein binds E2 and the DNA polymerase alpha-primase p68 subunit. *J. Virol.*, **72**, 7407–7419
- Matlashewski, G., Schneider, J., Banks, L., Jones, N., Murray, A. & Crawford, L. (1987) Human papillomavirus type 16 DNA cooperates with activated ras in transforming primary cells. *EMBO J.*, **6**, 1741–1746
- Matos, E., Loria, D., Amestoy, G.M., Herrera, L., Prince, M.A., Moreno, J., Krunfly, C., van den Brule, A.J., Meijer, C.J.L.M., Muñoz, N., Herrero, R. & Proyecto Concordia Collaborative Group (2003) Prevalence of human papillomavirus infection among women in Concordia, Argentina: A population-based study. *Sex. transm. Dis.*, **30**, 593–599
- Matsha, T., Erasmus, R., Kafuko, A.B., Mugwanya, D., Stepien, A. & Parker, M.I. for the CANSA/MRC Oesophageal Cancer Research Group (2002) Human papillomavirus associated with oesophageal cancer. *J. clin. Pathol.*, **55**, 587–590
- Matsukura, T. & Sugase, M. (1995) Identification of genital human papillomaviruses in cervical biopsy specimens: Segregation of specific virus types in specific clinicopathological lesions. *Int. J. Cancer*, **61**, 13–22
- Matsukura, T. & Sugase, M. (2001) Relationships between 80 human papillomavirus genotypes and different grades of cervical intraepithelial neoplasia: Association and causality. *Virology*, **283**, 139–147
- Matsukura, T. & Sugase, M. (2004) Human papillomavirus genomes in squamous cell carcinomas of the uterine cervix. *Virology*, **324**, 439–449
- Matsumoto, K., Kawana, K., Yoshikawa, H., Taketani, Y., Yoshiike, K. & Kanda, T. (2000) DNA vaccination of mice with plasmid expressing human papillomavirus 6 major capsid protein L1 elicits type-specific antibodies neutralizing pseudovirions constructed in vitro. *J. med. Virol.*, **60**, 200–204
- Matsumoto, K., Yasugi, T., Oki, A., Hoshiai, H., Taketani, Y., Kawana, T. & Yoshikawa, H. (2003) Are smoking and chlamydial infection risk factors for CIN? Different results after adjustment for HPV DNA and antibodies. *Br. J. Cancer*, **89**, 831–833
- Matsumoto, K., Leggatt, G.R., Zhong, J., Liu, X., de Kluyver, R.L., Peters, T., Fernando, G.J.P., Liem, A., Lambert, P.F. & Frazer, I.H. (2004) Impaired antigen presentation and effectiveness of combined active/passive immunotherapy for epithelial tumors. *J. natl Cancer Inst.*, **96**, 1611–1619

- Matthews, K., Leong, C.M., Baxter, L., Inglis, E., Yun, K., Bäckström, B.T., Doorbar, J. & Hibma, M. (2003) Depletion of Langerhans cells in human papillomavirus type 16-infected skin is associated with E6-mediated down regulation of E-cadherin. *J. Virol.*, **77**, 8378–8385
- Mavoungou, E., Poaty-Mavoungou, V., Touré, F.S., Sall, A., Delicat, A., Yaba, P., Mandeme, Y., Nabias, R. & Lansoud-Soukate, J. (1999) Impairment of natural killer cell activity in *Chlamydia trachomatis* infected individuals. *Trop. Med. int. Health*, **4**, 719–727
- Maw, R. (2004) Critical appraisal of commonly used treatment for genital warts. *Int. J. STD AIDS*, **15**, 357–364
- May, M., Dong, X.-P., Beyer-Finkler, E., Stubenrauch, F., Fuchs, P.G. & Pfister, H. (1994) The E6/E7 promoter of extrachromosomal HPV16 DNA in cervical cancers escapes from cellular repression by mutation of target sequences for YY1. *EMBO J.*, **13**, 1460–1466
- Mayans, M.V., Maguire, A., Miret, M. & Casabona, J. (1999) Disproportionate high incidence of invasive cervical cancer as an AIDS-indicative disease among young women in Catalonia, Spain. *Sex. transm. Dis.*, **26**, 500–503
- Mayaud, P., Gill, D.K., Weiss, H.A., Uledi, E., Kopwe, L., Todd, J., ka-Gina, G., Grosskurth, H., Hayes, R.J., Mabey, D.C.W. & Lacey, C.J. (2001) The interrelation of HIV, cervical human papillomavirus, and neoplasia among antenatal clinic attenders in Tanzania. *Sex. transm. Infect.*, **77**, 248–254
- Mayor, H.D., Drake, S., Stahmann, J. & Mumford, D. M. (1976) Antibodies to adeno-associated satellite virus and herpes simplex in sera from cancer patients and normal adults. *Am. J. Obstet. Gynecol.*, **126**, 100–104
- Mazzarelli, J.M., Atkins, G.B., Geisberg, J.V. & Ricciardi, R.P. (1995) The viral oncoproteins Ad5 E1A, HPV16 E7 and SV40 TAG bind a common region of the TBP-associated factor-110. *Oncogene*, **11**, 1859–1864
- Mbulaiteye, S.M., Biggar, R.J., Goedert, J.J. & Engels, E.A. (2003) Immune deficiency and risk for malignancy among persons with AIDS. *J. Acquir. Immune Defic. Syndr.*, **32**, 527–533
- McBride, A.A., Romanczuk, H. & Howey, P.M. (1991) The papillomavirus E2 regulatory proteins. *J. Biol. Chem.*, **266**, 18411–18414
- McCaffrey, J., Yamasaki, L., Dyson, N.J., Harlow, E. & Griep, A.E. (1999) Disruption of retinoblastoma protein family function by human papillomavirus type 16 E7 oncoprotein inhibits lens development in part through *E2F-1*. *Mol. Cell. Biol.*, **19**, 6458–6468
- McCann, M.F., Irwin, D.E., Walton, L.A., Hulka, B.S., Morton, J.L. & Axelrad, C.M. (1992) Nicotine and cotinine in cervical mucus of smokers, passive smokers, and nonsmokers. *Cancer Epidemiol. Biomarkers Prev.*, **1**, 125–129
- McDonnell, P.J., McDonnell, J.M., Kessiss, T., Green, W.R. & Shah, K.V. (1987) Detection of human papillomavirus type 6/11 DNA in conjunctival papillomas by in situ hybridization with radioactive probes. *Hum. Pathol.*, **18**, 1115–1119
- McGrae, J.D., Jr, Greer, C.E. & Manos, M.M. (1993) Multiple Bowen's disease of the fingers associated with human papilloma virus type 16. *Int. J. Dermatol.*, **32**, 104–107
- McGregor, B., Byrne, P., Kirgan, D., Albright, J., Manalo, P. & Hall, M. (1993) Confirmation of the association of human papillomavirus with human colon cancer. *Am. J. Surg.*, **166**, 738–742
- McGregor, J.M., Farthing, A., Crook, T., Yu, C.C.-W., Dublin, E.A., Levison, D.A. & MacDonald, D.M. (1994) Posttransplant skin cancer: A possible role for p53 gene mutation but not for oncogenic human papillomaviruses. *J. Am. Acad. Dermatol.*, **30**, 701–706

- McHugh, R.W., Hazen, P., Eliezri, Y.D. & Nuovo, G.J. (1996) Metastatic periungual squamous cell carcinoma: Detection of human papillomavirus type 35 RNA in the digital tumor and axillary lymph node metastases. *J. Am. Acad. Dermatol.*, **34**, 1080–1082
- McIndoe, W.A., McLean, M.R., Jones, R.W. & Mullins, P.R. (1984) The invasive potential of carcinoma *in situ* of the cervix. *Obstet. Gynecol.*, **64**, 451–458
- McIntyre, M.C., Ruesch, M.N. & Laimins, L.A. (1996) Human papillomavirus E7 oncoproteins bind a single form of cyclin E in a complex with cdk2 and p107. *Virology*, **215**, 73–82
- McLaughlin-Drubin, M.E., Wilson, S., Mullikin, B., Suzich, J. & Meyers, C. (2003) Human papillomavirus type 45 propagation, infection, and neutralization. *Virology*, **312**, 1–7
- McLaughlin-Drubin, M.E., Christensen, N.D. & Meyers, C. (2004) Propagation, infection, and neutralization of authentic HPV16 virus. *Virology*, **322**, 213–219
- McLellan, R., Buscema, J., Guerrero, E., Shah, K.V., Woodruff, J.D. & Currie, J.L. (1990) Investigation of ovarian neoplasia of low malignant potential for human papillomavirus. *Gynecol. Oncol.*, **38**, 383–385
- McMillan, N.A.J., Payne, E., Frazer, I.H. & Evander, M. (1999) Expression of the $\alpha 6$ integrin confers papillomavirus binding upon receptor-negative B-cells. *Virology*, **261**, 271–279
- McMurray, H.R. & McCance, D.J. (2004) Degradation of p53, not telomerase activation, by E6 is required for bypass of crisis and immortalization by human papillomavirus type 16 E6/E7. *J. Virol.*, **78**, 5698–5706
- McNicol, P.J. & Dodd, J.G. (1990a) Detection of papillomavirus DNA in human prostatic tissue by Southern blot analysis. *Can. J. Microbiol.*, **36**, 359–362
- McNicol, P.J. & Dodd, J.G. (1990b) Detection of human papillomavirus DNA in prostate gland tissue by using the polymerase chain reaction amplification assay. *J. clin. Microbiol.*, **28**, 409–412
- McNicol, P.J. & Dodd, J.G. (1991) High prevalence of human papillomavirus in prostate tissues. *J. Urol.*, **145**, 850–853
- McNicol, P., Paraskevas, M. & Guijon, F. (1994) Variability of polymerase chain reaction-based detection of human papillomavirus DNA is associated with the composition of vaginal microbial flora. *J. med. Virol.*, **43**, 194–200
- Medina-Martínez, O., Vallejo, V., Guido, M.C. & Garcia-Carrancá, A. (1997) Ha-ras oncogene-induced transcription of human papillomavirus type 18 E6 and E7 oncogenes. *Mol. Carcinog.*, **19**, 83–90
- Megevand, E., Denny, L., Dehaeck, K., Soeters, R. & Bloch, B. (1996) Acetic acid visualization of the cervix: An alternative to cytologic screening. *Obstet. Gynecol.*, **88**, 383–386
- Meisels, A. & Fortin, R. (1976) Condylomatous lesions of the cervix and vagina. I. Cytological patterns. *Acta cytol.*, **20**, 505–509
- Melbye, M., Smith, E., Wohlfahrt, J., Østerlind, A., Orholm, M., Bergmann, O.J., Mathiesen, L., Darragh, T.M. & Palefsky, J.M. (1996) Anal and cervical abnormality in women — Prediction by human papillomavirus tests. *Int. J. Cancer*, **68**, 559–564
- Melchers, W., de Mare, S., Kuitert, E., Galama, J., Walboomers, J. & van den Brule, A.J.C. (1993) Human papillomavirus and cutaneous warts in meat handlers. *J. clin. Microbiol.*, **31**, 2547–2549
- Melendy, T., Sedman, J. & Stenlund, A. (1995) Cellular factors required for papillomavirus DNA replication. *J. Virol.*, **69**, 7857–7867

- Melief, C.J.M., van Der Burg, S.H., Toes, R.E.M., Ossendorp, F. & Offringa, R. (2002) Effective therapeutic anticancer vaccines based on precision guiding of cytolytic T lymphocytes. *Immunol. Rev.*, **188**, 177–182
- Melikian, A.A., Sun, P., Prokopczyk, B., El-Bayoumy, K., Hoffmann, D., Wang, X. & Waggoner, S. (1999a) Identification of benzo[*a*]pyrene metabolites in cervical mucus and DNA adducts in cervical tissues in humans by gas chromatography-mass spectrometry. *Cancer Lett.*, **146**, 127–134
- Melikian, A.A., Wang, X., Waggoner, S., Hoffmann, D. & El-Bayoumy, K. (1999b) Comparative response of normal and of human papillomavirus-16 immortalized human epithelial cervical cells to benzo[*a*]pyrene. *Oncology Rep.*, **6**, 1371–1376
- Melkert, P.W.J., Hopman, E., van den Brule, A.J.C., Risse, E.K.J., van Diest, P.J., Bleker, O.P., Helmerhorst, T., Schipper, M.E.I., Meijer, C.J.L.M. & Walboomers, J.M.M. (1993) Prevalence of HPV in cytologically normal cervical smears, as determined by the polymerase chain reaction, is age-dependent. *Int. J. Cancer*, **53**, 919–923
- Mellin, H., Friesland, S., Lewensohn, R., Dalianis, T. & Munck-Wikland, E. (2000) Human papillomavirus (HPV) DNA in tonsillar cancer: Clinical correlates, risk of relapse, and survival. *Int. J. Cancer (Pred. Oncol.)*, **89**, 300–304
- Mellin, H., Dahlgren, L., Munck-Wikland, E., Lindholm, J., Rabbani, H., Kalantari, M. & Dalianis, T. (2002) Human papillomavirus type 16 is episomal and a high viral load may be correlated to better prognosis in tonsillar cancer. *Int. J. Cancer*, **102**, 152–158
- Melnikow, J., Nuovo, J., Willan, A.R., Chan, B.K.S. & Howell, L.P. (1998) Natural history of cervical squamous intraepithelial lesions: A meta-analysis. *Obstet. Gynecol.*, **92**, 727–735
- Melsheimer, P., Klaes, R., von Knebel-Doerberitz, M. & Bastert, G. (2001) Prospective clinical study comparing DNA flow cytometry and HPV typing as predictive tests for persistence and progression of CIN I/II. *Cytometry*, **46**, 166–171
- Melsheimer, P., Kaul, S., Dobeck, S. & Bastert, G. (2003) Immunocytochemical detection of HPV high-risk type L1 capsid proteins in LSIL and HSIL as compared with detection of HPV L1 DNA. *Acta cytol.*, **47**, 124–128
- Melsheimer, P., Vinokurova, S., Wentzensen, N., Bastert, G. & von Knebel-Doerberitz, M. (2004) DNA aneuploidy and integration of human papillomavirus type 16 E6/E7 oncogenes in intraepithelial neoplasia and invasive squamous cell carcinoma of the cervix uteri. *Clin. Cancer Res.*, **10**, 3059–3063
- Melton, J.L. & Rasmussen, J.E. (1991) Clinical manifestations of human papillomavirus infection in nongenital sites. *Dermatol. Clin.*, **9**, 219–233
- Menendez Velazquez, J.F., Gonzalez Sanchez, J.L., Rodriguez de Santiago, J.D. & Muñoz Reyes, R. & Bailon Uriza, R. (1993) [Treatment of cervical infection of HPV by trichloroacetic acid.] *Ginecol. Obst. Méx.*, **61**, 48–51 (in Spanish)
- Meschede, W., Zumbach, K., Braspenning, J., Scheffner, M., Benitez-Bribiesca, L., Luande, J., Gissmann, L. & Pawlita, M. (1998) Antibodies against early proteins of human papillomaviruses as diagnostic markers for invasive cervical cancer. *J. clin. Microbiol.*, **36**, 475–480
- Metcalf, A.M. & Dean, T. (1995) Risk of dysplasia in anal condyloma. *Surgery*, **118**, 724–726
- Mevorach, R.A., Cos, L.R., di Sant'Agnese, P.A. & Stoler, M. (1990) Human papillomavirus type 6 in grade I transitional cell carcinoma of the urethra. *J. Urol.*, **143**, 126–128
- Meydani, S.N., Wu, D., Santos, M.S. & Hayek, M.G. (1995) Antioxidants and immune response in aged persons: Overview of present evidence. *Am. J. clin. Nutr.*, **62** (Suppl.), S1462–S1476

- Meyer, T., Arndt, R., Christophers, E. & Stockfleth, E. (2000) Frequency and spectrum of HPV types detected in cutaneous squamous-cell carcinomas depend on the HPV detection system: A comparison of four PCR assays. *Dermatology*, **201**, 204–211
- Meyer, T., Arndt, R., Nindl, I., Ulrich, C., Christophers, E. & Stockfleth, E. (2003) Association of human papillomavirus infections with cutaneous tumors in immunosuppressed patients. *Transplant. int.*, **16**, 146–153
- Meyers, C., Alam, S., Mane, M. & Hermonat, P.L. (2001) Altered biology of adeno-associated virus type 2 and human papillomavirus during dual infection of natural host tissue. *Virology*, **287**, 30–39
- Meyskens, F.L., Jr, Surwit, E., Moon, T.E., Childers, J.M., Davis, J.R., Dorr, R.T., Johnson, C.S. & Alberts, D.S. (1994) Enhancement of regression of cervical intraepithelial neoplasia II (moderate dysplasia) with topically applied all-*trans*-retinoic acid: A randomized trial. *J. natl Cancer Inst.*, **86**, 539–543
- Michelin, D., Gissmann, L., Street, D., Potkul, R.K., Fisher, S., Kaufmann, A.M., Qiao, L. & Schreckenberger, C. (1997) Regulation of human papillomavirus type 18 *in vivo*: Effects of estrogen and progesterone in transgenic mice. *Gynecol. Oncol.*, **66**, 202–208
- Mietz, J.A., Unger, T., Huibregtse, J.M. & Howley, P.M. (1992) The transcriptional transactivation function of wild-type p53 is inhibited by SV40 large T-antigen and by HPV-16 E6 oncoprotein. *EMBO J.*, **11**, 5013–5020
- Miller, A.B. (1992) *Cervical Cancer Screening Programmes: Managerial Guidelines*, Geneva, World Health Organization
- Miller, C.J. & Shattock, R.J. (2003) Target cells in vaginal HIV transmission. *Microbes Infect.*, **5**, 59–67
- Mincheva, A., Gissmann, L. & zur Hausen, H. (1987) Chromosomal integration sites of human papillomavirus DNA in three cervical cancer cell lines mapped by *in situ* hybridization. *Med. Microbiol. Immunol.*, **176**, 245–256
- Mindel, A. & Tideman, R. (1999) HPV transmission — Still feeling the way. *Lancet*, **354**, 2097–2098
- Mineta, H., Ogino, T., Amano, H.M., Ohkawa, Y., Araki, K., Takebayashi, S. & Miura, K. (1998) Human papilloma virus (HPV) type 16 and 18 detected in head and neck squamous cell carcinoma. *Anticancer Res.*, **18**, 4765–4768
- Minkoff, H., Feldman, J., DeHovitz, J., Landesman, S. & Burk, R. (1998) A longitudinal study of human papillomavirus carriage in human immunodeficiency virus-infected and human immunodeficiency virus-uninfected women. *Am. J. Obstet. Gynecol.*, **178**, 982–986
- Minkoff, H., Ahdieh, L., Massad, L.S., Anastos, K., Watts, D.H., Melnick, S., Muderspach, L., Burk, R. & Palefsky, J. (2001) The effect of highly active antiretroviral therapy on cervical cytologic changes associated with oncogenic HPV among HIV-infected women. *AIDS*, **15**, 2157–2164
- Minkoff, H., Feldman, J.G., Strickler, H.D., Watts, D.H., Bacon, M.C., Levine A., Palefsky, J.M., Burk, R., Cohen, M.H. & Anastos, K. (2004) Relationship between smoking and human papillomavirus infections in HIV-infected and -uninfected women. *J. infect. Dis.*, **189**, 1821–1828
- Miracco, C., Palumbo, N., Lavergne, D., Nyongo, A., Tosi, P. & de Villiers, E.-M. (2001) Malignant melanomas: Search for human papillomaviruses. *Arch. Dermatol.*, **137**, 826–827
- Mitchell, M.F., Hittelman, W.N., Hong, W.K., Lotan, R. & Schottenfeld, D. (1994) The natural history of cervical intraepithelial neoplasia: An argument for intermediate endpoint biomarkers. *Cancer Epidemiol. Biomarkers Prev.*, **3**, 619–626

- Mitchell, M.F., Tortolero-Luna, G., Wright, T., Sarkar, A., Richards-Kortum, R., Hong, W.K. & Schottenfeld, D. (1996) Cervical human papillomavirus infection and intraepithelial neoplasia: A review. *J. natl Cancer Inst. Monogr.*, **21**, 17–25
- Mitchell, M.F., Schottenfeld, D., Tortolero-Luna, G., Cantor, S.B. & Richards-Kortum, R. (1998) Colposcopy for the diagnosis of squamous intraepithelial lesions: A meta-analysis. *Obstet. Gynecol.*, **91**, 626–631
- Mitra, A.B. (1999) Genetic deletion and human papillomavirus infection in cervical cancer: Loss of heterozygosity sites at 3p and 5p are important genetic events. *Int. J. Cancer*, **72**, 322–324
- Mitrani-Rosenbaum, S., Gal, D., Friedman, M., Kitron, N., Tsvieli, R., Mordel, N. & Anteby, S.O. (1988) Papillomaviruses in lesions of the lower genital tract in Israeli patients. *Eur. J. Cancer clin. Oncol.*, **24**, 725–731
- Miyagi, J., Tshako, K., Kinjo, T., Iwamasa, T. & Hirayasu, T. (2000) Recent striking changes in histological differentiation and rate of human papillomavirus infection in squamous cell carcinoma of the lung in Okinawa, a subtropical island in southern Japan. *J. clin Pathol.*, **53**, 676–684
- Miyagi, J., Kinjo, T., Tshako, K., Higa, M., Iwamasa, T., Kamada, Y. & Hirayasu, T. (2001) Extremely high Langerhans cell infiltration contributes to the favourable prognosis of HPV-infected squamous cell carcinoma and adenocarcinoma of the lung. *Histopathology*, **38**, 355–367
- Mizobuchi, S., Sakamoto, H., Tachimori, Y., Kato, H., Watanabe, H. & Terada, M. (1997) Absence of human papillomavirus-16 and -18 DNA and Epstein–Barr virus DNA in esophageal squamous cell carcinoma. *Jpn. J. clin. Oncol.*, **27**, 1–5
- Moar, M.H. & Jarrett, W.F.H. (1985) A cutaneous fibropapilloma from a red deer (*Cervus elaphus*) associated with a papillomavirus. *Intervirology*, **24**, 108–118
- Moar, M.H., Campo, M.S., Laird, H.M. & Jarrett, W.F.H. (1981) Unintegrated viral DNA sequences in a hamster tumor induced by bovine papilloma virus. *J. Virol.*, **39**, 945–949
- Moar, M.H., Jarrett, W.F.H. & O’Neil, B.W. (1986) Viral DNA sequences detected in a hamster liposarcoma induced by bovine papillomavirus type 4. *J. gen. Virol.*, **67**, 187–190
- Moberg, M., Gustavsson, I. & Gyllensten, U. (2004) Type-specific associations of human papillomavirus load with risk of developing cervical carcinoma *in situ*. *Int. J. Cancer*, **112**, 854–859
- Modis, Y., Trus, B.L. & Harrison, S.C. (2002) Atomic model of the papillomavirus capsid. *EMBO J.*, **21**, 4754–4762
- Mohr, I.J., Clark, R., Sun, S., Androphy, E.J., MacPherson, P. & Botchan, M.R. (1990) Targeting the E1 replication protein to the papillomavirus origin of replication by complex formation with the E2 transactivator. *Science*, **250**, 1694–1699
- Molano, M., van den Brule, A., Plummer, M., Weiderpass, E., Posso, H., Arslan, A., Meijer, C.J.L.M., Muñoz, N., Franceschi, S. & the HPV Study Group (2003a) Determinants of clearance of human papillomavirus infections in Colombian women with normal cytology: A population-based, 5-year follow-up study. *Am. J. Epidemiol.*, **158**, 486–494
- Molano, M., Weiderpass, E., Posso, H., Morr e, S.A., Ronderos, M., Franceschi, S., Arslan, A., Meijer, C.J.L.M., Muñoz, N., van den Brule, A.J.C. & the HPV Study Group (2003b) Prevalence and determinants of *Chlamydia trachomatis* infections in women from Bogota, Colombia. *Sex. transm. Infect.*, **79**, 474–478
- Molden, T., Kraus, I., Karlsen, F., Skomedal, H., Nyg ard, J.F. & Hagmar, B. (2005) Comparison of human papillomavirus messenger RNA and DNA detection: A cross-sectional study of

- 4,136 women > 30 years of age with a 2-year follow-up of high-grade squamous intraepithelial lesion. *Cancer Epidemiol. Biomarkers Prev.*, **14**, 367–372
- Monsonogo, J., Magdelenat, H., Catalan, F., Coscas, Y., Zerat, L. & Sastre, X. (1991) Estrogen and progesterone receptors in cervical human papillomavirus related lesions. *Int. J. Cancer*, **48**, 533–539
- Monsonogo, J., Cessot, G., Ince, S.E., Galazka, A.R. & Abdul-Ahad, A.K. (1996) Randomised double-blind trial of recombinant interferon-beta for condyloma acuminatum. *Genitourin. Med.*, **72**, 111–114
- Moodley, M., Moodley, J., Chetty, R. & Herrington, C.S. (2003) The role of steroid contraceptive hormones in the pathogenesis of invasive cervical cancer: A review. *Int. J. Gynecol. Cancer*, **13**, 103–110
- Moore, R.A., Edwards, J.E., Hopwood, J. & Hicks, D. (2001) Imiquimod for the treatment of genital warts: A quantitative systematic review. *BMC Infect. Dis.*, **1**, 3
- Moore, A.L., Sabin, C.A., Madge, S., Mocroft, A., Reid, W. & Johnson, M.A. (2002) Highly active antiretroviral therapy and cervical intraepithelial neoplasia. *AIDS*, **16**, 927–929
- Moore, J.S., Rahemtulla, F., Kent, L.W., Hall, S.D., Iking, M.R., Wright, P.F., Nguyen, H.H. & Jackson, S. (2003) Oral epithelial cells are susceptible to cell-free and cell-associated HIV-1 infection in vitro. *Virology*, **313**, 343–353
- Moreno, V., Muñoz, N., Bosch, F.X., de Sanjosé, S., Gonzalez, L.C., Tafur, L., Gili, M., Izarzugaza, I., Navarro, C., Vergara, A., Viladiu, P., Ascunce, N. & Shan, K.V. (1995) Risk factors for progression of cervical intraepithelial neoplasm grade III to invasive cervical cancer. *Cancer Epidemiol. Biomarkers Prev.*, **4**, 459–467
- Moreno, V., Bosch, F.X., Muñoz, N., Meijer, C.J.L.M., Shah, K.V., Walboomers, J.M.M., Herrero, R. & Franceschi, S. for the International Agency for Research on Cancer (IARC) (2002) Effect of oral contraceptive on risk of cervical cancer in women with human papillomavirus infection: The IARC multicentric case-control study, *Lancet*, **359**, 1085–1092
- Moreno-Lopez, J., Pettersson, U., Dinter, Z. & Philipson, L. (1981) Characterization of a papilloma virus from the European elk (EEPV). *Virology*, **112**, 589–595
- Moreno-Lopez, J., Ahola, H., Stenlund, A., Osterhaus, A. & Pettersson, U. (1984) Genome of an avian papillomavirus. *J. Virol.*, **51**, 872–875
- Moreno-Lopez, J., Ahola, H., Eriksson, A., Bergman, P. & Pettersson, U. (1987) Reindeer papillomavirus transforming properties correlate with a highly conserved E5 region. *J. Virol.*, **61**, 3394–3400
- Morin, C., Bouchard, C., Brisson, J., Fortier, M., Blanchette, C. & Meisels, A. (2000) Human papillomaviruses and vulvar vestibulitis. *Obstet. Gynecol.*, **95**, 683–687
- Mork, J., Lie, A.K., Glatte, E., Hallmans, G., Jellum, E., Koskela, P., Møller, B., Pukkala, E., Schiller, J.T., Youngman, L., Lehtinen, M. & Dillner, J. (2001) Human papillomavirus infection as a risk factor for squamous-cell carcinoma of the head and neck. *New Engl. J. Med.*, **344**, 1125–1131
- Morris, M., Eifel, P.J., Lu, J., Grigsby, P.W., Levenback, C., Stevens, R.E., Rotman, M., Gershenson, D.M. & Mutch, D.G. (1999) Pelvic radiation with concurrent chemotherapy compared with pelvic and para-aortic radiation for high-risk cervical cancer. *New Engl. J. Med.*, **340**, 1137–1143
- Morrison, C., Eliezri, Y., Magro, C. & Nuovo, G.J. (2002) The histologic spectrum of epidermodysplasia verruciformis in transplant and AIDS patients. *J. cutan. Pathol.*, **29**, 480–489

- Mortazavi, S., Zali, M., Raoufi, M., Nadji, M., Kowsarian, P. & Nowroozi, A. (2002) The prevalence of human papillomavirus in cervical cancer in Iran. *Asian Pacific J. Cancer Prev.*, **3**, 69–72
- Moscicki, A.-B., Burt, V.G., Kanowitz, S., Darragh, T. & Shiboski, S. (1999) The significance of squamous metaplasia in the development of low grade squamous intraepithelial lesions in young women. *Cancer*, **85**, 1139–1144
- Moscicki, A.-B., Ellenberg, J.H., Vermund, S.H., Holland, C.A., Darragh, T., Crowley-Nowick, P.A., Levin, L. & Wilson, C.M. (2000) Prevalence of and risks for cervical human papillomavirus infection and squamous intraepithelial lesions in adolescent girls. Impact of infection with human immunodeficiency virus. *Arch. pediatr adolesc. Med.*, **154**, 127–134
- Moscicki, A.-B., Hills, N., Shiboski, S., Powell, K., Jay, N., Hanson, E., Miller, S., Clayton, L., Farhat, S., Broering, J., Darragh, T. & Palefsky, J. (2001) Risks for incident human papillomavirus infection and low-grade squamous intraepithelial lesion development in young females. *J. Am. med. Assoc.*, **285**, 2995–3002
- Moscicki, A.-B., Durako, S.J., Houser, J., Ma, Y., Murphy, D.A., Darragh, T.M., Farhat, S. & Wilson, C.M. (2003) Human papillomavirus infection and abnormal cytology of the anus in HIV-infected and uninfected adolescents. *AIDS*, **17**, 311–320
- Moscicki, A.-B., Ellenberg, J.H., Crowley-Nowick, P., Darragh, T.M., Xu, J. & Farhat, S. (2004) Risk of high-grade squamous intraepithelial lesion in HIV-infected adolescents. *J. infect. Dis.*, **190**, 1413–1421
- Mossadegh, N., Gissmann, L., Müller, M., Zentgraf, H., Alonso, A. & Tomakidi, P. (2004) Codon optimization of the human papillomavirus 11 (HPV 11) L1 gene leads to increased gene expression and formation of virus-like particles in mammalian epithelial cells. *Virology*, **326**, 57–66
- Motegi, S., Tamura, A., Endo, Y., Kato, G., Takahashi, A., Negishi, I. & Ishikawa, O. (2003) Malignant proliferating trichilemmal tumour associated with human papillomavirus type 21 in epidermodysplasia verruciformis. *Br. J. Dermatol.*, **148**, 180–182
- Moubayed, P., Mwakyoma, H. & Schneider, D.T. (2004) High frequency of human papillomavirus 6/11, 16, and 18 infections in precancerous lesions and squamous cell carcinoma of the conjunctiva in subtropical Tanzania. *Am. J. clin. Pathol.*, **122**, 938–943
- Mounds, P. & Kashima, H. (1984) Association of human papillomavirus subtype and clinical course in respiratory papillomatosis. *Laryngoscope*, **94**, 28–33
- Mounds, P., Shah, K.V. & Kashima, H. (1982) Viral etiology of juvenile- and adult-onset squamous papilloma of the larynx. *Proc. natl Acad. Sci. USA*, **79**, 5425–5429
- Moura, J.W., Stocco dos Santos, R.C., D'Agli, M.L.Z., D'Angelino, J.L., Birgel, E.H. & Becak, W. (1988) Chromosome aberrations in cattle raised on bracken fern pasture. *Experientia*, **44**, 785–788
- Moy, R.L. & Quan, M.B. (1991) The presence of human papillomavirus 16 in squamous cell carcinoma of the proximal finger and reconstruction with a bilobed transposition flap. *J. Dermatol. Surg. Oncol.*, **17**, 171–175
- Moy, R.L., Eliezri, Y.D., Nuovo, G.J., Zitelli, J.A., Bennett, R.G. & Silverstein, S. (1989) Human papillomavirus type 16 DNA in periungual squamous cell carcinomas. *J. Am. med. Assoc.*, **261**, 2669–2673
- Moyal-Baracco, M., Leibowitch, M. & Orth, G. (1990) Vestibular papillae of the vulva. Lack of evidence for human papillomavirus etiology. *Arch. Dermatol.*, **126**, 1594–1598

- Moyret-Lalle, C., Marçais, C., Jacquemier, J., Moles, J.-P., Daver, A., Soret, J.-Y., Jeanteur, P., Ozturk, M. & Theillet, C. (1995) *ras*, *p53* And HPV status in benign and malignant prostate tumors. *Int. J. Cancer*, **64**, 124–129
- Muderspach, L., Wilczynski, S., Roman, L., Bade, L., Felix, J., Small, L.A., Kast, W.M., Fascio, G., Marty, V. & Weber, J. (2000) A phase I trial of a human papillomavirus (HPV) peptide vaccine for women with high-grade cervical and vulvar intraepithelial neoplasia who are HPV 16 positive. *Clin. Cancer Res.*, **6**, 3406–3416
- Müller, H. & Gissmann, L. (1978) *Mastomys natalensis* papillomavirus (MnPV), the causative agent of epithelial proliferations: Characterization of the virus particle. *J. gen. Virol.*, **41**, 315–323
- Müller, M., Viscidi, R.P., Sun, Y., Guerrero, E., Hill, P.M., Shah, F., Bosch, F.X., Muñoz, N., Gissmann, L. & Shah, K.V. (1992) Antibodies to HPV 16 E6 and E7 proteins as markers for HPV 16 associated invasive cancer. *Virology*, **187**, 508–514
- Müller, M., Gissmann, L., Cristiano, R.J., Sun, X.-Y., Frazer, I.H., Jenson, A.B., Alonso, A., Zentgraf, H. & Zhou, J. (1995) Papillomavirus capsid binding and uptake by cells from different tissues and species. *J. Virol.*, **69**, 948–954
- Mund, K., Han, C., Daum, R., Helfrich, S., Müller, M., Fisher, S.G., Schiller, J.T. & Gissmann, L. (1997) Detection of human papillomavirus type 16 DNA and of antibodies to human papillomavirus type 16 proteins in children. *Intervirology*, **40**, 232–237
- Münger, K., Werness, B.A., Dyson, N., Phelps, W.C., Harlow, E. & Howley, P.M. (1989a) Complex formation of human papillomavirus E7 proteins with the retinoblastoma tumor suppressor gene product. *EMBO J.*, **8**, 4099–4105
- Münger, K., Phelps, W.C., Bubb, V., Howley, P.M. & Schlegel, R. (1989b) The E6 and E7 genes of human papillomavirus type 16 together are necessary and sufficient for transformation of primary human keratinocytes. *J. Virol.*, **63**, 4417–4421
- Münger, K., Basile, J.R., Duensing, S., Eichten, A., Gonzalez, S.L., Grace, M. & Zacny, V.L. (2001) Biological activities and molecular targets of the human papillomavirus E7 oncoprotein. *Oncogene*, **20**, 7888–7898
- Munn, S.E., Higgins, E., Marshall, M. & Clement, M. (1996) A new method of intralesional bleomycin therapy in the treatment of recalcitrant warts. *Br. J. Dermatol.*, **135**, 969–971
- Muñoz, N., Bosch, F.X., de Sanjosé, S., Tafur, L., Izarzugaza, I., Gili, M., Viladiu, P., Navarro, C., Martos, C., Ascunce, N., Gonzalez, L.C., Kaldor, J.M., Guerrero, E., Lörincz, A., Santamaria, M., de Ruiz, P.A., Aristizabal, N. & Shah, K.V. (1992) The causal link between human papillomavirus and invasive cervical cancer: A population-based case–control study in Colombia and Spain. *Int. J. Cancer*, **52**, 743–749
- Muñoz, N., Bosch, F.X., de Sanjosé, S., Vergara, A., del Moral, A., Muñoz, M.T., Tafur, L., Gili, M., Izarzugaza, I., Viladiu, P., Navarro, C., Alonso de Ruiz, P., Aristizabal, N., Santamaria, M., Orfila, J., Daniel, R.W., Guerrero, E. & Shah, K.V. (1993) Risk factors for cervical intraepithelial neoplasia grade III/carcinoma *in situ* in Spain and Colombia. *Cancer Epidemiol. Biomarkers Prev.*, **2**, 423–431
- Muñoz, N., Castellsagué, X., Bosch, F.X., Tafur, L., de Sanjosé, S., Aristizabal, N., Ghaffari, A.M. & Shah, K.V. (1996a) Difficulty in elucidating the male role in cervical cancer in Colombia, a high-risk area for the disease. *J. natl Cancer Inst.*, **88**, 1068–1075
- Muñoz, N., Kato, I., Bosch, F.X., Eluf-Neto, J., de Sanjosé, S., Ascunce, N., Gili, M., Izarzugaza, I., Viladiu, P., Tormo, M.J., Moreo, P., Gonzalez, L.C., Tafur, L., Walboomers, J.M.M. & Shah,

- K.V. (1996b) Risk factors for HPV DNA detection in middle-aged women. *Sex. transm. Dis.*, **23**, 504–510
- Muñoz, N., Franceschi, S., Bosetti, C., Moreno, V., Herrero, R., Smith, J.S., Shah, K.V., Meijer, C.J.L.M. & Bosch, F.X. for the International Agency for Research on Cancer (IARC) Multi-centric Cervical Cancer Study (2002) Role of parity and human papillomavirus in cervical cancer: The IARC multicentric case-control study. *Lancet*, **359**, 1093–1101
- Muñoz, N., Bosch, F.X., de Sanjosé, S., Herrero, R., Castellsagué, X., Shah, K.V., Snijders, P.J.F. & Meijer, C.J.L.M. for the International Agency for Research on Cancer Multicentric Cervical Cancer Study (2003) Epidemiologic classification of human papillomavirus types associated with cervical cancer. *New Engl. J. Med.*, **348**, 518–527
- Muñoz, N., Méndez, F., Posso, H., Molano, M., van den Brule, A.J.C., Ronderos, M., Meijer, C. & Muñoz, A. for the Instituto Nacional de Cancerología HPV Study Group (2004) Incidence, duration, and determinants of cervical human papillomavirus infection in a cohort of Colombian women with normal cytological results. *J. infect. Dis.*, **190**, 2077–2087
- Murphy, M., Pomeroy, L., Tynan, M., Murphy, J.F. & Mulcahy, F.M. (1995) Cervical cytological screening in HIV-infected women in Dublin — A six-year review. *Int. J. STD AIDS*, **6**, 262–266
- Murta, E.F.C., Neves, M.A., Jr, Sempionato, L.R.F., Costa, M.C. & Maluf, P.J. (2005) Vaginal intraepithelial neoplasia: Clinical-therapeutic analysis of 33 cases. *Arch. Gynecol. Obstet.*, **272**, 261–264
- Mvula, M., Iwasaka, T., Iguchi, A., Nakamura, S., Masaki, Z. & Sugimori, H. (1996) Do human papillomaviruses have a role in the pathogenesis of bladder carcinoma? *J. Urol.*, **155**, 471–474
- Myers, G., Bernard, H.-U., Delius, H., Favre, M., Icenogel, J., Van Ranst, M. & Wheeler, C., eds (1994) *Human Papillomaviruses 1994: A Compilation and Analysis of Nucleic Acid and Amino Acid Sequences*, Los Alamos, NM, Los Alamos National Laboratory
- Naghashfar, Z., McDonnell, P.J., McDonnell, J.M., Green, W.R. & Shah, K.V. (1986) Genital tract papillomavirus type 6 in recurrent conjunctival papilloma. *Arch. Ophthalmol.*, **104**, 1814–1815
- Nahass, G.T., Blauvelt, A., Leonardi, C.L. & Penneys, N.S. (1992) Basal cell carcinoma of the scrotum. Report of three cases and review of the literature. *J. Am. Acad. Dermatol.*, **26**, 574–578
- Nakagawa, S. & Huibregtse, J.M. (2000) Human Scribble (Vartul) is targeted for ubiquitin-mediated degradation by the high-risk papillomavirus E6 proteins and the E6AP ubiquitin-protein ligase. *Mol. cell. Biol.*, **20**, 8244–8253
- Nakagawa, M., Stites, D.P., Farhat, S., Judd, A., Moscicki, A.-B., Canchola, A.J., Hilton, J.F. & Palefsky, J.M. (1996) T-cell proliferative response to human papillomavirus type 16 peptides: Relationship to cervical intraepithelial neoplasia. *Clin. diagn. Lab. Immunol.*, **3**, 205–210
- Nakagawa, M., Stites, D.P., Farhat, S., Sisler, J.R., Moss, B., Kong, F., Moscicki, A.-B. & Palefsky, J.M. (1997) Cytotoxic T lymphocyte responses to E6 and E7 proteins of human papillomavirus type 16: Relationship to cervical intraepithelial neoplasia. *J. infect. Dis.*, **175**, 927–931
- Nakagawa, M., Stites, D.P., Patel, S., Farhat, S., Scott, M., Hills, N.K., Palefsky, J.M. & Moscicki, A.-B. (2000) Persistence of human papillomavirus type 16 infection is associated with lack of cytotoxic T lymphocyte response to the E6 antigens. *J. infect. Dis.*, **182**, 595–598
- Nakagawa, H., Sugano, K., Fujii, T., Kubushiro, K., Tsukazaki, K. & Nozawa, S. (2002) Frequent detection of human papilloma viruses in cervical dysplasia by PCR single-strand DNA-conformational polymorphism analysis. *Anticancer Res.*, **22**, 1655–1660

- Nakahara, T., Nishimura, A., Tanaka, M., Ueno, T., Ishimoto, A. & Sakai, H. (2002) Modulation of the cell division cycle by human papillomavirus type 18 E4. *J. Virol.*, **76**, 10914–10920
- Nakamura, T., Williams-Simons, L. & Westphal, H. (1997) A human papillomavirus type 18 E6/E7 transgene sensitizes mouse lens cells to human wild-type p53-mediated apoptosis. *Oncogene*, **14**, 2991–2998
- Nakamura, Y., Mashima, Y., Kameyama, K., Mukai, M. & Oguchi, Y. (1997) Detection of human papillomavirus infection in squamous tumours of the conjunctiva and lacrimal sac by immunohistochemistry, in situ hybridisation, and polymerase chain reaction. *Br. J. Ophthalmol.*, **81**, 308–313
- Nakao, Y., Yang, X., Yokoyama, M., Pater, M.M. & Pater, A. (1996) Malignant transformation of human ectocervical cells immortalized by HPV 18: *In vitro* model of carcinogenesis by cigarette smoke. *Carcinogenesis*, **17**, 577–583
- Nasir, L. & Reid, S.W.J. (1999) Bovine papillomaviral gene expression in equine sarcoid tumours. *Virus Res.*, **61**, 171–175
- Nasseri, M. & Wettstein, F.O. (1984) Differences exist between viral transcripts in cottontail rabbit papillomavirus-induced benign and malignant tumors as well as non-virus-producing and virus-producing tumors. *J. Virol.*, **51**, 706–712
- National Cancer Institute Workshop (1989) The 1988 Bethesda System for reporting cervical/vaginal cytological diagnoses. *J. Am. med. Assoc.*, **262**, 931–934
- Naucler, P., da Costa, F.M., Ljungberg, O., Bugalho, A. & Dillner, J. (2004) Human papillomavirus genotypes in cervical cancers in Mozambique. *J. gen. Virol.*, **85**, 2189–2190
- Nawa, A., Nishiyama, Y., Kobayashi, T., Wakahara, Y., Okamoto, T., Kikkawa, F., Suganuma, N., Goto, S., Kuzuya, K. & Tomoda, Y. (1995) Association of human leukocyte antigen-B1*03 with cervical cancer in Japanese women aged 35 years and younger. *Cancer*, **75**, 518–521
- Neary, K., Horwitz, B.H. & DiMaio, D. (1987) Mutational analysis of open reading frame E4 of bovine papillomavirus type 1. *J. Virol.*, **61**, 1248–1252
- Nees, M., Geoghegan, J.M., Hyman, T., Frank, S., Miller, L. & Woodworth, C.D. (2001) Papillomavirus type 16 oncogenes downregulate expression of interferon-responsive genes and upregulate proliferation-associated and NF- κ B-responsive genes in cervical keratinocytes. *J. Virol.*, **75**, 4283–4296
- Newton, R., Ziegler, J., Beral, V., Mbidde, E., Carpenter, L., Wabinga, H., Mbulaiteye, S., Appleby, P., Reeves, G., Jaffe, H. & the Uganda Kaposi's Sarcoma Study Group (2001) A case-control study of human immunodeficiency virus infection and cancer in adults and children residing in Kampala, Uganda. *Int. J. Cancer*, **92**, 622–627
- Newton, R., Ziegler, J., Ateenyi-Agaba, C., Bousarghin, L., Casabonne, D., Beral, V., Mbidde, E., Carpenter, L., Reeves, G., Parkin, D.M., Wabinga, H., Mbulaiteye, S., Jaffe, H., Bourbouli, D., Boshoff, C., Touzé, A., Coursaget, P. & the Uganda Kaposi's Sarcoma Study Group (2002) The epidemiology of conjunctival squamous cell carcinoma in Uganda. *Br. J. Cancer*, **87**, 301–308
- Nguyen, M.L., Nguyen, M.M., Lee, D., Griep, A.E. & Lambert, P.F. (2003) The PDZ ligand domain of the human papillomavirus type 16 E6 protein is required for E6's induction of epithelial hyperplasia in vivo. *J. Virol.*, **77**, 6957–6964
- Niedobitek, G., Pitteroff, S., Herbst, H., Shepherd, P., Finn, T., Anagnostopoulos, I. & Stein, H. (1990) Detection of human papillomavirus type 16 DNA in carcinomas of the palatine tonsil. *J. clin. Pathol.*, **43**, 918–921

- Nimako, M., Fiander, A.N., Wilkinson, G.W.G., Borysiewicz, L.K. & Man, S. (1997) Human papillomavirus-specific cytotoxic T lymphocytes in patients with cervical intraepithelial neoplasia grade III. *Cancer Res.*, **57**, 4855–4861
- Nindl, I., Benitez-Bribiesca, L., Berumen, J., Farmanara, N., Fisher, S., Gross, G., Lopez-Carillo, L., Müller, M., Tommasino, M., Vazquez-Curiel, A. & Gissmann, L. (1994) Antibodies against linear and conformational epitopes of the human papillomavirus (HPV) type 16 E6 and E7 oncoproteins in sera of cervical cancer patients. *Arch. Virol.*, **137**, 341–353
- Nindl, I., Gissmann, L., Fisher, S.G., Benitez-Bribiesca, L., Berumen, J. & Müller, M. (1996) The E7 protein of human papillomavirus (HPV) type 16 expressed by recombinant vaccinia virus can be used for detection of antibodies in sera from cervical cancer patients. *J. virol. Meth.*, **62**, 81–85
- Nishimura, A., Ono, T., Ishimoto, A., Dowhanick, J.J., Frizzell, M.A., Howley, P.M. & Sakai, H. (2000) Mechanisms of human papillomavirus E2-mediated repression of viral oncogene expression and cervical cancer cell growth inhibition. *J. Virol.*, **74**, 3752–3760
- Nishimura, M., Furumoto, H., Kato, T., Kamada, M. & Aono, T. (2000) Microsatellite instability is a late event in the carcinogenesis of uterine cervical cancer. *Gynecol. Oncol.*, **79**, 201–206
- Nishioka, S., Fukushima, K., Nishizaki, K., Gunduz, M., Tominaga, S., Fukazawa, M., Monden, N., Watanabe, S., Masuda, Y. & Ogura, H. (1999) Human papillomavirus as a risk factor for head and neck cancers — A case-control study. *Acta otolaryngol.*, **540**, 77–80
- Nobbenhuis, M.A.E., Walboomers, J.M.M., Helmerhorst, T.J.M., Rozendaal, L., Remmink, A.J., Risse, E.K.J., van der Linden, H.C., Voorhorst, F.J., Kenemans, P. & Meijer, C.J.L.M. (1999) Relation of human papillomavirus status to cervical lesions and consequences for cervical-cancer screening: A prospective study. *Lancet*, **354**, 20–25
- Nobbenhuis, M.A.E., Helmerhorst, T.J.M., van den Brule, A.J.C., Rozendaal, L., Voorhorst, F.J., Bezemer, P.D., Verheijen, R.H.M. & Meijer, C.J.L.M. (2001) Cytological regression and clearance of high-risk human papillomavirus in women with an abnormal cervical smear. *Lancet*, **358**, 1782–1783
- Nobbenhuis, M.A.E., Helmerhorst, T.J.M., van den Brule, A.J.C., Rozendaal, L., Bezemer, P.D., Voorhorst, F.J. & Meijer, C.J.L.M. (2002) High-risk human papillomavirus clearance in pregnant women: Trends for lower clearance during pregnancy with a catch-up postpartum. *Br. J. Cancer*, **87**, 75–80
- Noda, T., Sasagawa, T., Dong, Y., Fuse, H., Namiki, M. & Inoue, M. (1998) Detection of human papillomavirus (HPV) DNA in archival specimens of benign prostatic hyperplasia and prostatic cancer using a highly sensitive nested PCR method. *Urol. Res.*, **26**, 165–169
- Noel, J.C., Peny, M.O., Goldschmidt, D., Verhest, A., Heenen, M. & de Dobbeleer, G. (1993) Human papillomavirus type 1 DNA in verrucous carcinoma of the leg. *J. Am. Acad. Dermatol.*, **29**, 1036–1038
- Noel, J.C., Peny, M.O., Mat, O., Antoine, M., Firket, C., Detremmerie, O., Thiry, L., Verhest, A. & Vereerstraeten, P. (1994) Human papillomavirus type 16 associated with multifocal transitional cell carcinomas of the bladder in two transplanted patients. *Transplant. int.*, **7**, 340–343
- Noffsinger, A.E., Hui, Y.-Z., Suzuk, L., Yochman, L.K., Miller, M.A., Hurtubise, P., Gal, A.A. & Fenoglio-Preiser, C.M. (1995a) The relationship of human papillomavirus to proliferation and ploidy in carcinoma of the anus. *Cancer*, **75**, 958–967

- Noffsinger, A.E., Suzuk, L., Hui, Y.Z., Gal, A.A. & Fenoglio-Preiser, C.M. (1995b) Differential sensitivities of *E6* type-specific and *L1* consensus primers in the detection of human papillomavirus in anal carcinoma. *Mod. Pathol.*, **8**, 509–514
- Nonnenmacher, B., Hubbert, N.L., Kirnbauer, R., Shah, K.V., Muñoz, N., Bosch, F.X., de Sanjosé, S., Viscidi, R., Lowy, D.R. & Schiller, J.T. (1995) Serologic response to human papillomavirus type 16 (HPV-16) virus-like particles in HPV-16 DNA-positive invasive cervical cancer and cervical intraepithelial neoplasia grade III patients and controls from Colombia and Spain. *J. infect. Dis.*, **172**, 19–24
- Nonogaki, S., Wakamatsu, A., Longatto Filho, A.L., Pereira, S.M.M., Utagawa, M.L., Ferreira Alves, V.A., Di Loreto, C., Sakamoto Maeda, M.Y., Lima, T.P., Roteli-Martins, C. & Syrjänen, K. (2004) Hybrid Capture II and polymerase chain reaction for identifying HPV infections in samples collected in a new collection medium. A comparison. *Acta cytol.*, **48**, 514–520
- Nordin, P., Stenquist, B. & Hansson, B.G. (1994) Joint occurrence of human papillomavirus type 16 DNA in Bowen's disease on a finger and in dysplasia of the vulva and the uterine cervix (Letter to the Editor). *Br. J. Dermatol.*, **131**, 740
- Norval, M., Michie, J.R., Apps, M.V., Head, K.W. & Else, R.E. (1985) Rumen papillomas in sheep. *Vet. Microbiol.*, **10**, 219–229
- Noutsou, A., Koffa, M., Ergazaki, M., Siafakas, N.M. & Spandidos, D.A. (1996) Detection of human papilloma virus (HPV) and *K-ras* mutations in human lung carcinomas. *Int. J. Oncol.*, **8**, 1089–1093
- Noyes, W.F. & Mellors, R.C. (1957) Fluorescent antibody detection of the antigens of the Shope papillomavirus in papillomas of the wild and domestic rabbit. *J. exp. Med.*, **106**, 555–562
- Nuorva, K., Soini, Y., Kamel, D., Pöllänen, R., Bloigu, R., Vähäkangas, K. & Pääkkö, P. (1995) p53 Protein accumulation and the presence of human papillomavirus DNA in bronchiolo-alveolar carcinoma correlate with poor prognosis. *Int. J. Cancer (Pred. Oncol.)*, **64**, 424–429
- Nuovo, G.J., Friedman, D. & Richart, R.M. (1990) In-situ hybridization analysis of human papillomavirus DNA segregation patterns in lesions of the female genital tract. *Gynecol. Oncol.*, **36**, 256–262
- Nuovo, G.J., Gallery, F., MacConnell, P., Becker, J. & Bloch, W. (1991a) An improved technique for the *in situ* detection of DNA after polymerase chain reaction amplification. *Am. J. Pathol.*, **139**, 1239–1244
- Nuovo, G.J., Darfler, M.M., Impraim, C.C. & Bromley, S.E. (1991b) Occurrence of multiple types of human papillomavirus in genital tract lesions. Analysis by *in situ* hybridization and the polymerase chain reaction. *Am. J. Pathol.*, **138**, 53–58
- Nuovo, G.J., MacConnell, P., Forde, A. & Delvenne, P. (1991c) Detection of human papillomavirus DNA in formalin-fixed tissues by *in situ* hybridization after amplification by polymerase chain reaction. *Am. J. Pathol.*, **139**, 847–854
- Obalek, S., Favre, M., Szymanczyk, J., Misiewicz, J., Jablonska, S. & Orth, G. (1992) Human papillomavirus (HPV) types specific of epidermodysplasia verruciformis detected in warts induced by HPV3 or HPV3-related types in immunosuppressed patients. *J. invest. Dermatol.*, **98**, 936–941
- Obalek, S., Misiewicz, J., Jablonska, S., Favre, M. & Orth, G. (1993) Childhood condyloma acuminatum: Association with genital and cutaneous human papillomaviruses. *Pediatr. Dermatol.*, **10**, 101–106

- O'Banion, M.K., Reichmann, M.E. & Sundberg, J.P. (1986) Cloning and characterization of an equine cutaneous papillomavirus. *Virology*, **152**, 100–109
- O'Banion, M.K., Sundberg, J.P., Shima, A.L. & Reichmann, M.E. (1987) Venereal papilloma and papillomavirus in a Colobus monkey (*Colobus guereza*). *Intervirology*, **28**, 232–237
- O'Brien, P.M. & Campo, M.S. (2002) Evasion of host immunity directed by papillomavirus-encoded proteins. *Virus Res.*, **88**, 103–117
- O'Connor, M.J., Tan, S.-H., Tan, C.-H. & Bernard, H.-U. (1996) YY1 represses human papillomavirus type 16 transcription by quenching AP-1 activity. *J. Virol.*, **70**, 6529–6539
- O'Connor, D.P., Kay, E.W., Leader, M., Atkins, G.J., Murphy, G.M. & Mabruk, M.J.E.M.F. (2001a) p53 Codon 72 polymorphism and human papillomavirus associated skin cancer. *J. clin. Pathol.*, **54**, 539–542
- O'Connor, D.P., Kay, E.W., Leader, M., Murphy, G.M., Atkins, G.J. & Mabruk, M.J. (2001b) Altered p53 expression in benign and malignant skin lesions from renal transplant recipients and immunocompetent patients with skin cancer: Correlation with human papillomaviruses? *Diagn. mol. Pathol.*, **10**, 190–199
- Oda, T., Akaike, T., Hamamoto, T., Suzuki, F., Hirano, T. & Maeda, H. (1989) Oxygen radicals in influenza-induced pathogenesis and treatment with pyran polymer-conjugated SOD. *Science*, **244**, 974–976
- Odunsi, K.O., van Ee, C.C., Ganesan, T.S. & Shelling, A.N. (2000) Evaluation of the possible protective role of adeno-associated virus type 2 infection in HPV-associated premalignant disease of the cervix. *Gynecol. Oncol.*, **78**, 342–345
- Oelze, I., Kartenbeck, J., Crusius, K. & Alonso, A. (1995) Human papillomavirus type 16 E5 protein affects cell-cell communication in an epithelial cell line. *J. Virol.*, **69**, 4489–4494
- Oettlé, A.G. (1957) Spontaneous carcinoma of the glandular stomach in *Rattus (mastomys) natalensis*, an African rodent. *Br. J. Cancer*, **11**, 415–433
- Offord, E.A. & Beard, P. (1990) A member of the activator protein 1 family found in keratinocytes but not in fibroblasts required for transcription from a human papillomavirus type 18 promoter. *J. Virol.*, **64**, 4792–4798
- Ogawa, T., Tomita, Y., Okada, M., Shinozaki, K., Kubonoya, H., Kaiho, I. & Shirasawa, H. (2004) Broad-spectrum detection of papillomaviruses in bovine teat papillomas and healthy teat skin. *J. gen. Virol.*, **85**, 2191–2197
- Oguchi, T., Sato, S., Xiao, Y.H., Yokoyama, Y. & Saito, Y. (2000) Usefulness of PCR in situ hybridization as a technique for morphological detection of human papillomavirus in uterine cervical neoplasia. *Eur. J. gynaecol. Oncol.*, **21**, 585–587
- Ogunbiyi, O.A., Scholefield, J.H., Raftery, A.T., Smith, J.H., Duffy, S., Sharp, F. & Rogers, K. (1994) Prevalence of anal human papillomavirus infection and intraepithelial neoplasia in renal allograft recipients. *Br. J. Surg.*, **81**, 365–367
- Ogura, H., Watanabe, S., Fukushima, K., Masuda, Y., Fujiwara, T. & Yabe, Y. (1993) Human papillomavirus DNA in squamous cell carcinomas of the respiratory and upper digestive tracts. *Jpn. J. clin. Oncol.*, **23**, 221–225
- Ogura, H., Fukushima, K. & Watanabe, S. (1996) A high prevalence of human papillomavirus DNA in recurrent nasal papillomas. *J. Med. Microbiol.*, **45**, 162–166
- Oh, S.T., Kyo, S. & Laimins, L.A. (2001) Telomerase activation by human papillomavirus type 16 E6 protein: Induction of human telomerase reverse transcriptase expression through Myc and GC-rich Sp1 binding sites. *J. Virol.*, **75**, 5559–5566

- Oh, T.J., Kim, C.J., Woo, S.K., Kim, T.S., Jeong, D.J., Kim, M.S., Lee, S., Cho, H.S. & An, S. (2004) Development and clinical evaluation of a highly sensitive DNA microarray for detection and genotyping of human papillomaviruses. *J. clin. Microbiol.*, **42**, 3272–3280
- Oh, Y.-K., Sohn, T., Park, J.-S., Kang, M.-J., Choi, H.-G., Kim, J.-A., Kim, W.-K., Ko, J.J. & Kim, C.-K. (2004) Enhanced mucosal and systemic immunogenicity of human papillomavirus-like particles encapsidating interleukin-2 gene adjuvant. *Virology*, **328**, 266–273
- Okoye, A., Cordano, P., Taylor, E.R., Morgan, I.M., Everett, R. & Campo, M.S. (2005) Human papillomavirus 16 L2 inhibits the transcriptional activation function, but not the DNA replication function, of HPV-16 E2. *Virus Res.*, **108**, 1–14
- Olanian, O.B. (2002) Validity of colposcopy in the diagnosis of early cervical neoplasia — A review. *Afr. J. reprod. Health*, **6**, 59–69
- O’Leary, J.J., Landers, R.J., Crowley, M., Healy, I., Kealy, W.F., Hogan, J., Cullinane, C., Kelehan, P. & Doyle, C.T. (1997) Genotypic mapping of HPV and assessment of EBV prevalence in endocervical lesions. *J. clin. Pathol.*, **50**, 904–910
- de Oliveira, W.R.P., Rady, P.L., Grady, J., Hughes, T.K., Festa Neto, C., Rivitti, E.A. & Tyring, S.K. (2003) Polymorphisms of the interleukin 10 gene promoter in patients from Brazil with epidermodysplasia verruciformis. *J. Am. Acad. Dermatol.*, **49**, 639–643
- Olsen, A.O., Dillner, J., Skrandal, A. & Magnus, P. (1998a) Combined effect of smoking and human papillomavirus type 16 infection in cervical carcinogenesis. *Epidemiology*, **9**, 346–349
- Olsen, A.O., Ørstavik, I., Dillner, J., Vestergaard, B.F. & Magnus, P. (1998b) Herpes simplex virus and human papillomavirus in a population-based case-control study of cervical intraepithelial neoplasia grade II-III. *APMIS*, **106**, 417–424
- Olson, C. (1987) Animal papillomas: Historical perspectives. In: Selzman, N.P. & Howley, P.M., eds, *The Papillomaviruses*, New York, Plenum Press, pp. 39–66
- Olson, C., Jr & Cook, R.H. (1951) Cutaneous sarcoma-like lesions of the horse caused by the agent of bovine papilloma. *Proc. Soc. exp. Biol. Med.*, **27**, 281–284
- Olson, C., Pamukcu, A.M., Brobst, D.F., Kowalczyk, T., Satter, E.J. & Price, J.M. (1959) A urinary bladder tumor induced by a bovine cutaneous papilloma agent. *Cancer Res.*, **19**, 779–783
- Olson, C., Pamukcu, A.M. & Brobst, D.F. (1965) Papilloma-like virus from bovine urinary bladder tumors. *Cancer Res.*, **25**, 840–849
- Olson, C., Gordon, D.E., Robl, M.G. & Lee, K.P. (1969) Oncogenicity of bovine papilloma virus. *Arch. environ. Health*, **19**, 827–837
- Olsson, S.-E., Villa, L.L., Costa, R.L.R., Petta, C.A., Andrade, R.P., Malm, C., Iversen, O.-E., Høye, J., Steinwall, M., Riis-Johannessen, G., Andersson-Ellstrom, A., Elfgren, K., von Krogh, G., Lehtinen, M., Paavonen, J., Tamm, G.M., Giacoletti, K., Lupinacci, L., Esser, M.T., Vuocolo, S.C., Saah, A.J. & Barr, E. (2007) Induction of immune memory following administration of a prophylactic quadrivalent human papillomavirus (HPV) types 6/11/16/18 L1 virus-like particle (VLP) vaccine. *Vaccine*, **25**, 4931–4939
- Onda, T., Carter, J.J., Koutsky, L.A., Hughes, J.P., Lee, S.-K., Kuypers, J., Kiviat, N. & Galloway, D.A. (2003) Characterization of IgA response among women with incident HPV 16 infection. *Virology*, **312**, 213–221
- Ong, C.-K., Chan, S.-Y., Campo, M.S., Fujinaga, K., Mavromara-Nazos, P., Labropoulou, V., Pfister, H., Tay, S.-K., ter Meulen, J., Villa, L.L. & Bernard, H.-U. (1993) Evolution of human papillomavirus type 18: An ancient phylogenetic root in Africa and intratype diversity reflect coevolution with human ethnic groups. *J. Virol.*, **67**, 6424–6431

- Opalka, D., Lachman, C.E., MacMullen, S.A., Jansen, K.U., Smith, J.F., Chirmule, N. & Esser, M.T. (2003) Simultaneous quantitation of antibodies to neutralizing epitopes on virus-like particles for human papillomavirus types 6, 11, 16, and 18 by a multiplexed luminex assay. *Clin. diagn. Lab. Immunol.*, **10**, 108–115
- Oriel, J.D. (1971) Natural history of genital warts. *Br. J. vener. Dis.*, **47**, 1–13
- Origoni, M., Rossi, M., Ferrari, D., Lillo, F. & Ferrari, A.G. (1999) Human papillomavirus with co-existing vulvar vestibulitis syndrome and vestibular papillomatosis. *Int. J. Gynecol. Obstet.*, **64**, 259–263
- Orjuela, M., Ponce Castaneda, V., Ridaura, C., Lecona, E., Leal, C., Abramson, D.H., Orlow, I., Gerald, W. & Cordon-Cardo, C. (2000) Presence of human papilloma virus in tumor tissue from children with retinoblastoma: An alternative mechanism for tumor development. *Clin. Cancer Res.*, **6**, 4010–4016
- Orozco, J.J., Carter, J.J., Koutsky, L.A. & Galloway, D.A. (2005) Humoral immune response recognizes a complex set of epitopes on human papillomavirus type 6 L1 capsomers. *J. Virol.*, **79**, 9503–9514
- Orth, G. (1986) Epidermodysplasia verruciformis: A model for understanding the oncogenicity of human papillomaviruses. In: *Papillomaviruses* (Ciba Foundation Symposium 120), New York, John Wiley & Sons, pp. 157–174
- Orth, G. (1987) Epidermodysplasia verruciformis. In: Salzman, N.P. & Howley, P.M., eds, *The Papovaviridae*, Vol. 2, *The Papillomaviruses*, New York, Plenum Press, pp. 199–243
- Orth, G. & Favre, M. (1985) Human papillomaviruses. Biochemical and biologic properties. *Clin. Dermatol.*, **3**, 27–42
- Orth, G., Jeanteur, P. & Croissant, O. (1971) Evidence for and localization of vegetative viral DNA replication by autoradiographic detection of RNA-DNA hybrids in sections of tumours induced by Shope papillomavirus. *Proc. natl Acad. Sci. USA*, **68**, 1876–1880
- Orth, G., Jablonska, S., Jarzabek-Chorzelska, M., Obalek, S., Rzesa, G., Favre, M. & Croissant, O. (1979) Characteristics of the lesions and risk of malignant conversion associated with the type of human papillomavirus involved in epidermodysplasia verruciformis. *Cancer Res.*, **39**, 1074–1082
- Orth, G., Favre, M., Breitburd, F., Croissant, O., Jablonska, S., Obalek, S., Jarzabek-Chorzelska, M. & Rzesa, G. (1980) Epidermodysplasia verruciformis: A model for the role of papillomaviruses in human cancer. In: Essex, M., Todaro, G. & zur Hausen, H., eds, *Viruses in Naturally Occurring Cancers* (Cold Spring Harbor Conferences on Cell Proliferation, Vol. 7), Cold Spring Harbor, NY, CSH Press, pp. 259–282
- Orth, G., Jablonska, S., Favre, M., Croissant, O., Obalek, S., Jarzabek-Chorzelska, M. & Jibard, N. (1981) Identification of papillomaviruses in butchers' warts. *J. invest. Dermatol.*, **76**, 97–102
- Orth, G., Favre, M., Majewski, S. & Jablonska, S. (2001) Epidermodysplasia verruciformis defines a subset of cutaneous human papillomaviruses (Letter to the Editor). *J. Virol.*, **75**, 4952–4953
- Osterhaus, A.D.M.E., Ellens, D.J. & Horzinek, M.C. (1977) Identification and characterization of a papillomavirus from birds (Fringillidae). *Intervirology*, **8**, 351–359
- Östör, A.G. (1993) Natural history of cervical intraepithelial neoplasia: A critical review. *Int. J. gynecol. Pathol.*, **12**, 186–192
- Ostrow, R.S., Bender, M., Nimura, M., Seki, T., Kawashima, M., Pass, F. & Faras, A. (1982) Human papillomavirus DNA in cutaneous primary and metastasized squamous cell carcinomas from patients with epidermodysplasia verruciformis. *Proc. natl Acad. Sci. USA*, **79**, 1634–1638

- Ostrow, R.S., Zachow, K.R., Thompson, O. & Faras, A.J. (1984) Molecular cloning and characterization of a unique type of human papillomavirus from an immune deficient patient. *J. invest. Dermatol.*, **82**, 362–366
- Ostrow, R.S., Manias, D.A., Fong, W.J., Zachow, K.R. & Faras, A.J. (1987) A survey of human cancers for human papillomavirus DNA by filter hybridization. *Cancer*, **59**, 429–434
- Ostrow, R.S., Shaver, M.K., Turnquist, S., Viksnins, A., Bender, M., Vance, C., Kaye, V. & Faras, A.J. (1989a) Human papillomavirus-16 DNA in a cutaneous invasive cancer. *Arch. Dermatol.*, **125**, 666–669
- Ostrow, R.S., Zachow, K.R., Shaver, M.K. & Faras, A.J. (1989b) Human papillomavirus type 27: Detection of a novel human papillomavirus in common warts of a renal transplant recipient. *J. Virol.*, **63**, 4904–4906
- Ostrow, R.S., McGlennen, R.C., Shaver, M.K., Kloster, B.E., Houser, D. & Faras, A.J. (1990) A rhesus monkey model for sexual transmission of a papillomavirus isolated from a squamous cell carcinoma. *Proc. natl Acad. Sci. USA*, **87**, 8170–8174
- Ostrow, R.S., LaBresh, K.V. & Faras, A.J. (1991) Characterization of the complete RhPV 1 genomic sequence and an integration locus from a metastatic tumor. *Virology*, **181**, 424–429
- Ostrow, R.S., Coughlin, S.M., McGlennen, R.C., Johnson, A.N., Ratterree, M.S., Scheffler, J., Yaegashi, N., Galloway, D.A. & Faras, A.J. (1995) Serological and molecular evidence of rhesus papillomavirus type 1 infections in tissues from geographically distinct institutions. *J. gen. Virol.*, **76**, 293–299
- Ostwald, C., Müller, P., Barten, M., Rutsatz, K., Sonnenburg, M., Milde-Langosch, K. & Löning, T. (1994) Human papillomavirus DNA in oral squamous cell carcinomas and normal mucosa. *J. oral Pathol. Med.*, **23**, 220–225
- Ostwald, C., Rutsatz, K., Schweder, J., Schmidt, W., Gundlach, K. & Barten, M. (2003) Human papillomavirus 6/11, 16 and 18 in oral carcinomas and benign oral lesions. *Med. Microbiol. Immunol.*, **192**, 145–148
- Ottaviano, M. & La Torre, P. (1982) Examination of the cervix with the naked eye using acetic acid test. *Am. J. Obstet. Gynecol.*, **143**, 139–142
- Otten, N., von Tscherner, C., Lazary, S., Antczak, D.F. & Gerber, H. (1993) DNA of bovine papillomavirus type 1 and 2 in equine sarcoids: PCR detection and direct sequencing. *Arch. Virol.*, **132**, 121–131
- Ozbun, M.A. & Meyers, C. (1997) Characterization of late gene transcripts expressed during vegetative replication of human papillomavirus type 31b. *J. Virol.*, **71**, 5161–5172
- Özsaran, A.A., Ates, T., Dikmen, Y., Zeytinoglu, A., Terek, C., Erhan, Y., Özacar, T. & Bilgic, A. (1999) Evaluation of the risk of cervical intraepithelial neoplasia and human papilloma virus infection in renal transplant patients receiving immunosuppressive therapy. *Eur. J. Gynaecol. Oncol.*, **20**, 127–130
- Paavonen, J., Stevens, C.E., Wolner-Hanssen, P., Critchlow, C.W., Derouen, T., Kiviat, N., Koutsky, L., Stamm, W.E., Corey, L. & Holmes, K.K. (1988) Colposcopic manifestations of cervical and vaginal infections. *Obstet. Gynecol. Surv.*, **43**, 373–381
- Pace, G.W. & Leaf, C.D. (1995) The role of oxidative stress in HIV disease. *Free Radic. Biol. Med.*, **19**, 523–528
- Padayachee, A. & Prescott, C.A. (1993) Relationship between the clinical course and HPV typing of recurrent laryngeal papillomatosis. The Red Cross War Memorial Children's Hospital experience 1982–1988. *Int. J. paediat. Otorhinolaryngol.*, **26**, 141–147

- Padlewska, K., Ramoz, N., Cassonnet, P., Riou, G., Barrois, M., Majewski, S., Croissant, O., Jablonska, S. & Orth, G. (2001) Mutation and abnormal expression of the p53 gene in the viral skin carcinogenesis of epidermodysplasia verruciformis. *J. invest. Dermatol.*, **117**, 935–942
- Palazzi, M.A., Erwenne, C.M. & Villa, L.L. (2000) Detection of human papillomavirus in epithelial lesions of the conjunctiva. *Sao Paulo med. J.*, **118**, 125–130
- Palazzi, M.A., Yunes, J.A., Cardinali, I.A., Stangenhans, G.P., Brandalise, S.R., Ferreira, S.A., Sobrinho, J.S.P. & Villa, L.L. (2003) Detection of oncogenic human papillomavirus in sporadic retinoblastoma. *Acta ophthalmol. scand.*, **81**, 396–398
- Palefsky, J.M. & Holly, E.A. (2003) Immunosuppression and co-infection with HIV. *J. natl Cancer Inst. Monogr.*, **31**, 41–46
- Palefsky, J.M., Holly, E.A., Ralston, M.L., Arthur, S.P., Hogeboom, C.J. & Darragh, T. M. (1997a) Anal cytological abnormalities and anal HPV infection in men with Centers for Disease Control group IV HIV disease. *Genitourin. Med.*, **73**, 174–180
- Palefsky, J.M., Holly, E.A., Hogeboom, C.J., Berry, J.M., Jay, N. & Darragh, T.M. (1997b) Anal cytology as a screening tool for anal squamous intraepithelial lesions. *J. acquir. immune Defic. Syndr. hum. Retrovirol.*, **14**, 415–422
- Palefsky, J.M., Holly, E.A., Ralston, M.L., Jay, N., Berry, J.M. & Darragh, T.M. (1998a) High incidence of anal high-grade squamous intra-epithelial lesions among HIV-positive and HIV-negative homosexual and bisexual men. *AIDS*, **12**, 495–503
- Palefsky, J.M., Holly, E.A., Hogeboom, C.J., Ralston, M.L., DaCosta, M.M., Botts, R., Berry, J.M., Jay, N. & Darragh, T.M. (1998b) Virologic, immunologic, and clinical parameters in the incidence and progression of anal squamous intraepithelial lesions in HIV-positive and HIV-negative homosexual men. *J. acquir. immune Defic. Syndr. hum. Retrovirol.*, **17**, 314–319
- Palefsky, J.M., Minkoff, H., Kalish, L.A., Levine, A., Sacks, H.S., Garcia, P., Young, M., Melnick, S., Miotti, P. & Burk, R. (1999) Cervicovaginal human papillomavirus infection in human immunodeficiency virus-1 (HIV)-positive and high-risk HIV-negative women. *J. natl Cancer Inst.*, **91**, 226–236
- Palefsky, J.M., Holly, E.A., Ralston, M.L., Da Costa, M. & Greenblatt, R.M. (2001) Prevalence and risk factors for anal human papillomavirus infection in human immunodeficiency virus (HIV)-positive and high-risk HIV-negative women. *J. infect. Dis.*, **183**, 383–391
- Palker, T.J., Monteiro, J.M., Martin, M.M., Kakareka, C., Smith, J.F., Cook, J.C., Joyce, J.G. & Jansen, K.U. (2001) Antibody, cytokine and cytotoxic T lymphocyte responses in chimpanzees immunized with human papillomavirus virus-like particles. *Vaccine*, **19**, 3733–3743
- Palmer, H.J. & Paulson, K.E. (1997) Reactive oxygen species and antioxidants in signal transduction and gene expression. *Nutr. Rev.*, **55**, 353–361
- Pamukcu, A.M. (1963) Epidemiologic studies on urinary bladder tumors in Turkish cattle. *Ann. N.Y. Acad. Sci.*, **108**, 938–947
- Pan, H. & Griep, A.E. (1994) Altered cell cycle regulation in the lens of HPV-16 E6 or E7 transgenic mice: Implications for tumor suppressor gene function in development. *Genes Dev.*, **8**, 1285–1299
- Pan, H. & Griep, A.E. (1995) Temporally distinct patterns of p53-dependent and p53-independent apoptosis during mouse lens development. *Genes Dev.*, **9**, 2157–2169
- Panici, P.B., Scambia, G., Perrone, L., Battaglia, F., Cattani, P., Rabitti, C., Dettori, G., Capelli, A., Sedlis, A. & Mancuso, S. (1992) Oral condyloma lesions in patients with extensive genital human papillomavirus infection. *Am. J. obstet. Gynecol.*, **167**, 451–458

- Pao, C.C., Lin, S.-S., Lin, C.-Y., Maa, J.-S., Lai, C.-H. & Hsieh, T.-T. (1991) Identification of human papillomavirus DNA sequences in peripheral blood mononuclear cells. *Am. J. clin. Pathol.*, **95**, 540–546
- Pao, C.C., Tsai, P.L., Chang, Y.-L., Hsiet, T.-T. & Jin, J.Y. (1992) Non-sexual papillomavirus transmission routes. *Lancet*, **339**, 1479–1480
- Papadopoulou, K., Labropoulou, V., Davaris, P., Mavromara, P. & Tsimara-Papastamatiou, H. (1998) Detection of human papillomaviruses in squamous cell carcinomas of the lung. *Virchows Arch.*, **433**, 49–54
- Papnicolaou, G.N. & Traut, H.F. (1943) *Diagnosis of Uterine Cancer by the Vaginal Smear*, New York, The Commonwealth Fund
- Paraskevaïdis, E., Arbyn, M., Sotiriadis, A., Diakomanolis, E., Martin-Hirsch, P., Koliopoulos, G., Makrydimas, G., Tofoski, J. & Roukos, D.H. (2004) The role of HPV DNA testing in the follow-up period after treatment for CIN: A systematic review of the literature. *Cancer Treat Rev.*, **30**, 205–211
- Park, J.A.S., Hwang, E.S., Park, S.N., Ahn, H.K., Um, S.J., Kim, S.J. & Namkoong, S.E. (1997) Physical status and expression of HPV genes in cervical cancers. *Gynecol. Oncol.*, **65**, 121–129
- Park, J.S., Park, D.C., Kim, C.J., Ahn, H.K., Um, S.J., Park, S.N., Kim, S.J. & Namkoong, S.E. (1998a) HPV-16-related proteins as the serologic markers in cervical neoplasia. *Gynecol. Oncol.*, **69**, 47–55
- Park, J., Sun, D., Genest, D.R., Trivijitsilp, P., Suh, I. & Crum, C.P. (1998b) Coexistence of low and high grade squamous intraepithelial lesions of the cervix: Morphological progression or multiple papillomaviruses? *Gynecol. Oncol.*, **70**, 386–391
- Park, J.-S., Boyer, S., Mitchell, K., Gilfor, D., Birrer, M., Darlington, G., El Deiry, W., Firestone, G.L., Munger, K., Band, V., Fisher, P.B. & Dent, P. (2000a) Expression of human papilloma virus E7 protein causes apoptosis and inhibits DNA synthesis in primary hepatocytes via increased expression of p21^{Cip-1/WAF1/MDA6}. *J. biol. Chem.*, **275**, 18–28
- Park, J.-S., Kim, E.-J., Kwon, H.-J., Hwang, E.-S., Namkoong, S.-E. & Um, S.J. (2000b) Inactivation of interferon regulatory factor-1 tumor suppressor protein by HPV E7 oncoprotein. Implication for the E7-mediated immune evasion mechanism in cervical carcinogenesis. *J. biol. Chem.*, **275**, 6764–6769
- Pastrana, D.V., Buck, C.B., Pang, Y.-Y.S., Thompson, C.D., Castle, P.E., FitzGerald, P.C., Krüger Kjaer, S., Lowy, D.R. & Schiller, J.T. (2004) Reactivity of human sera in a sensitive, high-throughput pseudovirus-based papillomavirus neutralization assay for HPV16 and HPV18. *Virology*, **321**, 205–216
- Patel, D., Huang, S.-M., Baglia, L.A. & McCance, D.J. (1999) The E6 protein of human papillomavirus type 16 binds to and inhibits co-activation by CBP and p300. *EMBO J.*, **18**, 5061–5072
- Pater, M.M., Hughes, G.A., Hyslop, D.E., Nakshatri, H. & Pater, A. (1988) Glucocorticoid-dependent oncogenic transformation by type 16 but not type 11 human papilloma virus DNA. *Nature*, **335**, 832–835
- Pater, M.M., Mittal, R. & Pater, A. (1994) Role of steroid hormones in potentiating transformation of cervical cells by human papillomaviruses. *Trends Microbiol.*, **2**, 229–235
- Pawellek, A., Hewlett, G., Rosenbruch, M., Kreuter, J. & Rubsamen-Waigmann, H. (2002) DNA from bovine papillomavirus type 2 induces warts in a xenograft model. *Virus Res.*, **90**, 365–370

- Payne, S., Kernohan, N.M., Walker, F., Taylor, Y., Melvin, W.T., Sewell, H.F., Flannelly, G., Se Thoe, S.Y., Wong, K.K., Pathmanathan, R., Sam, C.K., Cheng, H.M., Prasad, U., Wong, K. Y., Collins, R.J., Srivastava, G., Pittaluga, S., Cheung, A.N. & Wong, L.C. (1995) Absence of in situ hybridization evidence for latent- or lytic-phase Epstein-Barr virus infection of pre-invasive squamous lesions of the cervix. *J. Pathol.*, **176**, 221–226
- Paz, I.B., Cook, N., Odom-Maryon, T., Xie, Y. & Wilczynski, S.P. (1997) Human papillomavirus (HPV) in head and neck cancer. An association of HPV 16 with squamous cell carcinoma of Waldeyer's tonsillar ring. *Cancer*, **79**, 595–604
- Pecoraro, G., Lee, M., Morgan, D. & Defendi, V. (1991) Evolution of in vitro transformation and tumorigenesis of HPV-16 and HPV-18 immortalized primary cervical epithelial cells. *Am. J. Pathol.*, **138**, 1–8
- Pegoraro, R.J., Rom, L., Lanning, P.A., Moodley, M., Naiker, S. & Moodley, J. (2002) P53 codon 72 polymorphism and human papillomavirus type in relation to cervical cancer in South African women. *Int. J. Gynecol. Cancer*, **12**, 383–388
- Peh, W.L., Middleton, K., Christensen, N., Nicholls, P., Egawa, K., Sotlar, K., Brandsma, J., Percival, A., Lewis, J., Liu, W.J. & Doorbar, J. (2002) Life cycle heterogeneity in animal models of human papillomavirus-associated disease. *J. Virol.*, **76**, 10401–10416
- Peh, W.L., Brandsma, J.L., Christensen, N.D., Cladel, N.M., Wu, X. & Doorbar, J. (2004) The viral E4 protein is required for the completion of the cottontail rabbit papillomavirus productive cycle in vivo. *J. Virol.*, **78**, 2142–2151
- Pehoushek, J. & Smith, K.J. (2001) Imiquimod and 5% fluorouracil therapy for anal and perianal squamous cell carcinoma in situ in an HIV-1-positive man. *Arch. Dermatol.*, **137**, 14–16
- Pei, X.F., Sherman, L., Sun, Y.H. & Schlegel, R. (1998) HPV-16 E7 protein bypasses keratinocyte growth inhibition by serum and calcium. *Carcinogenesis*, **19**, 1481–1486
- Peipert, J.F. (2003) Genital chlamydial infections. *New Engl. J. Med.*, **349**, 2424–2430
- Peixoto Guimaraes, D., Lu, S.H., Snijders, P., Wilmotte, R., Herrero, R., Lenoir, G., Montesano, R., Meijer, C.J., Walboomers, J. & Hainaut, P. (2001) Absence of association between HPV DNA, TP53 codon 72 polymorphism, and risk of oesophageal cancer in a high-risk area of China. *Cancer Lett.*, **162**, 231–235
- Péllisson, I., Chardonnet, Y., Euvrard, S. & Schmitt, D. (1994) Immunohistochemical detection of p53 protein in cutaneous lesions from transplant recipients harbouring human papillomavirus DNA. *Virchows Arch.*, **424**, 623–630
- Peng, H.Q., Liu, S.L., Mann, V., Rohan, T. & Rawls, W. (1991) Human papillomavirus types 16 and 33, herpes simplex virus type 2 and other risk factors for cervical cancer in Sichuan Province, China. *Int. J. Cancer*, **47**, 711–716
- Peng, X., Olson, R.O., Christian, C.B., Lang, C.M. & Kreider, J.W. (1993) Papillomas and carcinomas in transgenic rabbits carrying EJ-*ras* DNA and cottontail rabbit papillomavirus DNA. *J. Virol.*, **67**, 1698–1701
- Perea, S.E., Massimi, P. & Banks, L. (2000) Human papillomavirus type 16 E7 impairs the activation of the interferon regulatory factor-1. *Int. J. mol. Med.*, **5**, 661–666
- Pérez-Ayala, M., Ruiz-Cabello, F., Esteban, F., Concha, A., Redondo, M., Oliva, M.R., Cabrera, T. & Garrido, F. (1990) Presence of HPV 16 sequences in laryngeal carcinomas. *Int. J. Cancer*, **46**, 8–11

- Perfettini, J.-L., Darville, T., Gachelin, G., Souque, P., Huerre, M., Dautry-Varsat, A. & Ojcius, D.M. (2000) Effect of *Chlamydia trachomatis* infection and subsequent tumor necrosis factor alpha secretion on apoptosis in the murine genital tract. *Infect. Immun.*, **68**, 2237–2244
- Perfettini, J.-L., Hospital, V., Stahl, L., Jungas, T., Verbeke, P. & Ojcius, D.M. (2003a) Cell death and inflammation during infection with the obligate intracellular pathogen, *Chlamydia*. *Biochimie*, **85**, 763–769
- Perfettini, J.-L., Ojcius, D.M., Andrews, C.W., Jr, Korsmeyer, S.J., Rank, R.G. & Darville, T. (2003b) Role of proapoptotic BAX in propagation of *Chlamydia muridarum* (the mouse pneumonitis strain of *Chlamydia trachomatis*) and the host inflammatory response. *J. Biol. Chem.*, **278**, 9496–9502
- Peterhans, E. (1997) Oxidants and antioxidants in viral diseases: Disease mechanisms and metabolic regulation. *J. Nutr.*, **127**, 962S–965S
- Peters, N., Van Leeuwen, A.M., Pieters, W.J.L.M., Hollema, H., Quint, W.G.V. & Burger, M.P.M. (1995) Bacterial vaginosis is not important in the etiology of cervical neoplasia: A survey on women with dyskaryotic smears. *Sex. Transm. Dis.*, **22**, 296–302
- Petersen, C.S., Sjölin, K.-E., Rosman, N. & Lindeberg, H. (1994) Lack of human papillomavirus DNA in carcinoma cuniculatum (Letter to the Editor). *Acta Derm. Venereol.*, **74**, 231–232
- Peto, J., Gilham, C., Fletcher, O. & Matthews, F.E. (2004) The cervical cancer epidemic that screening has prevented in the UK. *Lancet*, **364**, 249–256
- Petry, K.U., Kochel, H., Bode, U., Schedel, I., Niesert, S., Glaubitz, M., Maschek, H. & Kuhnle, H. (1996) Human papillomavirus is associated with the frequent detection of warty and basaloïd high-grade neoplasia of the vulva and cervical neoplasia among immunocompromised women. *Gynecol. Oncol.*, **60**, 30–34
- Petry, K.U., Böhmer, G., Iftner, T., Flemming, P., Stoll, M. & Schmidt, R.E. (1999) Human papillomavirus testing in primary screening for cervical cancer of human immunodeficiency virus-infected women, 1990–1998. *Gynecol. Oncol.*, **75**, 427–431
- Petry, K.-U., Menton, S., Menton, M., van Loenen-Frosch, F., de Carvalho Gomes, H., Holz, B., Schopp, B., Garbrecht-Buettner, S., Davies, P., Boehmer, G., van den Akker, E. & Iftner, T. (2003) Inclusion of HPV testing in routine cervical cancer screening for women above 29 years in Germany: Results for 8466 patients. *Br. J. Cancer*, **88**, 1570–1577
- Pett, M.R., Alazawi, W.O.F., Roberts, I., Downen, S., Smith, D.I., Stanley, M.A. & Coleman, N. (2004) Acquisition of high-level chromosomal instability is associated with integration of human papillomavirus type 16 in cervical keratinocytes. *Cancer Res.*, **64**, 1359–1368
- Peyton, C.L., Schiffman, M., Lörinçz, A.T., Hunt, W.C., Mielzynska, I., Bratti, C., Eaton, S., Hildesheim, A., Morera, L.A., Rodriguez, A.C., Herrero, R., Sherman, M.E. & Wheeler, C.M. (1998) Comparison of PCR- and Hybrid Capture-based human papillomavirus detection systems using multiple cervical specimen collection strategies. *J. Clin. Microbiol.*, **36**, 3248–3254
- Pfister, H. (2003) Human papillomavirus and skin cancer. *J. Natl Cancer Inst. Monogr.*, **31**, 52–56
- Pfister, H. & Haneke, E. (1984) Demonstration of human papilloma virus type 2 DNA in Bowen's disease. *Arch. Dermatol. Res.*, **276**, 123–125
- Pfister, H., Linz, U., Gissmann, L., Huchthausen, B., Hoffmann, D. & zur Hausen, H. (1979) Partial characterization of a new type of bovine papilloma viruses. *Virology*, **96**, 1–8
- Pfister, H., Fink, B. & Thomas, C. (1981) Extrachromosomal bovine papillomavirus type 1 DNA in hamster fibromas and fibrosarcomas. *Virology*, **115**, 414–418

- Pfister, H., Hettich, I., Runne, U., Gissmann, L. & Chalf, G.N. (1983a) Characterization of human papillomavirus type 13 from focal epithelial hyperplastic neck lesion. *J. Virol.*, **47**, 363–366
- Pfister, H., Gassenmaier, A., Nürnberger, F. & Stüttgen, G. (1983b) Human papillomavirus 5-DNA in a carcinoma of an epidermodysplasia verruciformis patient infected with various human papillomavirus types. *Cancer Res.*, **43**, 1436–1441
- Pfister, H., Gassenmaier, A. & Fuchs, P.G. (1986) Demonstration of human papillomavirus DNA in two keratoacanthomas. *Arch. dermatol. Res.*, **278**, 243–246
- Pfister, H., Fuchs, P.G., Majewski, S., Jablonska, S., Pniewska, I. & Malejczyk, M. (2003) High prevalence of epidermodysplasia verruciformis-associated human papillomavirus DNA in actinic keratoses of the immunocompetent population. *Arch. dermatol. Res.*, **295**, 273–279
- Phelps, W.C., Yee, C.L., Münger, K. & Howley, P.M. (1988) The human papillomavirus type 16 E7 gene encodes transactivation and transformation functions similar to those of adenovirus E1A. *Cell*, **53**, 539–547
- Phelps, W.C., Bagchi, S., Barnes, J.A., Raychaudhuri, P., Kraus, V., Münger, K., Howley, P.M. & Nevins, J.R. (1991) Analysis of *trans* activation by human papillomavirus type 16 E7 and adenovirus 12S E1A suggests a common mechanism. *J. Virol.*, **65**, 6922–6930
- Phelps, W.C., Münger, K., Yee, C.L., Barnes, J.A. & Howley, P.M. (1992) Structure-function analysis of the human papillomavirus type 16 E7 oncoprotein. *J. Virol.*, **66**, 2418–2427
- Phillips, A.C. & Vousden, K.H. (1997) Analysis of the interaction between human papillomavirus type 16 E7 and the TATA-binding protein, TBP. *J. gen. Virol.*, **78**, 905–909
- Picconi, M.A., Eiján, A.M., Distéfano, A.L., Pueyo, S., Alonio, L.V., Gorostidi, S., Teyssié, A.R. & Casabé, A. (2000) Human papillomavirus (HPV) DNA in penile carcinomas in Argentina: Analysis of primary tumors and lymph nodes. *J. med. Virol.*, **61**, 65–69
- Pierceall, W.E., Goldberg, L.H. & Ananthaswamy, H.N. (1991) Presence of human papilloma virus type 16 DNA sequences in human nonmelanoma skin cancers. *J. invest. Dermatol.*, **97**, 880–884
- Piirsoo, M., Ustav, E., Mandel, T., Stenlund, A., & Ustav, M. (1996) *Cis* and *trans* requirements for stable episomal maintenance of the BPV-1 replicator. *EMBO J.*, **15**, 1–11
- Piketty, C., Darragh, T.M., Da Costa, M., Bruneval, P., Heard, I., Kazatchkine, M.D. & Palefsky, J.M. (2003) High prevalence of anal human papillomavirus infection and anal cancer precursors among HIV-infected persons in the absence of anal intercourse. *Ann. intern. Med.*, **138**, 453–459
- Piketty, C., Darragh, T.M., Heard, I., Da Costa, M., Bruneval, P., Kazatchkine, M.D. & Palefsky, J.M. (2004) High prevalence of anal squamous intraepithelial lesions in HIV-positive men despite the use of highly active antiretroviral therapy. *Sex. transm. Dis.*, **31**, 96–99
- Pilch, H., Günzel, S., Schäffer, U., Tanner, B., Brockerhoff, P., Maeurer, M., Höckel, M., Hommel, G. & Knapstein, P.G. (2001) The presence of HPV DNA in cervical cancer: Correlation with clinico-pathologic parameters and prognostic significance: 10 years experience at the Department of Obstetrics and Gynecology of the Mainz University. *Int. J. Gynecol. Cancer*, **11**, 39–48
- Pim, D., Collins, M. & Banks, L. (1992) Human papillomavirus type 16 E5 gene stimulates the transforming activity of the epidermal growth factor receptor. *Oncogene*, **7**, 27–32
- Pins, M.R., Young, R.H., Crum, C.P., Leach, I.H. & Scully, R.E. (1997) Cervical squamous cell carcinoma in situ with intraepithelial extension to the upper genital tract and invasion of tubes and ovaries: Report of a case with human papilloma virus analysis. *Int. J. Gynecol. Pathol.*, **16**, 272–278

- Pinto, A.P., Lin, M.-C., Mutter, G.L., Sun, D., Villa, L.L. & Crum, C.P. (1999) Allelic loss in human papillomavirus-positive and -negative vulvar squamous cell carcinomas. *Am. J. Pathol.*, **154**, 1009–1015
- Pinto, L.A., Edwards, J., Castle, P.E., Harro, C.D., Lowy, D.R., Schiller, J.T., Wallace, D., Kopp, W., Adelsberger, J.W., Baseler, M.W., Berzofsky, J.A. & Hildesheim, A. (2003) Cellular immune responses to human papillomavirus (HPV)-16 L1 in healthy volunteers immunized with recombinant HPV-16 L1 virus-like particles. *J. infect. Dis.*, **188**, 327–338
- Pintos, J., Franco, E.L., Black, M.J., Bergeron, J. & Arella, M. (1999) Human papillomavirus and prognoses of patients with cancers of the upper aerodigestive tract. *Cancer*, **85**, 1903–1909
- Pirisi, L., Yasumoto, S., Feller, M., Doniger, J. & DiPaolo, J.A. (1987) Transformation of human fibroblasts and keratinocytes with human papillomavirus type 16 DNA. *J. Virol.*, **61**, 1061–1066
- Pirisi, L., Creek, K.E., Doniger, J. & DiPaolo, J.A. (1988) Continuous cell lines with altered growth and differentiation properties originate after transfection of human keratinocytes with human papillomavirus type 16 DNA. *Carcinogenesis*, **9**, 1573–1579
- Pirisi, L., Batova, A., Jenkins, G.R., Hodam, J.R. & Creek, K.E. (1992) Increased sensitivity of human keratinocytes immortalized by human papillomavirus type 16 DNA to growth control by retinoids. *Cancer Res.*, **52**, 187–193
- Platz-Christensen, J.J., Sundström, E. & Larsson, P.-G. (1994) Bacterial vaginosis and cervical intraepithelial neoplasia. *Acta obstet. gynecol. scand.*, **73**, 586–588
- Plummer, M., Herrero, R., Franceschi, S., Meijer, C.J.L.M., Snijders, P., Bosch, F.X., de Sanjosé, S. & Muñoz, N. for the IARC Multi-Centre Cervical Cancer Study Group (2003) Smoking and cervical cancer: Pooled analysis of the IARC multi-centric case-control study. *Cancer Causes Control*, **14**, 805–814
- Plunkett, M., Brestovac, B., Thompson, J., Sterrett, G., Filion, P., Smith, D. & Frost, F. (2003) The value of HPV DNA typing in the distinction between adenocarcinoma of endocervical and endometrial origin. *Pathology*, **35**, 397–401
- Poirier, L.A. (2002) The effects of diet, genetics and chemicals on toxicity and aberrant DNA methylation: An introduction. *J. Nutr.*, **132** (Suppl.), S2336–S2339
- Poletti, P.A., Halfon, A. & Marti, M.-C. (1998) Papillomavirus and anal carcinoma. *Int. J. colorect. Dis.*, **13**, 108–111
- Poljak, M., Gale, N. & Kambic, V. (1997) Human papillomaviruses: A study of their prevalence in the epithelial hyperplastic lesions of the larynx. *Acta otolaryngol.*, **527** (Suppl.), 66–69
- Poljak, M., Cerar, A. & Seme, K. (1998) Human papillomavirus infection in esophageal carcinomas: A study of 121 lesions using multiple broad-spectrum polymerase chain reactions and literature review. *Hum. Pathol.*, **29**, 266–271
- Popescu, N.C. & diPaolo, J.A. (1990) Integration of human papillomavirus 16 DNA and genomic rearrangements in immortalized human keratinocyte lines. *Cancer Res.*, **50**, 1316–1323
- Poppe, W.A.J., Peeters, R., Drijkoningen, M., Ide, P.S., Daenens, P., Lauweryns, J.M. & Van Assche, F.A. (1996) Cervical cotinine and macrophage-Langerhans cell density in the normal human uterine cervix. *Gynecol. obstet. Invest.*, **41**, 253–259
- Porreco, R., Penn, I., Droegemueller, W., Greer, B. & Makowski, E. (1975) Gynecologic malignancies in immunosuppressed organ homograft recipients. *Obstet. Gynecol.*, **45**, 359–364
- Prasad, C.K., Meyers, C., Zhan, D.-J., You, H., Chiriva-Internati, M., Mehta, J.L., Liu, Y. & Hermonat, P.L. (2003) The adeno-associated virus major regulatory protein Rep78-c-Jun-DNA motif complex modulates AP-1 activity. *Virology*, **314**, 423–431

- Premoli-De-Percoco, G. & Ramirez, J.L. (2001) High risk human papillomavirus in oral squamous carcinoma: Evidence of risk factors in a Venezuelan rural population. Preliminary report. *J. oral Pathol. Med.*, **30**, 355–361
- Prendiville, W. (2005) Recent innovations in colposcopy practice. *Best. Pract. Res. clin. Obstet. Gynaecol.*, **19**, 779–792
- Prétet, J.-L., Dalstein, V., Monnier-Benoit, S., Delpout, S. & Mougin, C. (2004) High risk HPV load estimated by Hybrid Capture II® correlates with HPV 16 load measured by real-time PCR in cervical smears of HPV16-infected women. *J. clin. Virol.*, **31**, 140–147
- Pretorius, R.G., Peterson, P., Novak, S., Azizi, F., Sadeghi, M. & Lorincz A.T. (2002) Comparison of two signal-amplification DNA tests for high-risk HPV as an aid to colposcopy. *J. Reprod. Med.*, **47**, 296
- Price, M.L., Tidman, M.J., Fagg, N.L.K., Palmer, T.J. & MacDonald, D.M. (1988) Distinctive epidermal atypia in immunosuppression-associated cutaneous malignancy. *Histopathology*, **13**, 89–94
- Pride, G.L. (1990) Treatment of large lower genital tract condylomata acuminata with topical 5-fluorouracil. *J. reprod. Med.*, **35**, 384–387
- Prokopczyk, B., Cox, J.E., Hoffmann, D. & Waggoner, S.E. (1997) Identification of tobacco-specific carcinogen in the cervical mucus of smokers and nonsmokers. *J. natl Cancer Inst.*, **89**, 868–873
- Prozialeck, W.C., Fay, M.J., Lamar, P.C., Pearson, C.A., Sigar, I. & Ramsey, K.H. (2002) *Chlamydia trachomatis* disrupts N-cadherin-dependent cell–cell junctions and sequesters β -catenin in human cervical epithelial cells. *Infect. Immun.*, **70**, 2605–2613
- Puranen, M., Yliskoski, M., Saarikoski, S., Syrjänen, K. & Syrjänen, S. (1996) Vertical transmission of human papillomavirus from infected mothers to their newborn babies and persistence of the virus in childhood. *Am. J. Obstet. Gynecol.*, **174**, 694–699
- Puranen, M.H., Yliskoski, M.H., Saarikoski, S.V., Syrjanen, K.J. & Syrjanen, S.M. (1997) Exposure of an infant to cervical human papillomavirus infection of the mother is common. *Am. J. Obstet. Gynecol.*, **176**, 1039–1045
- Purdie, K.J., Sexton, C.J., Proby, C.M., Glover, M.T., Williams, A.T., Stables, J.N. & Leigh, I.M. (1993) Malignant transformation of cutaneous lesions in renal allograft patients: A role for human papillomavirus. *Cancer Res.*, **53**, 5328–5333
- Purdie, K.J., Pennington, J., Proby, C.M., Khalaf, S., de Villiers, E.-M., Leigh, I.M. & Storey, A. (1999) The promoter of a novel human papillomavirus (HPV77) associated with skin cancer displays UV responsiveness, which is mediated through a consensus p53 binding sequence. *EMBO J.*, **18**, 5359–5369
- Purola, E. & Savia, E. (1977) Cytology of gynecologic condyloma acuminatum. *Acta cytol.*, **21**, 26–31
- Puthenveetil, J.A., Frederickson, S.M. & Reznikoff, C.A. (1996) Apoptosis in human papillomavirus16 E7-, but not E6-immortalized human uroepithelial cells. *Oncogene*, **13**, 1123–1131
- Qu, W., Jiang, G., Cruz, Y., Chang, C.J., Ho, G.Y.F., Klein, R.S. & Burk, R.D. (1997) PCR detection of human papillomavirus: Comparison between MY09/MY11 and GP5+/GP6+ primer systems. *J. clin. Microbiol.*, **35**, 1304–1310
- Rabelo-Santos, S.H., Zeferino, L., Villa, L.L., Sobrinho, J.P., Amaral, R.G. & Magalhães, A.V. (2003) Human papillomavirus prevalence among women with cervical intraepithelial neoplasia III and invasive cervical cancer from Goiânia, Brazil. *Mem. Inst. Oswaldo Cruz*, **98**, 181–184

- Rabkin, C.S., Biggar, R.J., Melbye, M. & Curtis, R.E. (1992) Second primary cancers following anal and cervical carcinoma: Evidence of shared etiologic factors. *Am. J. Epidemiol.*, **136**, 54–58
- Rady, P.L., Arany, I., Hughes, T.K. & Tying, S.K. (1995) Type-specific primer-mediated direct sequencing of consensus primer-generated PCR amplicons of human papilloma viruses: A new approach for the simultaneous detection of multiple viral type infections. *J. virol. Meth.*, **53**, 245–254
- Rady, P.L., Schnadig, V.J., Weiss, R.L., Hughes, T.K. & Tying, S.K. (1998) Malignant transformation of recurrent respiratory papillomatosis associated with integrated human papilloma-virus type 11 DNA and mutation of p53. *Laryngoscope*, **108**, 735–740
- Ragin, C.C.R., Reshmi, S.C. & Gollin, S.M. (2004) Mapping and analysis of HPV16 integration sites in a head and neck cancer cell line. *Int. J. Cancer.*, **110**, 701–709
- Raj, K., Berguerand, S., Southern, S., Doorbar, J. & Beard, P. (2004) E1^EE4 protein of human papillomavirus type 16 associates with mitochondria. *J. Virol.*, **78**, 7199–7207
- Rajkumar, T., Franceschi, S., Vaccarella, S., Gajalakshmi, V., Sharmila, A., Snijders, P.J.F., Muñoz, N., Meijer, C.J.L.M. & Herrero, R. (2003) Role of paan chewing and dietary habits in cervical carcinoma in Chennai, India. *Br. J. Cancer*, **88**, 1388–1393
- Ramirez, R.D., Morales, C.P., Herbert, B.-S., Rohde, J.M., Passons, C., Shay, J.W. & Wright, W.E. (2001) Putative telomere-independent mechanisms of replicative aging reflect inadequate growth conditions. *Genes Dev.*, **15**, 398–403
- Ramoz, N., Rueda, L.-A., Bouadjar, B., Favre, M. & Orth, G. (1999) A susceptibility locus for epidermodysplasia verruciformis, an abnormal predisposition to infection with the oncogenic human papillomavirus type 5, maps to chromosome 17qter in a region containing a psoriasis locus. *J. invest. Dermatol.*, **112**, 259–263
- Ramoz, N., Taieb, A., Rueda, L.A., Montoya, L.S., Bouadjar, B., Favre, M. & Orth, G. (2000) Evidence for a nonallelic heterogeneity of epidermodysplasia verruciformis with two susceptibility loci mapped to chromosome regions 2p21-p24 and 17q25. *J. invest. Dermatol.*, **114**, 1148–1153
- Ramoz, N., Rueda, L.-A., Bouadjar, B., Montoya, L.-S., Orth, G. & Favre, M. (2002) Mutations in two adjacent novel genes are associated with epidermodysplasia verruciformis. *Nat. Genet.*, **32**, 579–581
- Razzaque, A. (1990) Oncogenic potential of human herpesvirus-6 DNA. *Oncogene*, **5**, 1365–1370
- Reagan, J.W. & Hamonic, M.J. (1956) The cellular pathology in carcinoma *in situ*: A cytohisto-pathologic correlation. *Cancer*, **9**, 385–402
- Reid, S.W.J. & Smith, K.T. (1992) The equine sarcoid: Detection of papillomaviral DNA in sarcoid tumours by use of consensus primers and the polymerase chain reaction. In: Plowright, W., Rosedale, P.D. & Wade, J.F., *Equine Infectious Disease VI*, Newmarker, R. & W. Publications, pp. 297–330
- Reid, S.W.J., Smith, K.T. & Jarrett, W.F.H. (1994) Detection, cloning and characterisation of papillomaviral DNA present in sarcoid tumours of *Equus asinus*. *Vet. Rec.*, **135**, 430–432
- Reidy, P.M., Dedo, H.H., Rabah, R., Field, J.B., Mathog, R.H., Gregoire, L. & Lancaster, W.D. (2004) Integration of human papillomavirus type 11 in recurrent respiratory papilloma-associated cancer. *Laryngoscope*, **114**, 1906–1909

- Remmerbach, T.W., Brinckmann, U.G., Hemprich, A., Chekol, M., Kühndel, K. & Liebert, U.G. (2004) PCR detection of human papillomavirus of the mucosa: Comparison between MY09/11 and GP5+/6+ primer sets. *J. clin. Virol.*, **30**, 302–308
- Renshaw, A.A., Davey, D.D., Birdsong, G.G., Walsh, M., Styer, P.E., Mody, D.R. & Colgan, T.J. (2003) Precision in gynecologic cytologic interpretation. A study from the College of American Pathologists Interlaboratory Comparison Program in Cervicovaginal Cytology. *Arch. Pathol. Lab. Med.*, **127**, 1413–1420
- Resnick, R.M., Cornelissen, M.T.E., Wright, D.K., Eichinger, G.H., Fox, H.S., ter Schegget, J., & Manos, M.M. (1990) Detection and typing of human papillomavirus in archival cervical cancer specimens by DNA amplification with consensus primers. *J. natl Cancer Inst.*, **82**, 1477–1484
- Respler, D.S., Jahn, A., Pater, A. & Pater, M.M. (1987) Isolation and characterization of papillomavirus DNA from nasal inverting (Schneiderian) papillomas. *Ann. Otol. Rhinol. Laryngol.*, **96**, 170–173
- Ressing, M.E., van Driel, W.J., Brandt, R.M.P., Kenter, G.G., de Jong, J.H., Bauknecht, T., Fleuren, G.-J., Hoogerhout, P., Offringa, R., Sette, A., Celis, E., Grey, H., Trimbois, B.J., Kast, W.M. & Melief, C.J.M.L. (2000) Detection of T helper responses, but not of human papillomavirus-specific cytotoxic T lymphocyte responses, after peptide vaccination of patients with cervical carcinoma. *J. Immunother.*, **23**, 255–266
- Reznikoff, C.A., Belair, C., Savelieva, E., Zhai, Y., Pfeifer, K., Yeager, T., Thompson, K.J., DeVries, S., Bindley, C., Newton, M.A., Sekhon, G. & Waldman, F. (1994) Long-term genome stability and minimal genotypic and phenotypic alterations in HPV16 E7-, but not E6-, immortalized human uroepithelial cells. *Genes Dev.*, **8**, 2227–2240
- Rezza, G., Giuliani, M., Branca, M., Benedetto, A., Migliore, G., Garbuglia, A.R., D'Ubaldo, C., Pezzotti, P., Capiello, G., Pomponi, F.D., Suligo, B., Schiesari, A., Ippolito, G. & Giacomini, G. (1997) Determinants of squamous intraepithelial lesions (SIL) on Pap smear: The role of HPV infection and of HIV-1-induced immunosuppression. DIANAIDS Collaborative Study Group. *Eur. J. Epidemiol.*, **13**, 937–943
- Rezza, G., Giuliani, M., Serraino, D., Branca, M., Benedetto, A., Garbuglia, A., Ippolito, G. & Franceschi, S. for the DIANAIDS Collaborative Study Group (1998) Risk factors for cervical presence of human papillomavirus DNA among women at risk for HIV infection. *Epidemiol. Infect.*, **121**, 173–177
- Richardson, H., Kelsall, G., Tellier, P., Voyer, H., Abrahamowicz, M., Ferenczy, A., Coutlée, F. & Franco, E.L. (2003) The natural history of type-specific human papillomavirus infections in female university students. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 485–490
- Richart, R.M. (1987) Causes and management of cervical intraepithelial neoplasia. *Cancer*, **60**, 1951–1959
- Richart, R.M. (1990) A modified terminology for cervical intraepithelial neoplasia. *Obstet. Gynecol.*, **75**, 131–133
- van Riggelen, J., Buchwalter, G., Soto, U., De-Castro Arce, J., zur Hausen, H., Wasylyk, B. & Rösl, F. (2005) Loss of net as repressor leads to constitutive increased *c-fos* transcription in cervical cancer cells. *J. Biol. Chem.*, **280**, 3286–3294
- Rihkanen, H., Aaltonen, L.-M. & Syrjänen, S.M. (1993) Human papillomavirus in laryngeal papillomas and in adjacent normal epithelium. *Clin. Otolaryngol.*, **18**, 470–474

- Rihkanen, H., Peltomaa, J. & Syrjänen, S. (1994) Prevalence of human papillomavirus (HPV) DNA in vocal cords without laryngeal papillomas. *Acta otolaryngol.*, **114**, 348–351
- Riley, R.R., Duensing, S., Brake, T., Münger, K., Lambert, P.F. & Arbeit, J.M. (2003) Dissection of human papillomavirus E6 and E7 function in transgenic mouse models of cervical carcinogenesis. *Cancer Res.*, **63**, 4862–4871
- Ringström, E., Peters, E., Hasegawa, M., Posner, M., Liu, M. & Kelsey, K.T. (2002) Human papillomavirus type 16 and squamous cell carcinoma of the head and neck. *Clin. Cancer Res.*, **8**, 3187–3192
- Rivera, A. & Tyring, S.K. (2004) Therapy of cutaneous human papillomavirus infections. *Dermatol. Ther.*, **17**, 441–448
- Roberts, D.J.H. & Cairnduff, F. (1995) Photodynamic therapy of primary skin cancer: A review. *Br. J. plast. Surg.*, **48**, 360–370
- Roberts, S., Ashmole, I., Johnson, G.D., Kreider, J.W. & Gallimore, P.H. (1993) Cutaneous and mucosal human papillomavirus E4 proteins form intermediate filament-like structures in epithelial cells. *Virology*, **197**, 176–187
- Roberts, S., Ashmole, I., Gibson, L.J., Rookes, S.M., Barton, G.J. & Gallimore, P.H. (1994) Mutational analysis of human papillomavirus E4 proteins: Identification of structural features important in the formation of cytoplasmic E4/cytokeratin networks in epithelial cells. *J. Virol.*, **68**, 6432–6445
- Roberts, S., Ashmole, I., Rookes, S.M. & Gallimore, P.H. (1997) Mutational analysis of the human papillomavirus type 16 E1[^]E4 protein shows that the C terminus is dispensable for keratin cytoskeleton association but is involved in inducing disruption of the keratin filaments. *J. Virol.*, **71**, 3554–3562
- Roberts, S., Hillman, M.L., Knight, G.L. & Gallimore, P.H. (2003) The ND10 component promyelocytic leukemia protein relocates to human papillomavirus type 1 E4 intranuclear inclusion bodies in cultured keratinocytes and in warts. *J. Virol.*, **77**, 673–684
- Robinson, W.R., Hamilton, C.A., Michaels, S.H. & Kissinger, P. (2001) Effect of excisional therapy and highly active antiretroviral therapy on cervical intraepithelial neoplasia in women infected with human immunodeficiency virus. *Am. J. Obstet. Gynecol.*, **184**, 538–543
- Roche, J.K. & Crum, C.P. (1991) Local immunity and the uterine cervix: Implication for cancer-associated viruses. *Cancer Immunol. Immunother.*, **33**, 203–209 (review)
- Rocque, W.J., Porter, D.J., Barnes, J.A., Dixon, E.P., Lobe, D.C., Su, J.L., Willard, D.H., Gaillard, R., Condreay, J.P., Clay, W.C., Hoffman, C.R., Overton, L.K., Pahel, G., Kost, T.A. & Phelps, W.C. (2000) Replication-associated activities of purified human papillomavirus type 11 E1 helicase. *Protein Expr. Purif.*, **18**, 148–159
- de Roda Husman, A.-M., Walboomers, J.M.M., van den Brule, A.J.C., Meijer, C.J.L.M. & Snijders, P.J.F. (1995) The use of general primers GP5 and GP6 elongated at their 3' ends with adjacent highly conserved sequences improves human papillomavirus detection by PCR. *J. gen. Virol.*, **76**, 1057–1062
- Roden, R.B., Kirnbauer, R., Jenson, A.B., Lowy, D.R. & Schiller, J.T. (1994) Interaction of papillomaviruses with the cell surface. *J. Virol.*, **68**, 7260–7266
- Roden, R.B.S., Hubbert, N.L., Kirnbauer, R., Breitburd, F., Lowy, D.R. & Schiller, J.T. (1995) Papillomavirus L1 capsids agglutinate mouse erythrocytes through a proteinaceous receptor. *J. Virol.*, **69**, 5147–5151

- Roden, R.B.S., Greenstone, H.L., Kirnbauer, R., Booy, F.P., Jessie, J., Lowy, D.R. & Schiller, J.T. (1996a) In vitro generation and type-specific neutralization of a human papillomavirus type 16 virion pseudotype. *J. Virol.*, **70**, 5875–5883
- Roden, R.B.S., Hubbert, N.L., Kirnbauer, R., Christensen, N.D., Lowy, D.R. & Schiller, J.T. (1996b) Assessment of the serological relatedness of genital human papillomaviruses by hemagglutination inhibition. *J. Virol.*, **70**, 3298–3301
- Roden, R.B.S., Armstrong, A., Haderer, P., Christensen, N.D., Hubbert, N.L., Lowy, D.R., Schiller, J.T. & Kirnbauer, R. (1997a) Characterization of a human papillomavirus type 16 variant-dependent neutralizing epitope. *J. Virol.*, **71**, 6247–6252
- Roden, R.B.S., Lowy, D.R. & Schiller, J.T. (1997b) Papillomavirus is resistant to desiccation. *J. infect. Dis.*, **176**, 1076–1079
- Roden, R.B.S., Yutzy, W.H., Fallon, R., Inglis, S., Lowy, D.R. & Schiller, J.T. (2000) Minor capsid protein of human genital papillomaviruses contains subdominant, cross-neutralizing epitopes. *Virology*, **270**, 254–257
- Rogers, S. & Rous, P. (1951) Joint action of a chemical carcinogen and a neoplastic virus to induce cancer in rabbits. Results of exposing epidermal cells to a carcinogenic hydrocarbon at time of infection with the Shope papilloma virus. *J. exp. Med.*, **93**, 459–488
- Roka, S., Rasoul-Rockenschaub, S., Roka, J., Kirnbauer, R., Mühlbacher, F. & Salat, A. (2004) Prevalence of anal HPV infection in solid-organ transplant patients prior to immunosuppression. *Transplant. int.*, **17**, 366–369
- Roland, P.Y., Stoler, M.H., Broker, T.R. & Chow, L.T. (1997) The differential expression of the HER-2/*neu* oncogene among high-risk human papillomavirus-infected glandular lesions of the uterine cervix. *Am. J. Obstet. Gynecol.*, **177**, 133–138
- Roman, A. & Fife, K. (1986) Human papillomavirus DNA associated with foreskins of normal newborns. *J. infect. Dis.*, **153**, 855–861
- Romanczuk, H. & Howley, P.M. (1992) Disruption of either the E1 or the E2 regulatory gene of human papillomavirus type 16 increases viral immortalization capacity. *Proc. natl Acad. Sci. USA*, **89**, 3159–3163
- Romney, S.L., Ho, G.Y.F., Palan, P.R., Basu, J., Kadish, A.S., Klein, S., Mikhail M., Hagan, R.J., Chang, C.J. & Burk, R.D. (1997) Effects of B-carotene and other factors on outcome of cervical dysplasia and human papillomavirus infection. *Gynecol. Oncol.*, **65**, 483–492
- Ronco, L.V., Karpova, A.Y., Vidal, M. & Howley, P.M. (1998) Human papillomavirus 16 E6 oncoprotein binds to interferon regulatory factor-3 and inhibits its transcriptional activity. *Genes Dev.*, **12**, 2061–2072
- Ronco, G., Ghisetti, V., Segnan, N., Snijders, P.J.F., Gillio-Tos, A., Meijer, C.J.L.M., Merletti, F. & Franceschi, S. (2005) Prevalence of human papillomavirus infection in women in Turin, Italy. *Eur. J. Cancer*, **41**, 297–305
- Rose, R.C., Bonnez, W., Reichman, R.C. & Garcea, R.L. (1993) Expression of human papillomavirus type 11 L1 protein in insect cells: In vivo and in vitro assembly of viruslike particles. *J. Virol.*, **67**, 1936–1944
- Rose, R.C., White, W.I., Li, M., Suzich, J.A., Lane, C. & Garcea, R.L. (1998) Human papillomavirus type 11 recombinant L1 capsomeres induce virus-neutralizing antibodies. *J. Virol.*, **72**, 6151–6154

- Rose, P.G., Bundy, B.N., Watkins, E.B., Thigpen, J.T., Deppe, G., Maiman, M.A., Clarke-Pearson, D.L. & Insalaco, S. (1999) Concurrent cisplatin-based radiotherapy and chemotherapy for locally advanced cervical cancer. *New Engl. J. Med.*, **340**, 1144–1153
- Rosemberg, S.K. (1991) Sexually transmitted papillomaviral infection in men. An update. *Dermatol. Clin.*, **9**, 317–331
- Rosenberger, G. (1971) Nature, manifestations, cause and control of chronic enzootic haematuria in cattle. *Vet. Med. Rev.*, **2/3**, 189–206
- Rosenblatt, K.A., Wicklund, K.G. & Stanford, J.L. (2001) Sexual factors and the risk of prostate cancer. *Am. J. Epidemiol.*, **153**, 1152–1158
- Rosenblatt, K.A., Carter, J.J., Iwasaki, L.M., Galloway, D.A. & Stanford, J.L. (2003) Serologic evidence of human papillomavirus 16 and 18 infections and risk of prostate cancer. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 763–768
- Rosenblatt, C., Lucon, A.M., Pereyra, E.A.G., Pinotti, J.A., Arap, S. & Ruiz, C.A. (2004) HPV prevalence among partners of women with cervical intraepithelial neoplasia. *Int. J. Gynecol. Obstet.*, **84**, 156–161
- Rosenthal, A.N., Ryan, A., Hopster, D., Suretheran, T. & Jacobs, I.J. (2001) High frequency of loss of heterozygosity in vulval intraepithelial neoplasia (VIN) is associated with invasive vulval squamous cell carcinoma (VSCC). *Int. J. Cancer*, **94**, 896–900
- Rösl, F., Arab, A., Klevenz, B. & zur Hausen, H. (1993) The effect of DNA methylation on gene regulation of human papillomaviruses. *J. gen. Virol.*, **74**, 791–801
- Rösl, F., Das, B.C., Lengert, M., Geletneky, K. & zur Hausen, H. (1997) Antioxidant-induced changes of the AP-1 transcription complex are paralleled by a selective suppression of human papillomavirus transcription. *J. Virol.*, **71**, 362–370
- Rotola, A., Monini, P., Di Luca, D., Savioli, A., Simone, R., Secchiero, P., Reggiani, A. & Cassai, E. (1992) Presence and physical state of HPV DNA in prostate and urinary-tract tissues. *Int. J. Cancer*, **52**, 359–365
- Rous, P. & Beard, J.W. (1934) A virus-induced mammalian growth with the characters of a tumour (the Shope rabbit papilloma). 1. The growth on implantation within favourable hosts. *J. exp. Med.*, **60**, 701–722
- Rous, P. & Beard, J.W. (1935) The progression to carcinoma of virus-induced rabbit papillomas (Shope). *J. exp. Med.*, **62**, 523–548
- Rous, P. & Kidd, J.G. (1938) The carcinogenic effect of a papilloma virus on the tared skin of rabbits. I. Description of the phenomenon. *J. exp. Med.*, **67**, 399–427
- Rous, P. & Friedewald, W.F. (1944) The effect of chemical carcinogens on virus-induced rabbit papillomas. *J. exp. Med.*, **79**, 511–537
- Rousseau, M.-C., Franco, E.L., Villa, L.L., Sobrinho, J.P., Termini, L., Prado, J.M. & Rohan, T.E. (2000) A cumulative case-control study of risk factor profiles for oncogenic and nononcogenic cervical human papillomavirus infections. *Cancer Epidemiol. Biomarkers Prev.*, **9**, 469–476
- Rousseau, M.-C., Pereira, J.S., Prado, J.C.M., Villa, L.L., Rohan, T.E. & Franco, E.L. (2001) Cervical coinfection with human papillomavirus (HPV) types as a predictor of acquisition and persistence of HPV infection. *J. infect. Dis.*, **184**, 1508–1517
- Rozendaal, L., Westerga, J., van der Linden, J.C., Walboomers, J.M.M., Voorhorst, F.J., Risse, E.K.J., Boon, M.E. & Meijer, C.J.L.M. (2000) PCR based high risk HPV testing is superior to neural network based screening for predicting incident CIN III in women with normal cytology and borderline changes. *J. clin. Pathol.*, **53**, 606–611

- Ruba, S., Schoolland, M., Allpress, S. & Sterrett, G. (2004) Adenocarcinoma in situ of the uterine cervix. Screening and diagnostic errors in Papanicolaou smears. *Cancer*, **102**, 280–287
- Rübben, A., Krones, R., Schwetschenau, B. & Grussendorf-Conen, E.-I. (1993) Common warts from immunocompetent patients show the same distribution of human papillomavirus types as common warts from immunocompromised patients. *Br. J. Dermatol.*, **128**, 264–270
- Rubin, M.A., Kleter, B., Zhou, M., Ayala, G., Cubilla, A.L., Quint, W.G.V. & Pirog, E.C. (2001) Detection and typing of human papillomavirus DNA in penile carcinoma. Evidence for multiple independent pathways of penile carcinogenesis. *Am. J. Pathol.*, **159**, 1211–1218
- Rüdlinger, R., Smith, I.W., Bunney, M.H. & Hunter, J.A. (1986) Human papillomavirus infections in a group of renal transplant recipients. *Br. J. Dermatol.*, **115**, 681–692
- Rüdlinger, R., Grob, R., Yu, Y.X. & Schnyder, U.W. (1989) Human papillomavirus-35-positive Bowenoid papulosis of the anogenital area and concurrent human papillomavirus-35-positive verruca with Bowenoid dysplasia of the periungual area. *Arch. Dermatol.*, **125**, 655–659
- Rueda, L.A. & Rodriguez, G. (1976) [Human warts after HPV. Clinical, histological and ultrastructural correlation.] *Med. Cut. I.L.A.*, **2**, 113–136 (in Spanish)
- Rugpao, S., Nagachinta, T., Wanapirak, C., Srisomboon, J., Suriyanon, V., Sirirojn, B., Chaiyarassamee, O., Prasertwitayakij, W., Celentano, D.D., Nelson, K.E., Vernon, S.D. & Duerr, A. (1998) Gynaecological conditions associated with HIV infection in women who are partners of HIV-positive Thai blood donors. *Int. J. STD AIDS*, **9**, 677–682
- Ruhland, A. & de Villiers, E.-M. (2001) Opposite regulation of the HPV 20-URR and HPV 27-URR promoters by ultraviolet irradiation and cytokines. *Int. J. Cancer*, **91**, 828–834
- Rylander, E., Ruusuvaara, L., Almströmer, M.W., Evander, M. & Wadell, G. (1994) The absence of vaginal human papillomavirus 16 DNA in women who have not experienced sexual intercourse. *Obstet. Gynecol.*, **83**, 735–737
- Ryu, H.-S. (2002) Concurrent chemoradiotherapy in cervical cancer (a new paradigm in cervical cancer treatment). *Yonsei med. J.*, **43**, 749–753
- Sá, L.R.M., DiLoreto, C., Leite, M.C.P., Wakamatsu, A., Santos, R.T.M. & Catao-Dias, J.L. (2000) Oral focal epithelial hyperplasia in a Howler monkey (*Alouatta fusca*). *Vet. Pathol.*, **37**, 492–496
- Saad, F., Gu, K., Jean-Baptiste, J., Gauthier, J. & MesMasson, A.-M. (1999) Absence of human papillomavirus sequences in early stage prostate cancer. *Can. J. Urol.*, **6**, 834–838
- Sacco, A., Siepi, F. & Crescenzi, M. (2003) HPV E7 expression in skeletal muscle cells distinguishes initiation of the postmitotic state from its maintenance. *Oncogene*, **22**, 4027–4034
- Sacks, S.L., Griffiths, P.D., Corey, L., Cohen, C., Cunningham, A., Dusheiko, G.M., Self, S., Spruance, S., Stanberry, L.R., Wald, A. & Whitley, R.J. (2004) HSV shedding. *Antiviral Res.*, **63** (Suppl. 1), S19–S26
- Saegusa, M., Takano, Y., Hashimura, M., Okayasu, I. & Shiga, J. (1995) HPV type 16 in conjunctival and junctional papilloma, dysplasia, and squamous cell carcinoma. *J. clin. Pathol.*, **48**, 1106–1110
- Saegusa, M., Hashimura, M., Takano, Y., Ohbu, M. & Okayasu, I. (1997) Absence of human papillomavirus genomic sequences detected by the polymerase chain reaction in oesophageal and gastric carcinomas in Japan. *J. Clin. pathol. mol. Pathol.*, **50**, 101–104
- Sailaja, G., Watts, R.M. & Bernard, H.-U. (1999) Many different papillomaviruses have low transcriptional activity in spite of strong epithelial specific enhancers. *J. gen. Virol.*, **80**, 1715–1724

- Salmerón, J., Lazcano-Ponce, E., Lorincz, A., Hernández, M., Hernández, P., Leyva, A., Uribe, M., Manzanares, H., Antunez, A., Carmona, E., Ronnett, B.M., Sherman, M.E., Bishai, D., Ferris, D., Flores, Y., Yunes, E. & Shah, K.V. (2003) Comparison of HPV-based assays with Papanicolaou smears for cervical cancer screening in Morelos State, Mexico. *Cancer Causes Control*, **14**, 505–512
- Saltzstein, D.R., Orihuela, E., Kocurek, J.N., Payne, D.A., Chan, T.-S. & Tyring, S.K. (1993) Failure of the polymerase chain reaction (PCR) to detect human papilloma virus (HPV) in transitional cell carcinoma of the bladder. *Anticancer Res.*, **13**, 423–425
- Sánchez-Lanier, M., Triplett, C. & Champion, M. (1994) Possible role for human papillomavirus 16 in squamous cell carcinoma of the finger. *J. med. Virol.*, **44**, 369–378
- Sandler, A.B., Vande Pol, S.B. & Spalholz, B.A. (1993) Repression of bovine papillomavirus type 1 transcription by the E1 replication protein. *J. Virol.*, **67**, 5079–5087
- Sang, B.C. & Barbosa, M.S. (1992) Single amino acid substitutions in 'low-risk' human papillomavirus (HPV) type 6 E7 protein enhance features characteristic of the 'high-risk' HPV E7 oncoproteins. *Proc. natl Acad. Sci. USA*, **89**, 8063–8067
- de Sanjosé, S., Muñoz, N., Bosch, F.X., Reimann, K., Pedersen, N.S., Orfila, J., Ascunce, N., Gonzalez, L.C., Tafur, L., Gili, M., Lette, I., Viladiu, P., Tormo, M.J., Moreo, P., Shah, K.V. & Wahren, B. (1994) Sexually transmitted agents and cervical neoplasia in Colombia and Spain. *Int. J. Cancer*, **56**, 358–363
- de Sanjose, S., Almirall, R., Lloveras, B., Font, R., Diaz, M., Muñoz, N., Català, I., Meijer, C.J.L.M., Snijders, P.J.F., Herrero, R. & Bosch, F.X. (2003) Cervical human papillomavirus infection in the female population in Barcelona, Spain. *Sex. transm. Dis.*, **30**, 788–793
- Sankaranarayanan, R., Nair, M.K., Jayaprakash, P.G., Stanley, G., Varghese, C., Ramadas, V., Padmakumary, G. & Padmanabhan, T.K. (1995) Cervical cancer in Kerala: A hospital registry-based study on survival and prognostic factors. *Br. J. Cancer*, **72**, 1039–1042
- Sankaranarayanan, R., Wesley, R., Somanathan, T., Dhakad, N., Shyamalakumary, B., Amma, N.S., Parkin, D.M. & Nair, M.K. (1998) Visual inspection of the uterine cervix after the application of acetic acid in the detection of cervical carcinoma and its precursors. *Cancer*, **83**, 2150–2156
- Sankaranarayanan, R., Shyamalakumary, B., Wesley, R., Amma, N.S., Parkin, D.M. & Nair, M.K. (1999) Visual inspection with acetic acid in the early detection of cervical cancer and precursors. *Int. J. Cancer*, **80**, 161–163
- Sankaranarayanan, R., Rajkumar, R., Theresa, R., Esmey, P.O., Mahe, C., Bagyalakshmi, K.R., Thara, S., Frappart, L., Lucas, E., Muwonge, R., Shanthakumari, S., Jeevan, D., Subbarao, T.M., Parkin, D.M. & Cherian, J. (2004a) Initial results from a randomized trial of cervical visual screening in rural South India. *Int. J. Cancer*, **109**, 461–467
- Sankaranarayanan, R., Chatterji, R., Shastri, S.S., Wesley, R.S., Basu, P., Mahe, C., Muwonge, R., Seigneurin, D., Somanathan, T., Roy, C., Kelkar, R., Chinoy, R., Dinshaw, K., Mandal, R., Amin, G., Goswami, S., Pal, S., Patil, S., Dhakad, N., Frappart, L. & Fontanieri, B. for the IARC Multicenter Study Group on Cervical Cancer Prevention in India (2004b) Accuracy of human papillomavirus testing in primary screening of cervical neoplasia: Results from a multicenter study in India. *Int. J. Cancer*, **112**, 341–347
- Sano, T., Sakurai, S., Fukuda, T. & Nakajima, T. (1995) Unsuccessful effort to detect human papillomavirus DNA in urinary bladder cancers by the polymerase chain reaction and *in situ* hybridization. *Pathol. int.*, **45**, 506–512

- Santin, A.D., Hermonat, P.L., Ravaggi, A., Chiriva-Internati, M., Zhan, D., Pecorelli, S., Parham, G.P. & Cannon, M.J. (1999) Induction of human papillomavirus-specific CD4⁺ and CD8⁺ lymphocytes by E7-pulsed autologous dendritic cells in patients with human papillomavirus type 16- and 18-positive cervical cancer. *J. Virol.*, **73**, 5402–5410
- Santin, A.D., Bellone, S., Gokden, M., Cannon, M.J. & Parham, G.P. (2002) Vaccination with HPV-18 E7-pulsed dendritic cells in a patient with metastatic cervical cancer. *New Engl. J. Med.*, **346**, 1752–1753
- Santos, A. & Gómez-Leal, A. (1994) Lesions of the lacrimal caruncle. Clinicopathologic features. *Ophthalmology*, **101**, 943–949
- Santos, C., Muñoz, N., Klug, S., Almonte, M., Guerrero, I., Alvarez, M., Velarde, C., Galdos, O., Castillo, M., Walboomers, J., Meijer, C. & Caceres, E. (2001) HPV types and cofactors causing cervical cancer in Peru. *Br. J. Cancer*, **85**, 966–971
- Sapp, M., Kraus, U., Volpers, C., Snijders, P.J.F., Walboomers, J.M.M. & Streeck, R.E. (1994) Analysis of type-restricted and cross-reactive epitopes on virus-like particles of human papillomavirus type 33 and in infected tissues using monoclonal antibodies to the major capsid protein. *J. gen. Virol.*, **75**, 3375–3383
- Sardi, J., Sananes, C., Giaroli, A., Bayo, J., Rueda, N.G., Vighi, S., Guardado, N., Panices, G., Snaidas, L., Vico, C. & di Paola, G. (1993) Results of a prospective randomized trial with neo-adjuvant chemotherapy in stage IB, bulky, squamous carcinoma of the cervix. *Gynecol. Oncol.*, **49**, 156–165
- Sarkar, F.H., Sakr, W.A., Li, Y.-W., Sreepathi, P. & Crissman, J.D. (1993) Detection of human papillomavirus (HPV) DNA in human prostatic tissues by polymerase chain reaction (PCR). *Prostate*, **22**, 171–180
- Sasadeusz, J., Kelly, H., Szer, J., Schwarzer, A.P., Mitchell, H. & Grigg, A. (2001) Abnormal cervical cytology in bone marrow transplant recipients. *Bone Marrow Transplant.*, **28**, 393–397
- Sasagawa, T., Inoue, M., Inoue, H., Yutsudo, M., Tanizawa, O. & Hakura, A. (1992) Induction of uterine cervical neoplasias in mice by human papillomavirus type 16 E6/E7 genes. *Cancer Res.*, **52**, 4420–4426
- Sasagawa, T., Yamazaki, H., Dong, Y.-Z., Satake, S.-I., Tateno, M. & Inoue, M. (1998) Immunoglobulin-A and -G responses against virus-like particles (VLP) of human papillomavirus type 16 in women with cervical cancer and cervical intra-epithelial lesions. *Int. J. Cancer*, **75**, 529–535
- Sasagawa, T., Shimakage, M., Nakamura, M., Sakaike, J., Ishikawa, H. & Inoue, M. (2000) Epstein-Barr virus (EBV) genes expression in cervical intraepithelial neoplasia and invasive cervical cancer: A comparative study with human papillomavirus (HPV) infection. *Hum. Pathol.*, **31**, 318–326
- Sasagawa, T., Basha, W., Yamazaki, H. & Inoue, M. (2001) High-risk and multiple human papillomavirus infections associated with cervical abnormalities in Japanese women. *Cancer Epidemiol. Biomarkers Prev.*, **10**, 45–52
- Sasaoka, R., Morimura, T., Mihara, M., Hagari, Y., Aki, T. & Miyamoto, T. (1996) Detection of human papillomavirus type 16 DNA in two cases of verrucous carcinoma of the foot. *Br. J. Dermatol.*, **134**, 983–984
- Saslow, D., Castle, P.E., Cox, J.T., Davey, D.D., Einstein, M.H., Ferris, D.G., Goldie, S.J., Harper, D.M., Kinney, W., Moscicki, A.-B., Noller, K.L., Wheeler, C.M., Ades, T., Andrews, K.S., Doroshenko, M.K., Kahn, K.G., Schmidt, C., Shafey, O., Smith, R.A., Partridge, E.E. &

- Garcia, F. for the Gynecologic Cancer Advisory Group (2007) American Cancer Society Guideline for human papillomavirus (HPV) vaccine use to prevent cervical cancer and its precursors. *CA Cancer J. Clin.*, **57**, 7–28
- Sasson, I.M., Haley, N.J., Hoffmann, D., Wynder, E.L., Hellberg, D. & Nilsson, S. (1985) Cigarette smoking and neoplasia of the uterine cervix: Smoke constituents in cervical mucus. *New Engl. J. Med.*, **312**, 315–316
- Sastre-Garau, X., Loste, M.N., Vincent-Salomon, A., Favre, M., Mouret, E., Delarochefordiere, A., Durand, J.C., Tartour, E., Lepage, V. & Charron, D. (1996) Decreased frequency of HLA-DRB1*13 alleles in French women with HPV-positive carcinoma of the cervix. *Int. J. Cancer*, **69**, 159–164
- Sayers, S.J., McMillan, A. & McGoogan, E. (1998) Anal cytological abnormalities in HIV-infected homosexual men. *Int. J. STD AIDS*, **9**, 37–40
- Sayhan, N., Yazici, H., Budak, M., Bitisik, O. & Dalay, N. (2001) p53 Codon 72 genotypes in colon cancer. Association with human papillomavirus infection. *Res. Commun. mol. Pathol. Pharmacol.*, **109**, 25–34
- Scala, M., Bonelli, G., Gipponi, M., Margarino, G. & Muzza, A. (2002) Cryosurgery plus adjuvant systemic α 2-interferon for HPV-associated lesions. *Anticancer Res.*, **22**, 1171–1176
- Schäfer, K., Müller, M., Faath, S., Henn, A., Osen, W., Zentgraf, H., Benner, A., Gissmann, L. & Jochmus, I. (1999) Immune response to human papillomavirus 16 L1E7 chimeric virus-like particles: Induction of cytotoxic T cells and specific tumor protection. *Int. J. Cancer*, **81**, 881–888
- Schaper, I.D., Marcuzzi, G.P., Weissenborn, S.J., Kasper, H.U., Dries, V., Smyth, N., Fuchs, P. & Pfister, H. (2005) Development of skin tumors in mice transgenic for early genes of human papillomavirus type 8. *Cancer Res.*, **65**, 1394–1400
- Schapiro, F., Sparkowski, J., Adduci, A., Suprynowicz, F., Schlegel, R. & Grinstein, S. (2000) Golgi alkalization by the papillomavirus E5 oncoprotein. *J. Cell Biol.*, **148**, 305–315
- Scheffner, M., Werness, B.A., Huibregtse, J.M., Levine, A.J. & Howley, P.M. (1990) The E6 oncoprotein encoded by human papillomavirus types 16 and 18 promotes the degradation of p53. *Cell*, **63**, 1129–1136
- Scheffner, M., Münger, K., Byrne, J.C. & Howley, P.M. (1991) The state of the p53 and retinoblastoma genes in human cervical carcinoma cell lines. *Proc. natl Acad. Sci. USA*, **88**, 5523–5527
- Scheffner, M., Huibregtse, J.M., Vierstra, R.D. & Howley, P.M. (1993) The HPV-16 E6 and E6-AP complex functions as a ubiquitin-protein ligase in the ubiquitination of p53. *Cell*, **75**, 495–505
- Schellekens, M.C., Dijkman, A., Aziz, M.F., Siregar, B., Cornain, S., Kolkman-Uljee, S., Peters, L.A.W. & Fleuren, G.J. (2004) Prevalence of single and multiple HPV types in cervical carcinomas in Jakarta, Indonesia. *Gynecol. Oncol.*, **93**, 49–53
- Scheurlen, W., Gissmann, L., Gross, G. & zur Hausen, H. (1986) Molecular cloning of two new HPV types (HPV 37 and HPV 38) from a keratoacanthoma and a malignant melanoma. *Int. J. Cancer*, **37**, 505–510
- Schiff, M., Becker, T.M., Masuk, M., van Asselt-King, L., Wheeler, C.M., Altobelli, K.K., North, C.Q. & Nahmias, A.J. (2000) Risk factors for cervical intraepithelial neoplasia in southwestern American Indian women. *Am. J. Epidemiol.*, **152**, 716–726
- Schiffman, M. & Adriansa, M.E. (2000) ASCUS-LSIL Triage Study. Design, methods and characteristics of trial participants. *Acta cytol.*, **44**, 726–742

- Schiffman, M. & Kjaer, S.K. (2003) Natural history of anogenital human papillomavirus infection and neoplasia. *J. natl Cancer Inst. Monogr.*, **31**, 14–19
- Schiffman, M.H. & Schatzkin, A. (1994) Test reliability is critically important to molecular epidemiology: An example from studies of human papillomavirus infection and cervical neoplasia. *Cancer Res.*, **54**, S1944–S1947
- Schiffman, M.H., Haley, N.J., Felton, J.S., Andrews, A.W., Kaslow, R.A., Lancaster, W.D., Kurman, R.J., Brinton, L.A., Lannom, L.B. & Hoffmann, D. (1987) Biochemical epidemiology of cervical neoplasia: Measuring cigarette smoke constituents in the cervix. *Cancer Res.*, **47**, 3886–3888
- Schiffman, M., Herrero, R., Hildesheim, A., Sherman, M.E., Bratti, M., Wacholder, S., Alfaro, M., Hutchinson, M., Morales, J., Greenberg, M.D. & Lorincz, A.T. (2000) HPV DNA testing in cervical cancer screening. Results from women in a high-risk province of Costa Rica. *J. Am. med. Assoc.*, **283**, 87–93
- Schiffman, M., Herrero, R., DeSalle, R., Hildesheim, A., Wacholder, S., Rodriguez, A.C., Bratti, M.C., Sherman, M.E., Morales, J., Guillen, D., Alfaro, M., Hutchinson, M., Wright, T.C., Solomon, D., Chen, Z., Alfaro, M., Hutchinson, M., Wright, T.C., Solomon, D., Chen, Z., Schussler, J., Castle, P.E. & Burk, R.D. (2005) The carcinogenicity of human papillomavirus types reflects viral evolution. *Virology*, **337**, 76–84
- Schiller, J.T. & Nardelli-Haeffliger, D. (2006) Second generation HPV vaccines to prevent cervical cancer. *Vaccine*, **24** (Suppl. 3), 147–153
- Schiller, J.T., Vass, W.C., Vousden, K.H. & Lowy, D.R. (1986) E5 open reading frame of bovine papillomavirus type 1 encodes a transforming gene. *J. Virol.*, **57**, 1–6
- Schilling, B., De-Medina, T., Syken, J., Vidal, M. & Munger, K. (1998) A novel human DnaJ protein, hTid-1, a homolog of the *Drosophila* tumor suppressor protein Tid56, can interact with the human papillomavirus type 16 E7 oncoprotein. *Virology*, **247**, 74–85
- Schlecht, N.F., Trevisan, A., Duarte-Franco, E., Rohan, T.E., Ferenczy, A., Villa, L.L. & Franco, E.L. (2003a) Viral load as a predictor of the risk of cervical intraepithelial neoplasia. *Int. J. Cancer*, **103**, 519–524
- Schlecht, N.F., Platt, R.W., Duarte-Franco, E., Costa, M.C., Sobrinho, J.P., Prado, J.C., Ferenczy, A., Rohan, T.E., Villa, L.L. & Franco, E.L. (2003b) Human papillomavirus infection and time to progression and regression of cervical intraepithelial neoplasia. *J. natl Cancer Inst.*, **95**, 1336–1343
- Schlecht, N.F., Platt, R.W., Negassa, A., Duarte-Franco, E., Rohan, T.E., Ferenczy, A., Villa, L.L. & Franco, E.L. (2003c) Modeling the time dependence of the association between human papillomavirus infection and cervical cancer precursor lesions. *Am. J. Epidemiol.*, **158**, 878–886
- Schlegel, R., Wade-Glass, M., Rabson, M.S. & Yang, Y.-C. (1986) The E5 transforming gene of bovine papillomavirus encodes a small, hydrophobic polypeptide. *Science*, **233**, 464–467
- Schlegel, R., Phelps, W.C., Zhang, Y.L. & Barbosa, M. (1988) Quantitative keratinocyte assay detects two biological activities of human papillomavirus DNA and identifies viral types associated with cervical carcinoma. *EMBO J.*, **7**, 3181–3187
- Schlehofer, J.R. & Heilbronn, R. (1990) Infection with adeno-associated virus type 5 inhibits mutagenicity of herpes simplex virus type 1 or 4-nitroquinoline-1-oxide. *Mutat. Res.*, **244**, 317–320

- Schmauz, R., Okong, P., de Villiers, E.-M., Dennin, R., Brade, L., Lwanga, S.K. & Owor, R. (1989). Multiple infections in cases of cervical cancer from a high-incidence area in tropical Africa. *Int. J. Cancer*, **43**, 805–809
- Schmitt, A., Harry, J.B., Rapp, B., Wettstein, F.O. & Iftner, T. (1994) Comparison of the properties of the E6 and E7 genes of low- and high-risk cutaneous papillomaviruses reveals strongly transforming and high Rb-binding activity for the E7 protein of the low-risk human papillomavirus type 1. *J. Virol.*, **68**, 7051–7059
- Schneider, V., Kay, S. & Lee, H.M. (1983) Immunosuppression as a high-risk factor in the development of condyloma acuminatum and squamous neoplasia of the cervix. *Acta cytol.*, **27**, 220–224
- Schneider, A., Oltersdorf, T., Schneider, V. & Gissmann, L. (1987) Distribution pattern of human papilloma virus 16 genome in cervical neoplasia by molecular *in situ* hybridization of tissue sections. *Int. J. Cancer*, **39**, 717–721
- Schneider, A., Hoyer, H., Lotz, B., Leistritza, S., Kuhne-Heid, R., Nindl, I., Müller, B., Haerting J. & Durst, M. (2000) Screening for high-grade cervical intra-epithelial neoplasia and cancer by testing for high-risk HPV, routine cytology or colposcopy. *Int. J. Cancer*, **89**, 529–534
- Schoell, W.M.J., Mirhashemi, R., Liu, B., Janicek, M.F., Podack, E.R., Penalver, M.A. & Averette, H.E. (1999) Generation of tumor-specific cytotoxic T lymphocytes by stimulation with HPV type 16 E7 peptide-pulsed dendritic cells: An approach to immunotherapy of cervical cancer. *Gynecol. Oncol.*, **74**, 448–455
- Schreckenberger, C. & Kaufmann, A.M. (2004) Vaccination strategies for the treatment and prevention of cervical cancer. *Curr. Opin. Oncol.*, **16**, 485–491
- Schreiber, K., Cannon, R.E., Karrison, T., Beck-Engeser, G., Huo, D., Tennant, R.W., Jensen, H., Kast, W.M., Krausz, T., Meredith, S.C., Chen, L. & Schreiber, H. (2004) Strong synergy between mutant *ras* and HPV16 E6/E7 in the development of primary tumors. *Oncogene*, **23**, 3972–3979
- Schüle, R., Rangarajan, P., Yang, N., Kliwer, S., Ransone, L.J., Bolado, J., Verma, I.M. & Evans, R.M. (1991) Retinoic acid is a negative regulator of AP-1-responsive genes. *Proc. natl Acad. Sci. USA*, **88**, 6092–6096
- Schuman, P., Ohmit, S.E., Klein, R.S., Duerr, A., Cu-Uvin, S., Jamieson, D.J., Anderson, J. & Shah, K.V. for the HIV Epidemiology Research Study (HERS) Group (2003) Longitudinal study of cervical squamous intraepithelial lesions in human immunodeficiency virus (HIV)-seropositive and at-risk HIV-seronegative women. *J. infect. Dis.*, **188**, 128–136
- Schwartz, S.M., Daling, J.R., Doody, D.R., Wipf, G.C., Carter, J.J., Madeleine, M.M., Mao, E.-J., Fitzgibbons, E.D., Huang, S., Beckmann, A.M., McDougall, J.K. & Galloway, D.A. (1998) Oral cancer risk in relation to sexual history and evidence of human papillomavirus infection. *J. natl Cancer Inst.*, **90**, 1626–1636
- Schwartz, S.M., Daling, J.R., Shera, K.A., Madeleine, M.M., McKnight, B., Galloway, D.A., Porter, P.L. & McDougall, J.K. (2001) Human papillomavirus and prognosis of invasive cervical cancer: A population-based study. *J. clin. Oncol.*, **19**, 1906–1915
- Schwarz, E., Freese, U.K., Gissmann, L., Mayer, W., Roggenbuck, B., Stremlau, A. & zur Hausen, H. (1985) Structure and transcription of human papillomavirus sequences in cervical carcinoma cells. *Nature*, **314**, 111–114
- Scott, D.R., Hagmar, B., Maddox, P., Hjerpe, A., Dillner, J., Cuzick, J., Sherman, M.E., Stoler, M.H., Kurman, R.J., Kiviat, N.B., Manos, M.M. & Schiffman, M. (2002a) Use of human

- papillomavirus DNA testing to compare equivocal cervical cytologic interpretations in the United States, Scandinavia, and the United Kingdom. *Cancer*, **96**, 14–20
- Scott, I.U., Karp, C.L. & Nuovo, G.J. (2002b) Human papillomavirus 16 and 18 expression in conjunctival intraepithelial neoplasia. *Ophthalmology*, **109**, 542–547
- Scully, C., Prime, S. & Maitland, N. (1985) Papillomaviruses: Their possible role in oral disease. *Oral Surg. oral Med. oral Pathol.*, **60**, 166–174
- Seavey, S.E., Holubar, M., Saucedo, L.J. & Perry, M.E. (1999) The E7 oncoprotein of human papillomavirus type 16 stabilizes p53 through a mechanism independent of p19^{ARF}. *J. Virol.*, **73**, 7590–7598
- Sedjo, R.L., Inserra, P., Abrahamsen, M., Harris, R.B., Roe, D.J., Baldwin, S. & Giuliano, A.R. (2002a) Human papillomavirus persistence and nutrients involved in the methylation pathway among a cohort of young women. *Cancer Epidemiol. Biomarkers Prev.*, **11**, 353–359
- Sedjo, R.L., Roe, D.J., Abrahamsen, M., Harris, R.B., Craft, N., Baldwin, S. & Giuliano, A.R. (2002b) Vitamin A, carotenoids, and risk of persistent oncogenic human papillomavirus infection. *Cancer Epidemiol. Biomarkers Prev.*, **11**, 876–884
- Sedjo, R.L., Papenfuss, M.R., Craft, N.E. & Giuliano, A.R. (2003a) Effect of plasma micro-nutrients on clearance of oncogenic human papillomavirus (HPV) infection (United States). *Cancer Causes Control*, **14**, 319–326
- Sedjo, R.L., Fowler, B.M., Schneider, A., Henning, S.M., Hatch, K. & Giuliano, A.R. (2003b) Folate, vitamin B12, and homocysteine status: Findings of no relation between human papillomavirus persistence and cervical dysplasia. *Nutrition*, **19**, 497–502
- Sedlacek, T.V., Lindheim, S., Eder, C., Hasty, L., Woodland, M., Ludomirsky, A. & Rando, R.F. (1989) Mechanism for human papillomavirus transmission at birth. *Am. J. Obstet. Gynecol.*, **161**, 55–59
- Segawa, T., Sasagawa, T., Yamazaki, H., Sakaike, J., Ishikawa, H. & Inoue, M. (1999) Fragile histidine triad transcription abnormalities and human papillomavirus E6-E7 mRNA expression in the development of cervical carcinoma. *Cancer*, **85**, 2001–2010
- Sehr, P., Zumbach, K. & Pawlita, M. (2001) A generic capture ELISA for recombinant proteins fused to glutathione *S*-transferase: Validation for HPV serology. *J. immunol. Meth.*, **253**, 153–162
- Sehr, P., Müller, M., Höpfl, R., Widschwendter, A. & Pawlita, M. (2002) HPV antibody detection by ELISA with capsid protein L1 fused to glutathione *S*-transferase. *J. virol. Meth.*, **106**, 61–70
- Selinka, H.-C., Giroglou, T. & Sapp, M. (2002) Analysis of the infectious entry pathway of human papillomavirus type 33 pseudovirions. *Virology*, **299**, 279–287
- Sellers, J.W., Karwalajtys, T.L., Kaczorowski, J., Mahony, J.B., Lytwyn, A., Chong, S., Sparrow, J. & Lorincz, A. for the Survey of HPV in Ontario Women Group (SHOW) (2003) Incidence, clearance and predictors of human papillomavirus infection in women. *Can. med. Assoc. J.*, **168**, 421–425
- Seo, Y.-S., Müller, F., Lusky, M. & Hurwitz, J. (1993) Bovine papilloma virus (BPV)-encoded E1 protein contains multiple activities required for BPV DNA replication. *Proc. natl Acad. Sci. USA*, **90**, 702–706
- Serfling, U., Ciancio, G., Zhu, W.-Y., Leonardi, C. & Penneys, N.S. (1992) Human papillomavirus and herpes virus DNA are not detected in benign and malignant prostatic tissue using the polymerase chain reaction. *J. Urol.*, **148**, 192–194

- Serraino, D., Carrieri, P., Pradier, C., Bidoli, E., Dorrucchi, M., Ghetti, E., Schiesari, A., Zucconi, R., Pezzotti, P., Dellamonica, P., Franceschi, S. & Rezza, G. (1999) Risk of invasive cervical cancer among women with, or at risk for, HIV infection. *Int. J. Cancer*, **82**, 334–337
- Serraino, D., Dal Maso, L., La Vecchia, C. & Franceschi, S. (2002) Invasive cervical cancer as an AIDS-defining illness in Europe. *AIDS*, **16**, 781–786
- Serth, J., Panitz, F., Paeslack, U., Kuczyk, M.A. & Jonas, U. (1999) Increased levels of human papillomavirus type 16 DNA in a subset of prostate cancers. *Cancer Res.*, **59**, 823–825
- van Seters, M., Fons, G., van Beurden, M. (2002) Imiquimod in the treatment of multifocal vulvar intraepithelial neoplasia 2/3. Results of a pilot study. *J. reprod. Med.*, **47**, 701–705
- Se Thoe, S.Y., Wong, K.K., Pathmanathan, R., Sam, C.K., Cheng, H.M. & Prasad, U. (1993). Elevated secretory IgA antibodies to Epstein-Barr virus (EBV) and presence of EBV DNA and EBV receptors in patients with cervical carcinoma. *Gynecol. Oncol.*, **50**, 168–172
- Settleman, J., Fazeli, A., Malicki, J., Horwitz, B.H. & DiMaio, D. (1989) Genetic evidence that acute morphologic transformation, induction of cellular DNA synthesis, and focus formation are mediated by a single activity of the bovine papillomavirus E5 protein. *Mol. cell. Biol.*, **9**, 5563–5572
- Shadan, F.F. & Villarreal, L.P. (1993) Coevolution of persistently infecting small DNA viruses and their hosts linked to host-interactive regulatory domains. *Proc. natl Acad. Sci. USA*, **90**, 4117–4121
- Shafti-Keramati, S., Handisurya, A., Kriehuber, E., Meneguzzi, G., Slupetzky, K. & Kirnbauer, R. (2003) Different heparan sulfate proteoglycans serve as cellular receptors for human papillomaviruses. *J. Virol.*, **77**, 13125–13135
- Shah, K.V. (1992) Papillomaviruses. In: Lennette, E.H., ed., *Laboratory Diagnosis of Viral Infection*, 2nd Ed., Marcel Dekker, Inc., pp. 591–612
- Shah, K.V. & Howley, P.M. (1996) Papillomaviruses. In: Fields, B.N., Knipe, D.M. & Howley, P.M., eds, *Field Virology*, New York, Raven Press, pp. 2078–2109
- Shah, K.H., Lewis, M.G., Jenson, A.B., Kurman, R.J. & Lancaster, W.D. (1980) Papillomavirus and cervical dysplasia (Letter to the Editor). *Lancet*, **ii**, 1190
- Shah, K., Kashima, H., Polk, B.F., Shah, F., Abbey, H. & Abramson, A. (1986) Rarity of cesarean delivery in cases of juvenile-onset respiratory papillomatosis. *Obstet. Gynecol.*, **68**, 795–799
- Shah, K.V., Daniel, R.W., Simons, J.W. & Vogelstein, B. (1992) Investigation of colon cancers for human papillomavirus genomic sequences by polymerase chain reaction. *J. surg. Oncol.*, **51**, 5–7
- Shah, K.V., Viscidi, R.P., Alberg, A.J., Helzlsouer, K.J. & Comstock, G.W. (1997) Antibodies to human papillomavirus 16 and subsequent *in situ* or invasive cancer of the cervix. *Cancer Epidemiol. Biomarkers Prev.*, **6**, 233–237
- Shahin, M., Moore, M.R., Worrall, S., Smith, B.L., Seawright, A.A. & Prakash, A.S. (1998) H-ras activation is an early event in the ptaquiloside-induced carcinogenesis: Comparison of acute and chronic toxicity in rats. *Biochem. biophys. Res. Comm.*, **250**, 491–497
- Shamanin, V., Delius, H. & de Villiers, E.-M. (1994a) Development of a broad spectrum PCR assay for papillomaviruses and its application in screening lung cancer biopsies. *J. gen. Virol.*, **75**, 1149–1156
- Shamanin, V., Glover, M., Rausch, C., Proby, C., Leigh, I.M., zur Hausen, H. & de Villiers, E.-M. (1994b) Specific types of human papillomavirus found in benign proliferations and carcinomas of the skin in immunosuppressed patients. *Cancer Res.*, **54**, 4610–4613

- Shamanin, V., zur Hausen, H., Lavergne, D., Proby, C.M., Leigh, I.M., Neumann, C., Hamm, H., Goos, M., Hausteiner, U.-F., Jung, E.G., Plewig, G., Wolff, H. & de Villiers, E.-M. (1996) Human papillomavirus infections in nonmelanoma skin cancers from renal transplant recipients and nonimmunosuppressed patients. *J. natl Cancer Inst.*, **88**, 802–811
- Shapiro, S., Rosenberg, L., Hoffman, M., Kelly, J.P., Cooper, D.D., Carrara, H., Denny, L.E., du Toit, G., Allan, B.R., Stander, I.A. & Williamson, A.-L. (2003) Risk of invasive cancer of the cervix in relation to the use of injectable progestogen contraceptives and combined estrogen/progestogen oral contraceptives (South Africa). *Cancer Causes Control*, **14**, 485–495
- Shen, J., Tate, J.E., Crum, C.P. & Goodman, M.L. (1996) Prevalence of human papillomaviruses (HPV) in benign and malignant tumors of the upper respiratory tract. *Mod. Pathol.*, **9**, 15–20
- Shen, Z.-Y., Hu, S.-P., Lu, L.-C., Tang, C.-Z., Kuang, Z.-S., Zhong, S.-P. & Zeng, Y. (2002a) Detection of human papillomavirus in esophageal carcinoma. *J. med. Virol.*, **68**, 412–416
- Shen, Z.-Y., Xu, L.-X., Chen, M.-H., Shen, J., Cai, W.-J. & Zeng, Y. (2002b) Progressive transformation of immortalized esophageal epithelial cells. *World J. Gastroenterol.*, **8**, 976–981
- Shepherd, J.H., Mould, T. & Oram, D.H. (2001) Radical trachelectomy in early stage carcinoma of the cervix: Outcome as judged by recurrence and fertility rates. *Br. J. Obstet. Gynaecol.*, **108**, 882–885
- Sherman, L., Jackman, A., Itzhaki, H., Stoppler, M.C., Koval, D. & Schlegel, R. (1997) Inhibition of serum- and calcium-induced differentiation of human keratinocytes by HPV16 E6 oncoprotein: Role of p53 inactivation. *Virology*, **237**, 296–306
- Sherman, M.E., Schiffman, M. & Cox, J.T. for the Atypical Squamous Cells of Undetermined Significance/Low-Grade Squamous Intraepithelial Lesion Triage Study Group (2002) Effects of age and human papilloma viral load on colposcopy triage: Data from the Randomized Atypical Squamous cells of Undetermined Significance/Low-Grade intraepithelial Lesion Triage Study (ALTS). *J. natl Cancer Inst.*, **94**, 102–107
- Sherman, M.E., Wang, S.S., Wheeler, C.M., Rich, L., Gravitt, P.E., Tarone, R. & Schiffman, M. (2003a) Determinants of human papillomavirus load among women with histological cervical intraepithelial neoplasia 3: Dominant impact of surrounding low-grade lesions. *Cancer Epidemiol. Biomarkers Prev.*, **12**, 1038–1044
- Sherman, M.E., Lorincz, A.T., Scott, D.R., Wacholder, S., Castle, P.E., Glass, A.G., Mielzynska-Lohnas, I., Rush, B.B. & Schiffman, M. (2003b) Baseline cytology, human papillomavirus testing, and risk for cervical neoplasia: A 10-year cohort analysis. *J. natl Cancer Inst.*, **95**, 46–52
- Shi, Y., Lee, J.-S. & Galvin, K.M. (1997) Everything you have ever wanted to know about Yin Yang 1... *Biochim. biophys. Acta*, **1332**, F49–F66
- Shibutani, Y.F., Schoenberg, M.P., Carpiello, V.L. & Malloy, T.R. (1992) Human papillomavirus associated with bladder cancer. *Urology*, **40**, 15–17
- Shidara, K., Suzuki, T., Hara, F. & Nakajima, T. (1994) Lack of synergistic association between human papillomavirus and *ras* gene point mutation in laryngeal carcinomas. *Laryngoscope*, **104**, 1008–1012
- Shields, T.S., Falk, R.T., Herrero, R., Schiffman, M., Weiss, N.S., Bratti, C., Rodriguez, A.C., Sherman, M.E., Burk, R.D. & Hildesheim, A. (2004) A case-control study of endogenous hormones and cervical cancer. *Br. J. Cancer*, **90**, 146–152

- Shin, K.-H., Park, K.-H., Hong, H.J., Kim, J.-M., Oh, J.-E., Choung, P.-H. & Min, B.-M. (2002) Prevalence of microsatellite instability, inactivation of mismatch repair genes, *p53* mutation, and human papillomavirus infection in Korean oral cancer patients. *Int. J. Oncol.*, **21**, 297–302
- Shin, H.-R., Lee, D.-H., Herrero, R., Smith, J.S., Vaccarella, S., Hong, S.-H., Jung, K.-Y., Kim, H.-H., Park, U.-D., Cha, H.-S., Park, S., Touzé, A., Muñoz, N., Snijders, P.J.F., Meijer, C.J.L.M., Coursaget, P. & Franceschi, S. (2003) Prevalence of human papillomavirus infection in women in Busan, South Korea. *Int. J. Cancer*, **103**, 413–421
- Shin, H.-R., Franceschi, S., Vaccarella, S., Roh, J.-W., Ju, Y.-H., Oh, J.-K., Kong, H.-J., Rha, S.-H., Jung, S.-I., Kim, J.-I., Jung, K.-Y., van Doorn, L.-J. & Quint, W. (2004) Prevalence and determinants of genital infection with papillomavirus, in female and male university students in Busan, South Korea. *J. infect Dis.*, **190**, 468–476
- Shindoh, M., Chiba, I., Yasuda, M., Saito, T., Funaoka, K., Kohgo, T., Amemiya, A., Sawada, Y. & Fujinaga, K. (1995) Detection of human papillomavirus DNA sequences in oral squamous cell carcinomas and their relation to *p53* and proliferating cell nuclear antigen expression. *Cancer*, **76**, 1513–1521
- Shoji, Y., Saegusa, M., Takano, Y., Hashimura, M. & Okayasu, I. (1997) Detection of the Epstein-Barr virus genome in cervical neoplasia is closely related to the degree of infiltrating lymphoid cells: A polymerase chain reaction and in situ hybridization approach. *Pathol. Int.*, **47**, 507–511
- Shope, R.E. & Hurst, E.W. (1933) Infectious papillomatosis of rabbits. With a note on the histopathology. *J. exp. Med.*, **58**, 607–624
- Shroyer, K.R., Kim, J.G., Manos, M.M., Greer, C.E., Pearlman, N.W. & Franklin, W.A. (1992) Papillomavirus found in anorectal squamous carcinoma, not in colon adenocarcinoma. *Arch. Surg.*, **127**, 741–744
- Shroyer, K.R., Brookes, C.G., Markham, N.E. & Shroyer, A.L. (1995) Detection of human papillomavirus in anorectal squamous cell carcinoma. Correlation with basaloid pattern of differentiation. *Am. J. clin. Pathol.*, **104**, 299–305
- Shykhon, M., Kuo, M. & Pearman, K. (2002) Recurrent respiratory papillomatosis. *Clin. Otolaryngol.*, **27**, 237–243
- Si, H.X., Tsao, S.W., Poon, C.S., Wang, L.D., Wong, Y.C. & Cheung, A.L.M. (2003) Viral load of HPV in esophageal squamous cell carcinoma. *Int. J. Cancer*, **103**, 496–500
- Si, H.X., Tsao, S.W., Poon, C.S.P. & Cheung, A.L.M. (2004) Human papillomavirus infection and loss of heterozygosity in esophageal squamous cell carcinoma. *Cancer Lett.*, **213**, 231–239
- Sibbet, G., Romero-Graillet, C., Meneguzzi, G. & Campo, M.S. (2000) $\alpha 6$ integrin is not the obligatory cell receptor for bovine papillomavirus type 4. *J. gen. Virol.*, **81**, 327–334
- Sideri, M., Jones, R.W., Wilkinson, E.J., Preti, M., Heller, D.S., Scurry, J., Haefner, H. & Neill, S. (2005) Squamous vulvar intraepithelial neoplasia. 2004 modified terminology, ISSVD Vulvar Oncology Subcommittee. *J. reprod. Med.*, **50**, 807–810
- Siegmund, M., Wayss, K. & Amtmann, E. (1991) Activation of latent papillomavirus genomes by chronic mechanical irritation. *J. gen. Virol.*, **72**, 2787–2789
- Sigstad, E., Lie, A.K., Luostarinen, T., Dillner, J., Jellum, E., Lehtinen, M., Thoresen, S. & Abeler, V. (2002) A prospective study of the relationship between prediagnostic human papillomavirus seropositivity and HPV DNA in subsequent cervical carcinomas. *Br. J. Cancer*, **87**, 175–180

- Sikström, B., Hellberg, D., Nilsson, S., Kallings, I. & Mårdh, P.A. (1997) Gynecological symptoms and vaginal wet smear findings in women with cervical human papillomavirus infection. *Gynecol. obstet. Invest.*, **43**, 49–52
- Silins, I., Avall-Lundqvist, E., Tadesse, A., Jansen, K.U., Stendahl, U., Lenner, P., Zumbach, K., Pawlita, M., Dillner, J. & Frankendal, B. (2002) Evaluation of antibodies to human papillomavirus as prognostic markers in cervical cancer patients. *Gynecol. Oncol.*, **85**, 333–338
- Silins, I., Wang, X., Tadesse, A., Jansen, K.U., Schiller, J.T., Avall-Lundqvist, E., Frankendal, B. & Dillner, J. (2004) A population-based study of cervical carcinoma and HPV infection in Latvia. *Gynecol. Oncol.*, **93**, 484–492
- da Silva, M., Velders, M.P., Nieland, J.D., Schiller, J.T., Nickoloff, B.J. & Kast, W.M. (2001a) Physical interaction of human papillomavirus virus-like particles with immune cells. *Int. Immunol.*, **13**, 633–641
- da Silva, D.M., Eiben, G.L., Fausch, S.C., Wakabayashi, M.T., Rudolf, M.P., Velders, M.P. & Kast, W.M. (2001b) Cervical cancer vaccines: emerging concepts and developments. *J. cell. Physiol.*, **186**, 169–182
- da Silva, C.S., Adad, S.J., Hazarabedian de Souza, M.A., Macedo Barcelos, A.C., Sarreta Terra, A.P. & Candido Murta, E.F. (2004) Increased frequency of bacterial vaginosis and *Chlamydia trachomatis* in pregnant women with human papillomavirus infection. *Gynecol. obstet. Invest.*, **58**, 189–193
- Silverberg, M.J., Ahdieh, L., Muñoz, A., Anastos, K., Burk, R.D., Cu-Uvin, S., Duerr, A., Greenblatt, R.M., Klein, R.S., Massad, S., Minkoff, H., Muderspach, L., Palefsky, J., Piessens, E., Schuman, P., Watts, H. & Shah, K.V. (2002) The impact of HIV infection and immunodeficiency on human papillomavirus type 6 or 11 infection and on genital warts. *Sex. transm. Dis.*, **29**, 427–435
- Simoneau, M., LaRue, H. & Fradet, Y. (1999) Low frequency of human papillomavirus infection in initial papillary bladder tumors. *Urol. Res.*, **27**, 180–184
- Simons, A.M., Phillip, D.H. & Coleman, D.V. (1993) Damage to DNA in cervical epithelium related to smoking tobacco. *Br. med. J.*, **306**, 1444–1448
- Simons, A.M., Múgica van Herckenrode, C., Rodriguez, J.A., Maitland, N., Anderson, M., Phillips, D.H. & Coleman, D.V. (1995) Demonstration of smoking-related DNA damage in cervical epithelium and correlation with human papillomavirus type 16, using exfoliated cervical cells. *Br. J. Cancer*, **71**, 246–249
- Simonson, S.J., Difilippantonio, M.J. & Lambert, P.F. (2005) Two distinct activities contribute to human papillomavirus 16 E6's oncogenic potential. *Cancer Res.*, **65**, 8266–8273
- Sinclair, A.L., Nouri, A.M.E., Oliver, R.T.D., Sexton, C. & Dalglish, A.G. (1993) Bladder and prostate cancer screening for human papillomavirus by polymerase chain reaction: Conflicting results using different annealing temperatures. *Br. J. biomed. Sci.*, **50**, 350–354
- Sippola-Thiele, M., Hanahan, D. & Howley, P.M. (1989) Cell-heritable stages of tumor progression in transgenic mice harboring the bovine papillomavirus type 1 genome. *Mol. cell. Biol.*, **9**, 925–934
- Sitas, F., Pacella-Norman, R., Carrara, H., Patel, M., Ruff, P., Sur, R., Jentsch, U., Hale, M., Rowji, P., Saffer, D., Connor, M., Bull, D., Newton, R. & Beral, V. (2000) The spectrum of HIV-1 related cancers in South Africa. *Int. J. Cancer*, **88**, 489–492
- Six, C., Heard, I., Bergeron, C., Orth, G., Poveda, J.-D., Zagury, P., Cesbron, P., Crenn-Hébert, C., Pradinaud, R., Sobesky, M., Marty, C., Babut, M.-L., Malkin, J.-E., Odier, A., Fridmann, S.,

- Aubert, J.-P., Brunet, J.-B. & de Vincenzi, I. (1998) Comparative prevalence, incidence and short-term prognosis of cervical squamous intraepithelial lesions amongst HIV-positive and HIV-negative women. *AIDS*, **12**, 1047–1056
- Sizemore, N., Choo, C.K., Eckert, R.L. & Rorke, E.A. (1988) Transcriptional regulation of the EGF receptor promoter by HPV16 and retinoic acid in human ectocervical epithelial cells. *Exp. Cell Res.*, **244**, 349–356
- Sjö, N., Heegaard, S. & Prause, J.U. (2000) Conjunctival papilloma. A histologically based retrospective study. *Acta ophthalmol. scand.*, **78**, 663–666
- Sjö, N.C., Heegaard, S., Prause, J.U., von Buchwald, C. & Lindeberg, H. (2001) Human papillomavirus in conjunctival papilloma. *Br. J. Ophthalmol.*, **85**, 785–787
- Skiadopoulos, M.H. & McBride, A.A. (1998) Bovine papillomavirus type 1 genomes and the E2 transactivator protein are closely associated with mitotic chromatin. *J. Virol.*, **72**, 2079–2088
- Skinner, G.R.B. (1976) Transformation of primary hamster embryo fibroblasts by type 2 simplex virus: Evidence for a ‘hit and run’ mechanism. *Br. J. exp. Pathol.*, **57**, 361–376
- Slebos, R.J.C., Lee, M.H., Plunkett, B.S., Kessiss, T.D., Williams, B.O., Jacks, T., Hedrick, L., Kastan, M.B. & Cho, K.R. (1994) p53-Dependent G1 arrest involves pRB-related proteins and is disrupted by the human papillomavirus 16 E7 oncoprotein. *Proc. natl Acad. Sci. USA*, **91**, 5320–5324
- Slupetzky, K., Gambhira, R., Culp, T.D., Shafti-Keramat, S., Schellenbacher, C., Christensen, N.D., Roden, R.B.S. & Kirnbauer, R. (2007) A papillomavirus-like particle (VL) vaccine displaying HPV 16 L2 epitopes induces cross-neutralizing antibodies to HPV11. *Vaccine*, **25**, 2001–2010
- Smetana, Z., Keller, T., Leventon-Kriss, S., Huszar, M., Lindner, A., Mitrani-Rosenbaum, S., Mendelson, E. & Smetana, S. (1995) Presence of human papilloma virus in transitional cell carcinoma in Jewish population in Israel. *Cell. mol. Biol.*, **41**, 1017–1023
- Smith, G. van S. & Pemberton, F.A. (1934) The picture of very early carcinoma of the uterine cervix. *Surg. Gynecol. Obstet.*, **59**, 1–8
- Smith, P.P., Bryant, E.M., Kaur, P. & McDougall, J.K. (1989) Cytogenetic analysis of eight human papillomavirus immortalized human keratinocyte cell lines. *Int. J. Cancer*, **44**, 1124–1131
- Smith, S.E., Davis, I.C., Leshin, B., Fleischer, A.B., Jr, White, W.L. & Feldman, S.R. (1993) Absence of human papillomavirus in squamous cell carcinomas of nongenital skin from immunocompromised renal transplant patients. *Arch. Dermatol.*, **129**, 1585–1588
- Smith, E.M., Summersgill, K.F., Allen, J., Hoffman, H.T., McCulloch, T., Turek, L.P. & Haugen, T.H. (2000) Human papillomavirus and risk of laryngeal cancer. *Ann. Otol. Rhinol. Laryngol.*, **109**, 1069–1076
- Smith, J., Herrero, R., Erles, K., Grimm, D., Muñoz, N., Bosch, F.X., Tafur, L., Shah, K.V. & Schlehofer, J.R. (2001) Adeno-associated virus seropositivity and HPV-induced cervical cancer in Spain and Colombia. *Int. J. Cancer*, **94**, 520–526
- Smith, J.S., Herrero, R., Bosetti, C., Muñoz, N., Bosch, F.X., Eluf-Neto, J., Castellsagué, X., Meijer, C.J.L.M., Van den Brule, A.J.C., Franceschi, S. & Ashley, R. for the International Agency for Research on Cancer (IARC) Multicentric Cervical Cancer Group (2002a) Herpes simplex virus-2 as a human papillomavirus cofactor in the etiology of invasive cervical cancer. *J. natl Cancer Inst.*, **94**, 1604–1613
- Smith, J.S., Muñoz, N., Herrero, R., Eluf-Neto, J., Ngelangel, C., Franceschi, S., Bosch, F.X., Walboomers, J.M.M. & Peeling, R.W. (2002b) Evidence for *Chlamydia trachomatis* as a

- human papillomavirus cofactor in the etiology of invasive cervical cancer in Brazil and the Philippines. *J. infect. Dis.*, **185**, 324–331
- Smith, J.S., Green, J., de Gonzalez, A.B., Appleby, P., Peto, J., Plummer, M., Franceschi, S. & Beral, V. (2003) Cervical cancer and use of hormonal contraceptives: A systematic review. *Lancet*, **361**, 1159–1167
- Smith, E.M., Ritchie, J.M., Summersgill, K.F., Klussmann, J.P., Lee, J.H., Wang, D., Haugen, T.H. & Turek, L.P. (2004a) Age, sexual behavior and human papillomavirus infection in oral cavity and oropharyngeal cancers. *Int. J. Cancer*, **108**, 766–772
- Smith, E.M., Ritchie, J.M., Summersgill, K.F., Hoffman, H.T., Wang, D.H., Haugen, T.H. & Turek, L.P. (2004b) Human papillomavirus in oral exfoliated cells and risk of head and neck cancer. *J. natl Cancer Inst.*, **96**, 449–455
- Smith, J.S., Bosetti, C., Muñoz, N., Herrero, R., Bosch, F.X., Eluf-Neto, J., Meijer, C.J.L.M., van den Brule, A.J.C., Franceschi, S. & Peeling, R.W. for the International Agency for Research on Cancer Multicentric Cervical Cancer Group (2004) *Chlamydia trachomatis* and invasive cervical cancer: A pooled analysis of the IARC multicentric case–control study. *Int. J. Cancer*, **111**, 431–439
- Smits, H.L., Tieben, L.M., Tjong-A-Hung, S.P., Jebbink, M.F., Minnaar, R.P., Jansen, C.L. & ter Schegget, J. (1992) Detection and typing of human papillomaviruses present in fixed and stained archival cervical smears by a consensus polymerase chain reaction and direct sequence analysis allow the identification of a broad spectrum of human papillomavirus types. *J. gen. Virol.*, **73**, 3263–3268
- Smyth, L.J.C., van Poelgeest, M.I.E., Davidson, E.J., Kwappenberg, K.M.C., Burt, D., Sehr, P., Pawlita, M., Man, S., Hickling, J.K., Fiander, A.N., Tristram, A., Kitchener, H.C., Offringa, R., Stern, P.L. & van der Burg, S.H. (2004) Immunological responses in women with human papillomavirus type 16 (HPV-16)-associated anogenital intraepithelial neoplasia induced by heterologous prime-boost HPV-16 oncogene vaccination. *Clin. Cancer Res.*, **10**, 2954–2961
- Snijders, P.J.F., Cromme, F.V., van den Brule, A.J.C., Schrijnemakers, H.F.J., Snow, G.B., Meijer, C.J.L.M. & Walboomers, J.M.M. (1992a) Prevalence and expression of human papillomavirus in tonsillar carcinomas, indicating a possible viral etiology. *Int. J. Cancer*, **51**, 845–850
- Snijders, P.J.F., Meijer, C.J.L.M., van den Brule, A.J.C., Schrijnemakers, H.F.J., Snow, G.B. & Walboomers, J.M.M. (1992b) Human papilloma virus (HPV) type 16 and 33 E6/E7 region transcripts in tonsillar carcinomas can originate from both integrated and episomal HPV-DNA. *J. gen. Virol.*, **73**, 2059–2066
- Snijders, P.J.F., van den Brule, A.J.C. & Meijer, C.J.L.M. (2003) The clinical relevance of human papillomavirus testing: Relationship between analytical and clinical sensitivity. *J. Pathol.*, **201**, 1–6
- Snoeck, R., Bossens, M., Parent, D., Delaere, B., Degreef, H., Van Ranst, M., Noël, J.C., Wulfsohn, M.S., Rooney, J.F., Jaffe, H.S. & De Clercq, E. (2001) Phase II double-blind, placebo-controlled study of the safety and efficacy of cidofovir topical gel for the treatment of patients with human papillomavirus infection. *Clin. infect. Dis.*, **33**, 597–602
- Sobhani, I., Vuagnat, A., Walker, F., Vissuzaine, C., Mirin, B., Hervatin, F., Marmuse, J.-P., Crémieux, A.-C., Carbon, C., Henin, D., Lehy, T. & Mignon, M. (2001) Prevalence of high-grade dysplasia and cancer in the anal canal in human papillomavirus-infected individuals. *Gastroenterology*, **120**, 857–866

- Sobhani, I., Walker, F., Roudot-Thoraval, F., Abramowitz, L., Johanet, H., Henin, D., Delchier, J.-C. & Soulé, J.-C. (2004) Anal carcinoma: Incidence and effect of cumulative infections. *AIDS*, **18**, 1561–1569
- Soini, Y., Nuorva, K., Kamel, D., Pöllänen, R., Vähäkangas, K., Lehto, V.-P. & Pääkkö, P. (1996) Presence of human papillomavirus DNA and abnormal p53 protein accumulation in lung carcinoma. *Thorax*, **51**, 887–893
- Soler, C., Chardonnet, Y., Allibert, P., Euvrard, S., Mandrand, B. & Thivolet, J. (1992) Detection of multiple types of human papillomavirus in a giant condyloma from a grafted patient. Analysis by immunohistochemistry, in situ hybridisation, Southern blot and polymerase chain reaction. *Virus Res.*, **23**, 193–208
- Soler, C., Chardonnet, Y., Allibert, P., Euvrard, S., Schmitt, D. & Mandrand, B. (1993) Detection of mucosal human papillomavirus types 6/11 in cutaneous lesions from transplant recipients. *J. invest. Dermatol.*, **101**, 286–291
- Solomon, D., Davey, D., Kurman, R., Moriarty, A., O'Connor, D., Prey, M., Raab, S., Sherman, M., Wilbur, D., Wright, T. Jr & Young, N. for the Forum Group Members and the Bethesda 2001 Workshop (2002) The 2001 Bethesda System: Terminology for reporting results of cervical cytology. *J. Am. med. Assoc.*, **287**, 2114–2119
- Song, S., Gulliver, G.A. & Lambert, P.F. (1998) Human papillomavirus type 16 E6 and E7 oncogenes abrogate radiation-induced DNA damage responses in vivo through p53-dependent and p53-independent pathways. *Proc. natl Acad. Sci. USA*, **95**, 2290–2295
- Song, S., Pitot, H.C. & Lambert, P.F. (1999) The human papillomavirus type 16 E6 gene alone is sufficient to induce carcinomas in transgenic animals. *J. Virol.*, **73**, 5887–5893
- Song, S., Liem, A., Miller, J.A. & Lambert, P.F. (2000) Human papillomavirus types 16 E6 and E7 contribute differently to carcinogenesis. *Virology*, **267**, 141–150
- Sonnex, C., Strauss, S. & Gray, J.J. (1999) Detection of human papillomavirus DNA on the fingers of patients with genital warts. *Sex. transm. Infect.*, **75**, 317–319
- Sopracordevole, F., Campagnutta, E., Parin, A., Vaccher, E., Volpe, R. & Scarabelli, C. (1996) Squamous intraepithelial cervical lesions in human immunodeficiency virus-seropositive women. *J. reprod. Med.*, **41**, 586–590
- Sotlar, K., Selinka, H.-C., Menton, M., Kandolf, R & Bültmann, B. (1998) Detection of human papillomavirus type 16 E6/E7 oncogene transcripts in dysplastic and nondysplastic cervical scrapes by nested RT-PCR. *Gynecol. Oncol.*, **69**, 114–121
- Soto, U., Das, B.C., Lengert, M., Finzer, P., zur Hausen, H. & Rosl, F. (1999) Conversion of HPV 18 positive non-tumorigenic HeLa-fibroblast hybrids to invasive growth involves loss of TNF- α mediated repression of viral transcription and modification of the AP-1 transcription complex. *Oncogene*, **18**, 3187–3198
- Spinillo, A., Tenti, P., Baltaro, F., Piazzini, G., Iasci, A. & De Santolo, A. (1996) Cervical intraepithelial neoplasia in pregnant intravenous drug users infected with human immunodeficiency virus type 1. *Eur. J. Obstet. Gynecol. reprod. Biol.*, **68**, 175–178
- Spira, A.I., Marx, P.A., Patterson, B.K., Mahoney, J., Koup, R.A., Wolinsky, S.M. & Ho, D.D. (1996) Cellular targets of infection and route of viral dissemination after an intravaginal inoculation of simian immunodeficiency virus into rhesus macaques. *J. exp. Med.*, **183**, 215–225
- Spradbrow, P.B. & Hoffman, D. (1980) Bovine ocular squamous cell carcinoma. *Vet. Bull.*, **50**, 449–459

- Spradbrow, P.B., Samuel, J.L., Kelly, W.R. & Wood, A.L. (1987) Skin cancer and papillomaviruses in cattle. *J. comp. Pathol.*, **97**, 469–479
- Sprecher-Goldberger, S., Thiry, L., Lefèbvre, N., Dekegel, D. & de Halleux, F. (1971) Complement-fixation antibodies to adeno-associated viruses, adenoviruses, cytomegaloviruses and herpes simplex viruses in patients with tumors and in control individuals. *Am. J. Epidemiol.*, **94**, 351–358
- Srivenugopal, K.S. & Ali-Osman, F. (2002) The DNA repair protein, O⁶-methylguanine–DNA methyltransferase is a proteolytic target for the E6 human papillomavirus oncoprotein. *Oncogene*, **21**, 5940–5945
- Stacey, S.N., Bartholomew, J.S., Ghosh, A., Stern, P.L., Mackett, M. & Arrand, J.R. (1992) Expression of human papillomavirus type 16 E6 protein by recombinant baculovirus and use for detection of anti-E6 antibodies in human sera. *J. gen. Virol.*, **73**, 2337–2345
- Stacey, S.N., Ghosh, A., Bartholomew, J.S., Tindle, R.W., Stern, P.L., Mackett, M. & Arrand, J.R. (1993) Expression of human papillomavirus type 16 E7 protein by recombinant baculovirus and use for the detection of E7 antibodies in sera from cervical carcinoma patients. *J. med. Virol.*, **40**, 14–21
- Stamm, W. (1999) Chlamydia trachomatis infections of the adult. In: Holmes, K.K., ed., *Sexually Transmitted Diseases*, Third Ed., New York, McGraw-Hill, pp. 407–422
- Stanczuk, G.A., Kay, P., Sibanda, E., Allan, B., Chirara, M., Tswana, S.A., Bergstrom, S. & Williamson, A.-L. (2003) Typing of human papillomavirus in Zimbabwean patients with invasive cancer of the uterine cervix. *Acta obstet. gynecol. scand.*, **82**, 762–766
- Stanley, M.A. (2002) Imiquimod and the imidazoquinolones: Mechanism of action and therapeutic potential. *Clin. exp. Dermatol.*, **27**, 571–577
- Stanley, M. (2003) Genital human papillomavirus infections — Current and prospective therapies. *J. natl Cancer Inst. Monogr.*, **31**, 117–124
- Stark, L.A., Arends, M.J., McLaren, K.M., Benton, E.C., Shahidullah, H., Hunter, J.A.A. & Bird, C.C. (1994) Prevalence of human papillomavirus DNA in cutaneous neoplasms from renal allograft recipients supports a possible viral role in tumour promotion. *Br. J. Cancer*, **69**, 222–229
- Stark, S., Petridis, A.K., Ghim, S.-J., Jenson, A.B., Bouwes Bavinck, J.N., Gross, G., Stockfleth, E., Fuchs, P.G. & Pfister, H. (1998) Prevalence of antibodies against virus-like particles of *epidermodysplasia verruciformis*-associated HPV8 in patients at risk of skin cancer. *J. invest. Dermatol.*, **111**, 696–701
- Steele, J.C. & Gallimore, P.H. (1990) Humoral assays of human sera to disrupted and nondisrupted epitopes of human papillomavirus type 1. *Virology*, **174**, 388–398
- Steele, J.C., Mann, C.H., Rookes, S., Rollason, T., Murphy, D., Freeth, M.G., Gallimore, P.H. & Roberts, S. (2005) T-cell responses to human papillomavirus type 16 among women with different grades of cervical neoplasia. *Br. J. Cancer*, **93**, 248–259
- Steenbergen, R.D.M., Hermsen, M.A.J.A., Walboomers, J.M.M., Meijer, G.A., Baak, J.P.A., Meijer, C.J.L.M. & Snijders, P.J.L.F. (1998) Non-random allelic losses at 3p, 11p and 13q during HPV-mediated immortalization and concomitant loss of terminal differentiation of human keratinocytes. *Int. J. Cancer*, **76**, 412–417
- Steenbergen, R.D.M., Kramer, D., Braakhuis, B.J.M., Stern, P.L., Verheijen, R.H.M., Meijer, C.J.L.M. & Snijders, P.J.F. (2004) TSLC1 gene silencing in cervical cancer cell lines and cervical neoplasia. *J. natl Cancer Inst.*, **96**, 294–305

- Steger, G. & Corbach, S. (1997) Dose-dependent regulation of the early promoter of human papillomavirus type 18 by the viral E2 protein. *J. Virol.*, **71**, 50–58
- Steger, G. & Pfister, H. (1992) In vitro expressed HPV 8 E6 protein does not bind p53. *Arch Virol.*, **125**, 355–360
- Steinberg, B.M., Topp, W.C., Schneider, P.S. & Abramson, A.L. (1983) Laryngeal papillomavirus infection during clinical remission. *New Engl. J. Med.*, **308**, 1261–1264
- Steller, M.A. (2002) Cervical cancer vaccines: Progress and prospects. *J. Soc. gynecol. Invest.*, **9**, 254–264
- Steller, M.A., Gurski, K.J., Murakami, M., Daniel, R.W., Shah, K.V., Celis, E., Sette, A., Trimble, E.L., Park, R.C. & Marincola, F.M. (1998) Cell-mediated immunological responses in cervical and vaginal cancer patients immunized with a lipidated epitope of human papillomavirus type 16 E7. *Clin. Cancer Res.*, **4**, 2103–2109
- Stender, I.-M., Lock-Andersen, J. & Wulf, H.C. (1999) Recalcitrant hand and foot warts successfully treated with photodynamic therapy with topical 5-aminolaevulinic acid: A pilot study. *Clin. exp. Dermatol.*, **24**, 154–159
- Stenlund, A., Moreno-Lopez, J., Ahola, H. & Pettersson, U. (1983) European elk papillomavirus: Characterization of the genome, induction of tumors in animals, and transformation *in vitro*. *J. Virol.*, **48**, 370–376
- Stephens, R.S. (2003) The cellular paradigm of chlamydial pathogenesis. *Trends Microbiol.*, **11**, 44–51
- Stern, P.L., Brown, M., Stacey, S.N., Kitchener, H.C., Hampson, I., Abdel-Hady, E.-S. & Moore, J.V. (2000) Natural HPV immunity and vaccination strategies. *J. clin. Virol.*, **19**, 57–66
- Stevens, J.G. & Wettstein, F.O. (1979) Multiple copies of Shope virus DNA are present in cells of benign and malignant non-virus-producing neoplasms. *J. Virol.*, **30**, 891–898
- St Louis, M.E., Icenogle, J.P., Manzila, T., Kamenga, M., Ryder, R.W., Heyward, W.L. & Reeves, W.C. (1993) Genital types of papillomavirus in children of women with HIV-1 infection in Kinshasa, Zaire. *Int. J. Cancer*, **54**, 181–184
- Stocco dos Santos, R.C., Lindsey, C.J., Ferraz, O.P., Pinto, J.R., Mirandola, R.S., Benesi, F.J., Birgel, E.H., Braganca Pereira, C.A. & Becak, W. (1998) Bovine papillomavirus transmission and chromosomal aberrations: An experimental model. *J. gen. Virol.*, **79**, 2127–2135
- Stockfleth, E., Röwert, J., Arndt, R., Christophers, E. & Meyer, T. (2000) Detection of human papillomavirus and response to topical 5% imiquimod in a case of stucco keratosis. *Br. J. Dermatol.*, **143**, 846–850
- Stoler, M.H. & Broker, T.R. (1986) In situ hybridization detection of human papillomavirus DNAs and messenger RNAs in genital condylomas and a cervical carcinoma. *Hum. Pathol.*, **17**, 1250–1258
- Stoler, M.H., Wolinsky, S.M., Whitbeck, A., Broker, T.R. & Chow, L.T. (1989) Differentiation-linked human papillomavirus types 6 and 11 transcription in genital condylomata revealed by *in situ* hybridization with message-specific RNA probes. *Virology*, **172**, 331–340
- Stone, M.S., Noonan, C.A., Tschien, J. & Bruce, J. (1987) Bowen's disease of the feet. Presence of HPV 16 DNA in tumour tissue. *Arch. Dermatol.*, **123**, 1517–1520
- Stoppler, M.C., Straight, S.W., Tsao, G., Schlegel, R. & McCance, D.J. (1996) The E5 gene of HPV-16 enhances keratinocyte immortalization by full-length DNA. *Virology*, **223**, 251–254

- Stöppler, H., Stöppler, M.C., Johnson, E., Simbulan-Rosenthal, C.M., Smulson, M.E., Iyer, S., Rosenthal, D.S. & Schlegel, R. (1998) The E7 protein of human papillomavirus type 16 sensitizes primary human keratinocytes to apoptosis. *Oncogene*, **17**, 1207–1214
- Storey, A., Pim, D., Murray, A., Osborn, K., Banks, L. & Crawford, L. (1988) Comparison of the in vitro transforming activities of human papillomavirus types. *EMBO J.*, **7**, 1815–1820
- Stragier, I., Snoeck, R., De Clercq, E., Van den Oord, J.J., Van Ranst, M. & De Greef, H. (2002) Local treatment of HPV-induced skin lesions by cidofovir. *J. med. Virol.*, **67**, 241–245
- Straight, S.W., Hinkle, P.M., Jewers, R.J. & McCance, D.J. (1993) The E5 oncoprotein of human papillomavirus type 16 transforms fibroblasts and effects the downregulation of the epidermal growth factor receptor in keratinocytes. *J. Virol.*, **67**, 4521–4532
- Straight, S.W., Herman, B. & McCance, D.J. (1995) The E5 oncoprotein of human papillomavirus type 16 inhibits the acidification of endosomes in human keratinocytes. *J. Virol.*, **69**, 3185–3192
- Strand, A., Rylander, E., Wilander, E., Zehbe, I. (1995) HPV infection in male partners of women with squamous intraepithelial neoplasia and/or high-risk HPV. *Acta dermat. venereol.*, **75**, 312–316
- Strand, A., Andersson, S., Zehbe, I. & Wilander, E. (1999) HPV prevalence in anal warts tested with the MY09/MY11 SHARP Signal system. *Acta dermat. venereol.*, **79**, 226–229
- Stratton, P., Gupta, P., Riestler, K., Fox, H., Zorrilla, C., Tuomala, R., Eriksen, N., Vajaranant, M., Minkoff, H. & Fowler, M.G. (1999) Cervical dysplasia on cervicovaginal Papanicolaou smear among HIV-1-infected pregnant and nonpregnant women. Women and Infants Transmission Study. *J. Acquir. Immune Defic. Syndr. Hum. Retrovirol.*, **20**, 300–307
- Stremlau, A., Gissmann, L., Ikenberg, H., Stark, M., Bannasch, P. & zur Hausen, H. (1985) Human papillomavirus type 16 related DNA in an anaplastic carcinoma of the lung. *Cancer*, **55**, 1737–1740
- Strickler, H.D. & Goedert, J.J. (2001) Sexual behavior and evidence for an infectious cause of prostate cancer. *Epidemiol. Rev.*, **23**, 144–151
- Strickler, H.D., Hildesheim, A., Viscidi, R.P., Shah, K.V., Goebel, B., Drummond, J., Waters, D., Sun, Y., Hubbert, N.L., Wacholder, S., Brinton, L.A., Han, C.-L., Nasca, P.C., McClimens, R., Turk, K., Devairakkam, V., Leitman, S., Martin, C. & Schiller, J.T. (1997) Interlaboratory agreement among results of human papillomavirus type 16 enzyme-linked immunosorbent assays. *J. clin. Microbiol.*, **35**, 1751–1756
- Strickler, H.D., Burk, R., Shah, K., Viscidi, R., Jackson, A., Pizza, G., Bertoni, F., Schiller, J.T., Manns, A., Metcalf, R., Qu, W. & Goedert, J.J. (1998a) A multifaceted study of human papillomavirus and prostate carcinoma. *Cancer*, **82**, 1118–1125
- Strickler, H.D., Schiffman, M.H., Shah, K.V., Rabkin, C.S., Schiller, J.T., Wacholder, S., Clayman, B. & Viscidi, R.P. (1998b) A survey of human papillomavirus 16 antibodies in patients with epithelial cancers. *Eur. J. Cancer Prev.*, **7**, 305–313
- Strickler, H.D., Kirk, G.D., Figueroa, J.P., Ward, E., Braithwaite, A.R., Escoffery, C., Drummond, J., Goebel, B., Waters, D., McClimens, R. & Manns, A. (1999a) HPV 16 antibody prevalence in Jamaica and the United States reflects differences in cervical cancer rates. *Int. J. Cancer*, **80**, 339–344
- Strickler, H.D., Viscidi, R., Escoffery, C., Rattray, C., Kotloff, K.L., Goldberg, J., Manns, A., Rabkin, C., Daniel, R., Hanchard, B., Brown, C., Hutchinson, M., Zanizer, D., Palefsky, J., Burk, R.D., Cranston, B., Clayman, B. & Shah, K.V. (1999b) Adeno-associated virus and development of cervical neoplasia. *J. med. Virol.*, **59**, 60–65

- Strickler, H.D., Palefsky, J.M., Shah, K.V., Anastos, K., Klein, R.S., Minkoff, H., Duerr, A., Massad, L.S., Celentano, D.D., Hall, C., Fazzari, M., Cu-Uvin, S., Bacon, M., Schuman, P., Levine, A.M., Durante, A.J., Gange, S., Melnick, S. & Burk, R.D. (2003) Human papillomavirus type 16 and immune status in human immunodeficiency virus-seropositive women. *J. natl Cancer Inst.*, **95**, 1062–1071
- Strickler, H.D., Burk, R.D., Fazzari, M., Anastos, K., Minkoff, H., Massad, L.S., Hall, C., Bacon, M., Levine, A.M., Watts, D.H., Silverberg, M.J., Xue, X., Schlecht, N.F., Melnick, S. & Palefsky, J.M. (2005) Natural history and possible reactivation of human papillomavirus in human immunodeficiency virus-positive women. *J. natl Cancer Inst.*, **97**, 577–586
- Strome, S.E., Savva, A., Brissett, A.E., Gostout, B.S., Lewis, J., Clayton, A.C., McGovern, R., Weaver, A.L., Persing, D. & Kasperbauer, J.L. (2002) Squamous cell carcinoma of the tonsils: A molecular analysis of HPV associations. *Clin. Cancer Res.*, **8**, 1093–1100
- Struijk, L., Bouwes Bavinck, J.N., Wanningen, P., van der Meijden, E., Westendorp, R.G.J., Ter Schegget, J. & Feltkamp, M.C.W. (2003) Presence of human papillomavirus DNA in plucked eyebrow hairs is associated with a history of cutaneous squamous cell carcinoma. *J. invest. Dermatol.*, **121**, 1531–1535
- Stubenrauch, F. & Pfister, H. (1994) Low-affinity E2-binding site mediates downmodulation of E2 transactivation of the human papillomavirus type 8 late promoter. *J. Virol.*, **68**, 6959–6966
- Stubenrauch, F., Colbert, A.M. & Laimins, L.A. (1998) Transactivation by the E2 protein of oncogenic human papillomavirus type 31 is not essential for early and late viral functions. *J. Virol.*, **72**, 8115–8123
- Stubenrauch, F., Hummel, M., Iftner, T. & Laimins, L.A. (2000) The E8^{E2C} protein, a negative regulator of viral transcription and replication, is required for extrachromosomal maintenance of human papillomavirus type 31 in keratinocytes. *J. Virol.*, **74**, 1178–1186
- Stümel, W. & Bernard, H.-U. (1999) The chromatin structure of the long control region of human papillomavirus type 16 represses viral oncoprotein expression. *J. Virol.*, **73**, 1918–1930
- Stümel, W., Huang, Z., Tan, S.-H., O'Connor, M.J. & Bernard, H.-U. (2000) Nuclear matrix attachment regions of human papillomavirus type 16 repress or activate the E6 promoter, depending on the physical state of the viral DNA. *J. Virol.*, **74**, 2489–2501
- Su, P.-F., Chiang, S.-Y., Wu, C.-W. & Wu, F.Y.-H. (2000). Adeno-associated virus major Rep78 protein disrupts binding of TATA-binding protein to the p97 promoter of human papillomavirus type 16. *J. Virol.*, **74**, 2459–2465
- Sugase, M. & Matsukura, T. (1997) Distinct manifestations of human papillomaviruses in the vagina. *Int. J. Cancer*, **72**, 412–415
- Sugiyama, M., Bhawal, U.K., Dohmen, T., Ono, S., Miyachi, M. & Ishikawa, T. (2003) Detection of human papillomavirus-16 and HPV-18 DNA in normal, dysplastic, and malignant oral epithelium. *Oral Surg. oral Med. oral Pathol. oral Radiol. Endod.*, **95**, 594–600
- Sukvirach, S., Smith, J.S., Tunsakul, S., Muñoz, N., Kesaratat, V., Opasatian, O., Chichareon, S., Kaenploy, V., Ashley, R., Meijer, C.J.L.M., Snijders, P.J.F., Coursaget, P., Franceschi, S. & Herrero, R. (2003) Population-based human papillomavirus prevalence in Lampang and Songkla, Thailand. *J. infect. Dis.*, **187**, 1246–1256
- Summersgill, K.F., Smith, E.M., Levy, B.T., Allen, J.M., Haugen, T.H. & Turek, L.P. (2001) Human papillomavirus in the oral cavities of children and adolescents. *Oral Surg. oral Med. oral Pathol. oral Radiol. Endod.*, **91**, 62–69

- Sun, Y., Eluf-Neto, J., Bosch, F.X., Muñoz, N., Booth, M., Walboomers, J.M.M., Shah, K.V. & Viscidi, R.P. (1994a) Human papillomavirus-related serological markers of invasive cervical carcinoma in Brazil. *Cancer Epidemiol. Biomarkers Prev.*, **3**, 341–347
- Sun, Y., Shah, K.V., Müller, M., Muñoz, N., Bosch, X.F. & Viscidi, R.P. (1994b) Comparison of peptide enzyme-linked immunosorbent assay and radioimmunoprecipitation assay with in vitro-translated proteins for detection of serum antibodies to human papillomavirus type 16 E6 and E7 proteins. *J. clin. Microbiol.*, **32**, 2216–2220
- Sun, X.-W., Ellerbrock, T.V., Lungu, O., Chiasson, M.A., Bush, T.J. & Wright, T.C., Jr (1995) Human papillomavirus infection in human immunodeficiency virus-seropositive women. *Obstet. Gynecol.*, **85**, 680–686
- Sun, Y., Hildesheim, A., Brinton, L.A., Nasca, P.C., Trimble, C.L., Kurman, R.J., Viscidi, R.P. & Shah, K.V. (1996) Human papillomavirus-specific serologic response in vulvar neoplasia. *Gynecol. Oncol.*, **63**, 200–203
- Sun, X.-W., Kuhn, L., Ellerbrock, T.V., Chiasson, M.A., Bush, T.J. & Wright, T.C., Jr (1997) Human papillomavirus infection in women infected with the human immunodeficiency virus. *New Engl. J. Med.*, **337**, 1343–1349
- Sun, Y., Han, H. & McCance, D.J. (1998) Active domains of human papillomavirus type 11 E1 protein for origin replication. *J. gen. Virol.*, **79**, 1651–1658
- Sundberg, J.P., Junge, R.E. & el Shazly, M.O. (1985) Oral papillomatosis in New Zealand white rabbits. *Am. J. vet. Res.*, **46**, 664–668
- Sundberg, J.P., O'Banion, M.K., Shima, A., Knupp, C. & Reichmann, M.E. (1988) Papillomas and carcinomas associated with a papillomavirus in European harvest mice (*Micromys minutus*). *Vet. Pathol.*, **25**, 356–361
- Sur, M., Cooper, K. & Allard, U. (2001) Investigation of human papillomavirus in transitional cell carcinomas of the urinary bladder in South Africa. *Pathology*, **33**, 17–20
- Surentheran, T., Harwood, C.A., Spink, P.J., Sinclair, A.L., Leigh, I.M., Proby, C.M., McGregor, J.M. & Breuer, J. (1998) Detection and typing of human papillomaviruses in mucosal and cutaneous biopsies from immunosuppressed and immunocompetent patients and patients with epidermodysplasia verruciformis: A unified diagnostic approach. *J. clin. Pathol.*, **51**, 606–610
- Sutton, A.J., Abrams, K.R., Jones, D.R., Sheldon, T.A. & Song, F. (2000) *Methods for Meta-Analysis in Medical Research*, Wiley, Chichester
- Suzich, J.A., Ghim, S.-J., Palmer-Hill, F.J., White, W.I., Tamura, J.K., Bell, J.A., Newsome, J.A., Jenson, A.B. & Schlegel, R. (1995) Systemic immunization with papillomavirus L1 protein completely prevents the development of viral mucosal papillomas. *Proc. natl Acad. Sci. USA*, **92**, 11553–11557
- Suzuk, L., Noffsinger, A.E., Hui, Y.Z. & Fenoglio-Preiser, C.M. (1996) Detection of human papillomavirus in esophageal squamous cell carcinoma. *Cancer*, **78**, 704–710
- Suzuki, T., Shidara, K., Hara, F. & Nakajima, T. (1994) High frequency of p53 abnormality in laryngeal cancers of heavy smokers and its relation to human papillomavirus infection. *Jpn. J. Cancer Res.*, **85**, 1087–1093
- Suzuki, H., Komiya, A., Aida, S., Ito, H., Yatani, R. & Shimazaki, J. (1996) Detection of human papillomavirus DNA and p53 gene mutations in human prostate cancer. *Prostate*, **28**, 318–324
- Sverdrup, F. & Khan, S.A. (1995) Two E2 binding sites alone are sufficient to function as the minimal origin of replication of human papillomavirus type 18 DNA. *J. Virol.*, **69**, 1319–1323

- Swan, D.C., Tucker, R.A., Holloway, B.P. & Icenogle, J.P. (1997) A sensitive, type-specific, fluorogenic probe assay for detection of human papillomavirus DNA. *J. clin. Microbiol.*, **35**, 886–891
- Swindle, C.S. & Engler, J.A. (1998) Association of the human papillomavirus type 11 E1 protein with histone H1. *J. Virol.*, **72**, 1994–2001
- Swinehart, J.M., Skinner, R.B., McCarty, J.M., Miller, B.H., Tyring, S.K., Korey, A. & Orenberg, E.K. (1997a) Development of intralesional therapy with fluorouracil/adrenaline injectable gel for management of condylomata acuminata: Two phase II clinical studies. *Genitourin. Med.*, **73**, 481–487
- Swinehart, J.M., Sperling, M., Phillips, S., Kraus, S., Gordon, S., McCarty, J.M., Webster, G.F., Skinner, R., Korey, A. & Orenberg, E.K. (1997b) Intralesional fluorouracil/epinephrine injectable gel for treatment of condylomata acuminata. A phase 3 clinical study. *Arch. Dermatol.*, **133**, 67–73
- Syed, T.A., Cheema, K.M., Khayyami, M., Ahmad, S.A., Ahmad, S.H., Ahmad, S. & Ahmad, S.A. (1995) Human leukocyte interferon-alpha versus podophyllotoxin in cream for the treatment of genital warts in males. A placebo-controlled, double-blind, comparative study. *Dermatology*, **191**, 129–132
- Syed, T.A., Qureshi, Z.A., Ahmad, S.A. & Ali, S.M. (2000) Management of intravaginal warts in women with 5-fluorouracil (1%) in vaginal hydrophilic gel: A placebo-controlled double-blind study. *Int. J. STD AIDS*, **11**, 371–374
- Syrjänen, K.J., Pyrhönen, S. & Syrjänen, St.M. (1983) Evidence suggesting human papillomavirus (HPV) etiology for the squamous cell papilloma of the paranasal sinus. *Arch. Geschwulstforsch.*, **53**, 77–82
- Syrjänen, S.M., von Krogh, G. & Syrjänen, K.J. (1987a) Detection of human papillomavirus DNA in anogenital condylomata in men using in situ DNA hybridisation applied to paraffin sections. *Genitourin. Med.*, **63**, 32–39
- Syrjänen, S., Happonen, R.-P., Virolainen, E., Siivonen, L. & Syrjänen, K. (1987b) Detection of human papillomavirus (HPV) structural antigens and DNA types in inverted papillomas and squamous cell carcinomas of the nasal cavities and paranasal sinuses. *Acta Otolaryngol.*, **104**, 334–341
- Syrjänen, K., Mäntyjarvi, R., Väyrynen, M., Syrjänen, S., Parkkinen, S., Yliskoski, M., Saarikoski, S. & Castrén, O. (1987c) Human papillomavirus (HPV) infections involved in the neoplastic process of the uterine cervix as established by prospective follow-up of 513 women for two years. *Eur. J. gynaecol. Oncol.*, **8**, 5–16
- Syvertson, J.T. (1952) The pathogenesis of the rabbit papilloma-to-carcinoma sequence. *Ann. N.Y. Acad. Sci.*, **54**, 1126–1140
- Szabó, I., Sepp, R., Nakamoto, K., Maeda, M., Sakamoto, H. & Uda, H. (1994) Human papillomavirus not found in squamous and large cell lung carcinomas by polymerase chain reaction. *Cancer*, **73**, 2740–2744
- Tachezy, R., Duson, G., Rector, A., Jenson, A.B., Sundberg, J.P. & Van Ranst, M. (2002a) Cloning and genomic characterization of *Felis domesticus* papillomavirus type 1. *Virology*, **301**, 313–321
- Tachezy, R., Rector, A., Havelkova, M., Wollants, E., Fiten, P., Opdenakker, G., Jenson, A.B., Sundberg, J.P. & Van Ranst, M. (2002b) Avian papillomaviruses: The parrot *Psittacus erithacus* papillomavirus (PePV) genome has a unique organization of the early protein region and is phylogenetically related to the chaffinch papillomavirus. *BMC Microbiol.*, **2**, 19

- Takac, I. (1998) The frequency of bacterial and yeast infection in women with different grades of cervical intraepithelial neoplasia (CIN). *Eur. J. Obstet. Gynecol. reprod. Biol.*, **80**, 231–234
- Takizawa, S., Nakagawa, S., Nakagawa, K., Yasugi, T., Fujii, T., Kugu, K., Yano, T., Yoshikawa, H. & Taketani, Y. (2003) Abnormal FHIT expression is an independent poor prognostic factor for cervical cancer. *Br. J. Cancer*, **88**, 1213–1216
- Talamini, G., Capelli, P., Zamboni, G., Mastromauro, M., Pasetto, M., Castagnini, A., Angelini, G., Bassi, C. & Scarpa, A. (2000) Alcohol, smoking and papillomavirus infection as risk factors for esophageal squamous-cell papilloma and esophageal squamous-cell carcinoma in Italy. *Int. J. Cancer*, **86**, 874–878
- Tamim, H., Finan, R.R., Sharida, H.E., Rashid, M. & Almawi, W.Y. (2002) Cervicovaginal co-infections with human papillomavirus and Chlamydia trachomatis. *Diagn. Microbiol. Infect. Dis.*, **43**, 277–281
- Tan, C.-H., Tachezy, R., van Ranst, M., Chan, S.-Y., Bernard, H.-U. & Burk, R.D. (1994) The *Mastomys natalensis* papillomavirus: Nucleotide sequence, genome organization, and phylogenetic relationship of a rodent papillomavirus involved in tumorigenesis of cutaneous epithelia. *Virology*, **198**, 534–541
- Tang, C.-K., Shermeta, D.W. & Wood, C. (1978) Congenital condylomata acuminata. *Am. J. Obstet. Gynecol.*, **131**, 912–913
- Tanigaki, T., Kanda, R., Yutsudo, M. & Hakura, A. (1986) Epidemiological aspects of epidermodysplasia verruciformis in Japan. *Jpn. J. Cancer Res.*, **77**, 896–900
- Taniguchi, A., Kikuchi, K., Nagata, K. & Yasumoto, S. (1993) A cell-type-specific transcription enhancer of type 16 human papillomavirus (HPV 16)-P₉₇ promoter is defined with HPV-associated cellular events in human epithelial cell lines. *Virology*, **195**, 500–510
- Tarkowski, T.A., Rajeevan, M.S., Lee, D.R. & Unger, E.R. (2001) Improved detection of viral RNA isolated from liquid-based cytology samples. *Mol. Diagn.*, **6**, 125–130
- Tate, D.R. & Anderson, R.J. (2002) Recrudescence of cervical dysplasia among women who are infected with the human immunodeficiency virus: A case-control analysis. *Am. J. Obstet. Gynecol.*, **186**, 880–882
- Teifke, J.P., Löhr, C.V. & Shirasawa, H. (1998) Detection of canine oral papillomavirus-DNA in canine oral squamous cell carcinomas and p53 overexpressing skin papillomas of the dog using the polymerase chain reaction and non-radioactive in situ hybridization. *Vet. Microbiol.*, **60**, 119–130
- Tekin, M.I., Tuncer, S., Aki, F.T., Bilen, C.Y., Aygün, C. & Özen, H. (1999) Human papillomavirus associated with bladder carcinoma? Analysis by polymerase chain reaction. *Int. J. Urol.*, **6**, 184–186
- Temmerman, M., Tyndall, M.W., Kidula, N., Claeys, P., Muchiri, L. & Quint, W. (1999) Risk factors for human papillomavirus and cervical precancerous lesions, and the role of concurrent HIV-1 infection. *Int. J. Gynecol. Obstet.*, **65**, 171–181
- Tenti, P., Zappatore, R., Romagnoli, S., Civardi, E., Giunta, P., Scelsi, R., Stella, G. & Carnevali, L. (1996) p53 Overexpression and human papillomavirus infection in transitional cell carcinoma of the urinary bladder: Correlation with histological parameters. *J. Pathol.*, **178**, 65–70
- Tenti, P., Zappatore, R., Migliora, P., Spinillo, A., Belloni, C. & Carnevali, L. (1999) Perinatal transmission of human papillomavirus from gravidas with latent infections. *Obstet. Gynecol.*, **93**, 475–479

- Teokharov, B.A. (1969) Non-gonococcal infections of the female genitalia. *Br. J. vener. Dis.*, **45**, 334–340
- Terai, M., DeSalle, R. & Burk, R.D. (2002) Lack of canonical E6 and E7 open reading frames in bird papillomaviruses: *Fringilla coelebs* papillomavirus and *Psittacus erithacus timneh* papillomavirus. *J. Virol.*, **76**, 10020–10023
- Terris, M.K. & Peehl, D.M. (1997) Human papillomavirus detection by polymerase chain reaction in benign and malignant prostate tissue is dependent on the primer set utilized. *Urology*, **50**, 150–156
- Thain, A., Jenkins, O., Clarke, A.R. & Gaston, K. (1996) CpG methylation directly inhibits binding of the human papillomavirus type 16 E2 protein to specific DNA sequences. *J. Virol.*, **70**, 7233–7235
- Thomas, M. & Banks, L. (1998) Inhibition of Bak-induced apoptosis by HPV-18 E6. *Oncogene*, **17**, 2943–2954
- Thomas, M. & Banks, L. (1999) Human papillomavirus (HPV) E6 interactions with Bak are conserved amongst E6 proteins from high and low risk HPV types. *J. gen. Virol.*, **80**, 1513–1517
- Thomas, J.T. & Laimins, L.A. (1998) Human papillomavirus oncoproteins E6 and E7 independently abrogate the mitotic spindle checkpoint. *J. Virol.*, **72**, 1131–1137
- Thomas, J.T., Hubert, W.G., Ruesch, M.N. & Laimins, L.A. (1999) Human papillomavirus type 31 oncoproteins E6 and E7 are required for the maintenance of episomes during the viral life cycle in normal human keratinocytes. *Proc. natl Acad. Sci. USA*, **96**, 8449–8454
- Thomas, K.K., Hughes, J.P., Kuypers, J.M., Kiviat, N.B., Lee, S.-K., Adam, D.E. & Koutsky LA. (2000) Concurrent and sequential acquisition of different genital human papillomavirus types. *J. infect. Dis.*, **182**, 1097–1102
- Thomas, D.B., Ray, R.M., Kuypers, J., Kiviat, N., Koetsawang, A., Ashley, R.L., Qin, Q. & Koetsawang, S. (2001a) Human papillomaviruses and cervical cancer in Bangkok. III. The role of husbands and commercial sex workers. *Am. J. Epidemiol.*, **153**, 740–748
- Thomas, D.B., Ray, R.M., Koetsawang, A., Kiviat, N., Kuypers, J., Qin, Q., Ashley, R.L. & Koetsawang, S. (2001b) Human papillomaviruses and cervical cancer in Bangkok. I. Risk factors for invasive cervical carcinomas with human papillomavirus types 16 and 18 DNA. *Am. J. Epidemiol.*, **153**, 723–731
- Thomas, D.B., Qin, Q., Kuypers, J., Kiviat, N., Ashley, R.L., Koetsawang, A., Ray, R.M. & Koetsawang, S. (2001c) Human papillomaviruses and cervical cancer in Bangkok. II. Risk factors for in situ and invasive squamous cell cervical carcinomas. *Am. J. Epidemiol.*, **153**, 732–739
- Thomas, J.O., Herrero, R., Omigbodun, A.A., Ojemakinde, K., Ajayi, I.O., Fawole, A., Oladepo, O., Smith, J.S., Arslan, A., Muñoz, N., Snijders, P.J.F., Meijer, C.J.L.M. & Franceschi, S. (2004) Prevalence of papillomavirus infection in women in Ibadan, Nigeria: A population-based study. *Br. J. Cancer*, **90**, 638–645
- Thompson, M.P. & Kurzrock, R. (2004) Epstein-Barr virus and cancer. *Clin. Cancer Res.*, **10**, 803–821
- Thompson, C.H., Rose, B.R. & Elliott, P.M. (1994) Cytomegalovirus and cervical cancer: Failure to detect a direct association or an interaction with human papillomaviruses. *Gynecol. Oncol.*, **54**, 40–46

- Thompson, H.S.G., Davies, M.L., Holding, F.P., Fallon, R.E., Mann, A.E., O'Neill, T. & Roberts, J.S.C. (1999) Phase I safety and antigenicity of TA-GW: A recombinant HPV6 L2E7 vaccine for the treatment of genital warts. *Vaccine*, **17**, 40–49
- Thompson, D.A., Zacny, V., Belinsky, G.S., Classon, M., Jones, D.L., Schlegel, R. & Münger, K. (2001) The HPV E7 oncoprotein inhibits tumor necrosis factor α -mediated apoptosis in normal human fibroblasts. *Oncogene*, **20**, 3629–3640
- Thorland, E.C., Myers, S.L., Gostout, B.S. & Smith, D.I. (2003) Common fragile sites are preferential targets for HPV16 integration in cervical tumors. *Oncogene*, **22**, 1225–1237
- Tideman, R.L., Thompson, C., Rose, B., Gilmour, S., Marks, C., van Beek, I., Berry, G., O'Connor, C. & Mindel, A. (2003) Cervical human papillomavirus infections in commercial sex workers — Risk factors and behaviours. *Int. J. STD AIDS*, **14**, 840–847
- Tieben, L.M., Berkhout, R.J.M., Smits, H.L., Bouwes Bavinck, J.N., Vermeer, B.J., Bruijn, J.A., van der Woude, F.J. & ter Schegget, J. (1994) Detection of epidermodysplasia verruciformis-like human papillomavirus types in malignant and premalignant skin lesions of renal transplant recipients. *Br. J. Dermatol.*, **131**, 226–230
- Tilbrook, P.A., Sterrett, G. & Kulski, J.K. (1992) Detection of papillomaviral-like DNA sequences in premalignant and malignant perineal lesions of sheep. *Vet. Microbiol.*, **31**, 327–341
- Tindle, R.W. & Frazer, I.H. (1994) Immune response to human papillomaviruses and the prospects for human papillomavirus-specific immunisation. *Curr. Top. Microbiol. Immunol.*, **186**, 217–253
- Tindle, R.W., Fernando, G.J.P., Sterling, J.C. & Frazer, I.H. (1991) A 'public' T-helper epitope of the E7 transforming protein of human papillomavirus 16 provides cognate help for several E7 B-cell epitopes from cervical cancer-associated human papillomavirus genotypes. *Proc. natl Acad. Sci. USA*, **88**, 5887–5891
- Tindle, R.W., Herd, K., Doan, T., Bryson, G., Leggatt, G.R., Lambert, P., Frazer, I.H. & Street, M. (2001) Nonspecific down-regulation of CD8⁺ T-cell responses in mice expressing human papillomavirus type 16 E7 oncoprotein from the keratin-14 promoter. *J. Virol.*, **75**, 5985–5997
- Titolo, S., Pelletier, A., Pulichino, A.-M., Brault, K., Wardrop, E., White, P.W., Cordingley, M.G. & Archambault, J. (2000) Identification of domains of the human papillomavirus type 11 E1 helicase involved in oligomerization and binding to the viral origin. *J. Virol.*, **74**, 7349–7361
- Titolo, S., Brault, K., Majewski, J., White, P.W. & Archambault, J. (2003) Characterization of the minimal DNA binding domain of the human papillomavirus e1 helicase: Fluorescence anisotropy studies and characterization of a dimerization-defective mutant protein. *J. Virol.*, **77**, 5178–5191
- Tobery, T.W., Smith, J.F., Kuklin, N., Skulsky, D., Ackerson, C., Huang, L., Chen, L., Cook, J.C., McClements, W.L. & Jansen, K.U. (2003) Effect of vaccine delivery system on the induction of HPV16L1-specific humoral and cell-mediated immune responses in immunized rhesus macaques. *Vaccine*, **21**, 1539–1547
- Tobiasch, E., Rabreau, M., Geletneky, K., Larue-Charlus, S., Severin, F., Becker, N. & Schlehofer, J.R. (1994). Detection of adeno-associated virus DNA in human genital tissue and in material from spontaneous abortion. *J. Med. Virol.*, **44**, 215–222
- Todd, R.W., Etherington, I.J. & Luesley, D.M. (2002) The effects of 5% imiquimod cream on high-grade vulval intraepithelial neoplasia. *Gynecol. Oncol.*, **85**, 67–70
- Todd, R.W., Roberts, S., Mann, C.H., Luesley, D.M., Gallimore, P.H. & Steele, J.C. (2004) Human papillomavirus (HPV) type 16-specific CD8⁺ T cell responses in women with high grade vulvar intraepithelial neoplasia. *Int. J. Cancer*, **108**, 857–862

- Togawa, K., Jaskiewicz, K., Takahashi, H., Meltzer, S.J. & Rustgi, A.K. (1994) Human papillomavirus DNA sequences in esophagus squamous cell carcinoma. *Gastroenterology*, **107**, 128–136
- Toh, Y., Kuwano, H., Tanaka, S., Baba, K., Matsuda, H., Sugimachi, K. & Mori, R. (1992) Detection of human papillomavirus DNA in esophageal carcinoma in Japan by polymerase chain reaction. *Cancer*, **70**, 2234–2238
- Tomakidi, P., Cheng, H., Kohl, A., Komposch, G. & Alonso, A. (2000) Modulation of the epidermal growth factor receptor by the human papillomavirus type 16 E5 protein in raft cultures of human keratinocytes. *Eur. J. Cell Biol.*, **79**, 407–412
- Tomasini, C., Aloï, F. & Pippione, M. (1993) Seborrheic keratosis-like lesions in epidermodysplasia verruciformis. *J. cutan. Pathol.*, **20**, 237–241
- Tommasino, M., Adamczewski, J.P., Carlotti, F., Barth, C.F., Manetti, R., Contorni, M., Cavaliere, F., Hunt, T. & Crawford, L. (1993) HPV16 E7 protein associates with the protein kinase p33^{CDK2} and cyclin A. *Oncogene*, **8**, 195–202
- Tommasino, M., Accardi, R., Caldeira, S., Dong, W., Malanchi, I., Smet, A. & Zehbe, I. (2003) The role of TP53 in cervical carcinogenesis. *Hum. Mutat.*, **21**, 307–312
- Tong, X. & Howley, P.M. (1997) The bovine papillomavirus E6 oncoprotein interacts with paxillin and disrupts the actin cytoskeleton. *Proc. natl Acad. Sci. USA*, **94**, 4412–4417
- Tong, X., Salgia, R., Li, J.-L., Griffin, J.D. & Howley, P.M. (1997) The bovine papillomavirus E6 protein binds to the LD motif repeats of paxillin and blocks its interaction with vinculin and the focal adhesion kinase. *J. biol. Chem.*, **272**, 33373–33376
- Tornesello, M.L., Buonaguro, F.M., Beth-Giraldo, E. & Giraldo, G. (1993) Human immunodeficiency virus type 1 tat gene enhances human papillomavirus early gene expression. *Inter-virology*, **36**, 57–64
- Torreló, A. (2002) What's new in the treatment of viral warts in children. *Pediatr. Dermatol.*, **19**, 191–199
- Torrisi, A., Del Mistro, A., Onnis, G.L., Merlin, F., Bertorelle, R. & Minucci, D. (2000) Colposcopy, cytology and HPV-DNA testing in HIV-positive and HIV-negative women. *Eur. J. Gynaecol. Oncol.*, **21**, 168–172
- Touati, E., Michel, V., Thiberge, J.-M., Wuscher, N., Huerre, M. & Labigne, A. (2003) Chronic *Helicobacter pylori* infections induce gastric mutations in mice. *Gastroenterology*, **124**, 1408–1419
- Tran-Thanh, D., Koushik, A., Provencher, D., Drouin, P., Dubuc-Lissoir, J., Gauthier, P., Allaire, G., Kornegay, J., Franco, E. & Coutlée, F. (2002) Detection of human herpes virus type 6 DNA in precancerous lesions of the uterine cervix. *J. med. Virol.*, **68**, 606–610
- Tran-Thanh, D., Provencher, D., Koushik, A., Duarte-Franco, E., Kessous, A., Drouin, P., Wheeler, C.M., Dubuc-Lissoir, J., Gauthier, P., Allaire, G., Vaclair, R., DiPaolo, J.A., Gravitt, P., Franco, E. & Coutlée, F. (2003) Herpes simplex virus type II is not a cofactor to human papillomavirus in cancer of the uterine cervix. *Am. J. Obstet. Gynecol.*, **188**, 129–134
- Trenfield, K., Spradbrow, P.B. & Vanselow, B. (1985) Sequences of papillomavirus DNA in equine sarcoids. *Equine vet. J.*, **17**, 449–452
- Trenfield, K., Spradbrow, P.B. & Vanselow, B.A. (1990) Detection of papillomavirus DNA in precancerous lesions of the ears of sheep. *Vet. Microbiol.*, **25**, 103–116
- Trenfield, K., Salmond, C.A., Pope, J.H. & Hardie, I.R. (1993) Southern blot analysis of skin biopsies for human papillomavirus DNA: Renal allograft recipients in south-eastern Queensland. *Australas. J. Dermatol.*, **34**, 71–78

- Trombetta, L.J. & Place, R.J. (2001) Giant condyloma acuminatum of the anorectum: Trends in epidemiology and management: Report of a case and review of the literature. *Dis. Colon Rectum*, **44**, 1878–1886
- Trottier, A.-M., Provencher, D., Mes-Masson, A.-M., Vauclair, R. & Coutlée, F. (1995) Absence of human papillomavirus sequences in ovarian pathologies. *J. clin. Microbiol.*, **33**, 1011–1013
- Trus, B.L., Roden, R.B.S., Greenstone, H.L., Vrhel, M., Schiller, J.T. & Booy, F.P. (1997) Novel structural features of bovine papillomavirus capsid revealed by a three-dimensional reconstruction to 9 Å resolution. *Nat. struct. Biol.*, **4**, 413–420
- Tsambaos, D., Monastirli, A., Kapranos, N., Georgiou, S., Pasmatzis, E., Stratigos, A., Koutselini, H. & Berger, H. (1995) Detection of human papillomavirus DNA in nongenital seborrheic keratoses. *Arch. dermatol. Res.*, **287**, 612–615
- Tseng, C.-J., Liang, C.-C., Soong, Y.-K. & Pao, C.-C. (1998) Perinatal transmission of human papillomavirus in infants: Relationship between infection rate and mode of delivery. *Obstet. Gynecol.*, **91**, 92–96
- Tsirimonaki, E., O'Neil, B.W., Williams, R. & Campo, M.S. (2003) Extensive papillomatosis of the bovine upper gastrointestinal tract. *J. comp. Pathol.*, **129**, 93–99
- Tsuda, H., Hashiguchi, Y., Nishimura, S., Kawamura, N., Inoue, T. & Yamamoto, K. (2003) Relationship between HPV typing and abnormality of G1 cell cycle regulators in cervical neoplasm. *Gynecol. Oncol.*, **91**, 476–485
- Tsuhako, K., Nakazato, I., Hirayasu, T., Sunakawa, H. & Iwamasa, T. (1998) Human papillomavirus DNA in adenosquamous carcinoma of the lung. *J. clin. Pathol.*, **51**, 741–749
- Tsuhako, K., Nakazato, I., Miyagi, J., Iwamasa, T., Arasaki, A., Hiratsuka, H., Sunakawa, H., Kohama, G. & Abo, T. (2000) Comparative study of oral squamous cell carcinoma in Okinawa, southern Japan and Sapporo in Hokkaido, northern Japan; with special reference to human papillomavirus and Epstein-Barr virus infection. *J. oral Pathol. Med.*, **29**, 70–79
- Tu, H., Jacobs, S.C., Mergner, W.J. & Kyprianou, N. (1994) Rare incidence of human papillomavirus types 16 and 18 in primary and metastatic human prostate cancer. *Urology*, **44**, 726–731
- Tucker, R.A., Unger, E.R., Holloway, B.P. & Swan, D.C. (2001) Real-time PCR-based fluorescent assay for quantitation of human papillomavirus types 6, 11, 16, and 18. *Mol. Diagn.*, **6**, 39–47
- Tulvatana, W., Bhattarakosol, P., Sansopha, L., Sipiyarak, W., Kowitdamrong, E., Paisuntornsug, T. & Karnsawai, S. (2003) Risk factors for conjunctival squamous cell neoplasia: A matched case-control study. *Br. J. Ophthalmol.*, **87**, 396–398
- Turner, J.R., Shen, L.H., Crum, C.P., Dean, P.J. & Odze, R.D. (1997) Low prevalence of human papillomavirus infection in esophageal squamous cell carcinomas from North America: Analysis by a highly sensitive and specific polymerase chain reaction-based approach. *Hum. Pathol.*, **28**, 174–178
- Turner, C.F., Rogers, S.M., Miller, H.G., Miller, W.C., Gribble, J.N., Chromy, J.R., Leone, P.A., Cooley, P.C., Quinn, T.C. & Zenilman, J.M. (2002) Untreated gonococcal and chlamydial infection in a probability sample of adults. *J. Am. med. Assoc.*, **287**, 726–733
- Uberti-Foppa, C., Origoni, M., Maillard, M., Ferrari, D., Ciuffreda, D., Mastroiilli, E., Lazzarin, A. & Lillo, F. (1998) Evaluation of the detection of human papillomavirus genotypes in cervical specimens by Hybrid Capture as screening for precancerous lesions in HIV-positive women. *J. med. Virol.*, **56**, 133–137

- Uberti-Foppa, C., Ferrari, D., Lodini, S., Reina, S., Ameglio, F., Grasso, M.A., Gallotta, G., Ferrari, A., Taccagni, G., Lazzarin, A. & Lillo, F.B. (2003) Long-term effect of highly active antiretroviral therapy on cervical lesions in HIV-positive women. *AIDS*, **17**, 2136–2138
- Um, S.-J., Rhyu, J.-W., Kim, E.-J., Jeon, K.-C., Hwang, E.-S. & Park, J.-S. (2002) Abrogation of IRF-1 response by high-risk HPV E7 protein in vivo. *Cancer Lett.*, **179**, 205–212
- Umpierre, S.A., Kaufman, R.H., Adam, E., Woods, K.V. & Adler-Storthz, K. (1991) Human papillomavirus DNA in tissue biopsy specimens of vulvar vestibulitis patients treated with interferon. *Obstet. Gynecol.*, **78**, 693–695
- Unckell, F., Streeck, R.E. & Sapp, M. (1997) Generation and neutralization of pseudovirions of human papillomavirus type 33. *J. Virol.*, **71**, 2934–2939
- Unger, E.R., Vernon, S.D., Lee, D.R., Miller, D.L., Sharma, S., Clancy, K.A., Hart, C.E. & Reeves, W.C. (1997) Human papillomavirus type in anal epithelial lesions is influenced by human immunodeficiency virus. *Arch. Pathol. Lab. Med.*, **121**, 820–824
- University of Zimbabwe/JHPIEGO Cervical Cancer Project (1999) Visual inspection with acetic acid for cervical-cancer screening: Test qualities in a primary-care setting. *Lancet*, **353**, 869–873
- Ushikai, M., Fujiyoshi, T., Kono, M., Antrasena, S., Oda, H., Yoshida, H., Fukuda, K., Furuta, S., Hakura, A. & Sonoda, S. (1994) Detection and cloning of human papillomavirus DNA associated with recurrent respiratory papillomatosis in Thailand. *Jpn. J. Cancer Res.*, **85**, 699–703
- Uzal, F.A., Latorraca, A., Ghodduzi, M., Horn, M., Adamson, M., Kelly, W.R. & Schenkel, R. (2000) An apparent outbreak of cutaneous papillomatosis in merino sheep in Patagonia, Argentina. *Vet. Res. Comm.*, **24**, 197–202
- Vajdy, M., Srivastava, I., Polo, J., Donnelly, J., O'Hagan, D. & Singh, M. (2004) Mucosal adjuvants and delivery systems for protein-, DNA- and RNA-based vaccines. *Immunol. Cell Biol.*, **82**, 617–627
- Valle, G.F. & Banks, L. (1995) The human papillomavirus (HPV)-6 and HPV-16 E5 proteins cooperate with HPV-16 E7 in the transformation of primary rodent cells. *J. gen. Virol.*, **76**, 1239–1245
- Vambutas, A., Bonagura, V.R. & Steinberg, B.M. (2000) Altered expression of TAP-1 and major histocompatibility complex class I in laryngeal papillomatosis: Correlation of TAP-1 with disease. *Clin. diagn. Lab. Immunol.*, **7**, 79–85
- Vambutas, A., DeVoti, J., Pinn, W., Steinberg, B.M. & Bonagura, V.R. (2001) Interaction of human papillomavirus type 11 E7 protein with TAP-1 results in the reduction of ATP-dependent peptide transport. *Clin. Immunol.*, **101**, 94–99
- Vandenvelde, C., De Foor, M. & Van Beers, D. (1993) Precision about the association between cervical carcinoma and HLA-DQB1*03 alleles. *Lancet*, **342**, 553
- Vande Pol, S.B., Brown, M.C. & Turner, C.E. (1998) Association of bovine papillomavirus type 1 E6 oncoprotein with the focal adhesion protein paxillin through a conserved protein interaction motif. *Oncogene*, **16**, 43–52
- Van Doornum, G.J.J., Prins, M., Pronk, L., Coutinho, R.A. & Dillner, J. (1994) A prospective study of antibody responses to defined epitopes of human papillomavirus 16 in relation to genital and anorectal presence of HPV DNA. *Clin. diagn. Lab. Immunol.*, **1**, 633–639
- Van Doornum, G.J.J., Korse, C.M., Buning-Kager, J.C.G.M., Bonfrer, J.M.G., Horenblas, S., Taal, B.G. & Dillner, J. (2003) Reactivity to human papillomavirus type 16 L1 virus-like particles in sera from patients with genital cancer and patients with carcinomas at five different extra-genital sites. *Br. J. Cancer*, **88**, 1095–1100

- Van Ranst, M., Fuse, A., Sobis, H., De Meurichy, W., Syrjänen, S.M., Billiau, A. & Opdenakker, G. (1991) A papillomavirus related to HPV type 13 in oral focal epithelial hyperplasia in the pygmy chimpanzee. *J. oral Pathol. Med.*, **20**, 325–331
- Van Ranst, M., Fuse, A., Fiten, P., Beuken, E., Pfister, H., Burk, R.D. & Opdenakker, G. (1992a) Human papillomavirus type 13 and pygmy chimpanzee papillomavirus type 1: Comparison of the genome organizations. *Virology*, **190**, 587–596
- Van Ranst, M., Tachezy, R., Pruss, J. & Burk, R.D. (1992b) Primary structure of the E6 protein of *Micromys minutus* papillomavirus and *Mastomys natalensis* papillomavirus. *Nucleic Acids Res.*, **20**, 2889
- Vanselow, B.A., Spradbrow, P.B. & Jackson, A.R.B. (1982) Papillomaviruses, papillomas and squamous cell carcinomas in sheep. *Vet. Rec.*, **110**, 561–562
- Vanselow, B.A. & Spradbrow, P.B. (1983) Squamous cell carcinoma of the vulva, hyperkeratosis and papillomaviruses in a ewe. *Aust. vet. J.*, **60**, 194–195
- Van Tine, B.A., Dao, L.D., Wu, S.-Y., Sonbuchner, T.M., Lin, B.Y., Zou, N., Chiang, C.-M., Broker, T.R. & Chow, L.T. (2004) Human papillomavirus (HPV) origin-binding protein associates with mitotic spindles to enable viral DNA partitioning. *Proc. natl Acad. Sci. USA*, **101**, 4030–4035
- Varcoe, R.L., MacGowan, K.M. & Cass, A.J. (2004) Airway fire during tracheostomy. *Aust. N.Z. J. Surg.*, **74**, 507–508
- Vecchione, A., Cermele, C., Giovagnoli, M.R., Valli, C., Alimandi, M., Carico, E., Esposito, D.L., Mariani-Costantini, R. & French, D. (1994) P53 expression and genetic evidence for viral infection in intraepithelial neoplasia of the uterine cervix. *Gynecol. Oncol.*, **55**, 343–348
- Velders, M.P., McElhiney, S., Cassetti, M.C., Eiben, G.L., Higgins, T., Kovacs, G.R., Elmishad, A.G., Kast, W.M. & Smith, L.R. (2001) Eradication of established tumors by vaccination with Venezuelan equine encephalitis virus replicon particles delivering human papillomavirus 16 E7 RNA. *Cancer Res.*, **61**, 7861–7867
- Veldman, T., Horikawa, I., Barrett, J.C. & Schlegel, R. (2001) Transcriptional activation of the telomerase hTERT gene by human papillomavirus type 16 E6 oncoprotein. *J. Virol.*, **75**, 4467–4472
- Veldman, T., Liu, X., Yuan, H. & Schlegel, R. (2003) Human papillomavirus E6 and Myc proteins associate *in vivo* and bind to and cooperatively activate the telomerase reverse transcriptase promoter. *Proc. natl. Acad. Sci. USA*, **100**, 8211–8216
- Venuti, A., Manni, V., Morello, R., De Marco, F., Marzetti, F. & Marcante, M.L. (2000) Physical state and expression of human papillomavirus in laryngeal carcinoma and surrounding normal mucosa. *J. med. Virol.*, **60**, 396–402
- Vermeer, B.J. & Hurks, M. (1994) The clinical relevance of immunosuppression by UV irradiation. *J. Photochem. Photobiol. B.*, **24**, 149–154
- Vernon, S.D., Hart, C.E., Reeves, W.C. & Icenogle, J.P. (1993) The HIV-1 *tat* protein enhances E2-dependent human papillomavirus 16 transcription. *Virus Res.*, **27**, 133–145
- Vernon, S.D., Unger, E.R. & Williams, D. (2000) Comparison of human papillomavirus detection and typing by cycle sequencing, line blotting, and Hybrid Capture. *J. clin. Microbiol.*, **38**, 651–655
- de Vet, H.C., Knipschild, P.G., Willebrand, D., Schouten, H.J. & Sturmans, F. (1991) The effect of beta-carotene on the regression and progression of cervical dysplasia: A clinical experiment. *J. clin. Epidemiol.*, **44**, 273–283

- Viac, J., Guérin-Reverchon, I., Chardonnet, Y. & Brémond, A. (1990) Langerhans cells and epithelial cell modifications in cervical intraepithelial neoplasia: Correlation with human papillomavirus infection. *Immunobiology*, **180**, 328–338
- Viac, J., Chardonnet, Y., Euvrard, S., Chignol, M.C. & Thivolet, J. (1992) Langerhans cells, inflammation markers and human papillomavirus infections in benign and malignant epithelial tumors from transplant recipients. *J. Dermatol.*, **19**, 67–77
- Viiikki, M., Pukkala, E., Nieminen, P. & Hakama, M. (2000) Gynaecological infections as risk determinants of subsequent cervical neoplasia. *Acta oncol.*, **39**, 71–75
- Villa, L.L., Sichero, L., Rahal, P., Caballero, O., Ferenczy, A., Rohan, T. & Franco, E.L. (2000) Molecular variants of human papillomavirus types 16 and 18 preferentially associated with cervical neoplasia. *J. gen. Virol.*, **81**, 2959–2968
- Villa, L.L., Costa, R.L.R., Petta, C.A., Andrade, R.P., Ault, K.A., Giuliano, A.R., Wheeler, C.M., Koutsky, L.A., Malm, C., Lehtinen, M., Skjeldestad, F.E., Olsson, S.-E., Steinwall, M., Brown, D.R., Kurman, R.J., Ronnett, B.M., Stoler, M.H., Ferenczy, A., Harper, D.M., Tamms, G.M., Yu, J., Lupinacci, L., Railkar, R., Taddeo, F.J., Jansen, K.U., Esser, M.T., Sings, H.L., Saah, A.J. & Barr, E. (2005) Prophylactic quadrivalent human papillomavirus (types 6, 11, 16, and 18) L1 virus-like particle vaccine in young women: A randomised double-blind placebo-controlled multicentre phase II efficacy trial. *Lancet Oncol.*, **6**, 271–278
- Villa, L.L., Costa, R.L.R., Petta, C.A., Andrade, R.P., Paavonen, J., Iversen, O.-E., Olsson, S.-E., Høye, J., Steinwall, M., Riis-Johannessen, G., Andersson-Ellstrom, A., Elfgrén, K., von Krogh, G., Lehtinen, M., Malm, C., Tamms, G.M., Giacoletti, K., Lupinacci, L., Railkar, R., Taddeo, F.J., Bryan, J., Esser, M.T., Sings, H.L., Saah, A.J. & Barr, E. (2006) High sustained efficacy of a prophylactic quadrivalent human papillomavirus types 6/11/16/18 L1 virus-like particle vaccine through 5 years of follow-up. *Br. J. Cancer*, **95**, 1459–1466
- de Villiers, E.-M. (1998) Human papillomavirus infections in skin cancers. *Biomed. Pharmacother.*, **52**, 26–33
- de Villiers, E.-M. (2003) Relationship between steroid hormone contraceptives and HPV, cervical intraepithelial neoplasia and cervical carcinoma. *Int. J. Cancer*, **103**, 705–708
- de Villiers, E.-M., Neumann, C., Oltersdorf, T., Fierlbeck, G. & zur Hausen, H. (1986a) Butcher's wart virus (HPV 7) infections in non-butchers. *J. invest. Dermatol.*, **87**, 236–238
- de Villiers, E.-M., Schneider, A., Gross, G. & zur Hausen, H. (1986b) Analysis of benign and malignant urogenital tumors for human papillomavirus infection by labelling cellular DNA. *Med. Microbiol. Immunol. Berl.*, **174**, 281–286
- de Villiers, E.-M., Hirsch-Behnam, A., von Knebel-Doerberitz, C., Neumann, C. & zur Hausen, H. (1989) Two newly identified human papillomavirus types (HPV 40 and 57) isolated from mucosal lesions. *Virology*, **171**, 248–253
- de Villiers, E.-M., Lavergne, D., McLaren, K. & Benton, E.C. (1997) Prevailing papillomavirus types in non-melanoma carcinomas of the skin in renal allograft recipients. *Int. J. Cancer*, **73**, 356–361
- de Villiers, E.-M., Lavergne, D., Chang, F., Syrjänen, K., Tosi, P., Cintorino, M., Santopietro, R. & Syrjänen, S. (1999a) An interlaboratory study to determine the presence of human papillomavirus DNA in esophageal carcinoma from China. *Int. J. Cancer*, **81**, 225–228
- de Villiers, E.-M., Ruhland, A. & Šekarić, P. (1999b) Human papillomaviruses in non-melanoma skin cancer. *Semin. Cancer Biol.*, **9**, 413–422

- de Villiers, E.-M., Fauquet, C., Broker, T.R., Bernard, H.-U. & zur Hausen, H. (2004a) Classification of papillomaviruses. *Virology*, **324**, 17–27
- de Villiers, E.-M., Gunst, K., Stein, H. & Scherübl, H. (2004b) Esophageal squamous cell cancer in patients with head and neck cancer: Prevalence of human papillomavirus DNA sequences. *Int. J. Cancer*, **109**, 253–258
- de Villiers, E.-M., Sandstrom, R.E., zur Hausen, H. & Buck, C.E. (2005) Presence of papillomavirus sequences in condylomatous lesions of the mamillae and in invasive carcinoma of the breast. *Breast Cancer Res.*, **7**, R1–R11
- Virmani, A.K., Muller, C., Rathi, A., Zoechbauer-Mueller, S., Mathis, M. & Gazdar, A.F. (2001) Aberrant methylation during cervical carcinogenesis. *Clin. Cancer Res.*, **7**, 584–589
- Viscidi, R.P., Sun, Y., Tszuzaki, B., Bosch, F.X., Muñoz, N. & Shah, K.V. (1993) Serologic response in human papillomavirus-associated invasive cervical cancer. *Int. J. Cancer*, **55**, 780–784
- Viscidi, R.P., Kotloff, K.L., Clayman, B., Russ, K., Shapiro, S. & Shah, K.V. (1997) Prevalence of antibodies to human papillomavirus (HPV) type 16 virus-like particles in relation to cervical HPV infection among college women. *Clin. diagn. Lab. Immunol.*, **4**, 122–126
- Viscidi, R.P., Schiffman, M., Hildesheim, A., Herrero, R., Castle, P.E., Bratti, M.C., Rodriguez, A.C., Sherman, M.E., Wang, S., Clayman, B. & Burk, R.D. (2004) Seroreactivity to human papillomavirus (HPV) types 16, 18, or 31 and risk of subsequent HPV infection: Results from a population-based study in Costa Rica. *Cancer Epidemiol. Biomarkers Prev.*, **13**, 324–327
- Volkow, P., Rubi, S., Lizano, M., Carrillo, A., Vilar-Compte, D., García-Carrancá, A., Sotelo, R., García, B., Sierra-Madero, J. & Mohar, A. (2001) High prevalence of oncogenic human papillomavirus in the genital tract of women with human immunodeficiency virus. *Gynecol. Oncol.*, **82**, 27–31
- Volpers, C., Unckell, F., Schirmacher, P., Streeck, R.E. & Sapp, M. (1995) Binding and internalization of human papillomavirus type 33 virus-like particles by eukaryotic cells. *J. Virol.*, **69**, 3258–3264
- Volz, L.R., Carpinello, V.L. & Malloy, T.R. (1994) Laser treatment of urethral condyloma: A five-year experience. *Urology*, **43**, 81–83
- Vonka, V., Kanka, J., Jelínek, J., Šubrt, I., Suchánek, A., Havránková, A., Váchal, M., Hirsch, I., Domorázková, E., Zavadová, H., RichtEROVÁ, V., Náprstková, J., Dvoráková, V. & Svoboda, B. (1984) Prospective study on the relationship between cervical neoplasia and herpes simplex type-2 virus. I. Epidemiological characteristics. *Int. J. Cancer*, **33**, 49–60
- Vonka, V., Hamšíková, E., Kanka, J., Ludvíková, V., Sapp, M. & Šmahel, M. (1999) Prospective study on cervical neoplasia. IV. Presence of HPV antibodies. *Int. J. Cancer*, **80**, 365–368
- Voog, E., Ricksten, A., Stenglein, M., Jonassen, F., Ternesten, A., Ryd, W. & Lowhagen, G.B. (1997) Are acetowhite lesions of the cervix correlated to the presence of Epstein-Barr virus DNA? *Int. J. STD AIDS*, **8**, 432–436
- van Voorst Vader, P.C., Orth, G., Dutronquay, V., Driessen, L.H., Eggink, H.F., Kallenberg, C.G. & The, T.H. (1986) Epidermodysplasia verruciformis. Skin carcinoma containing human papillomavirus type 5 DNA sequences and primary hepatocellular carcinoma associated with chronic hepatitis B virus infection in a patient. *Acta dermat. venereol.*, **66**, 231–236
- van Voorst Vader, P.C., de Jong, M.C., Blanken, R., Kallenberg, C.G., Vermey, A. & Scheres, J.M. (1987) Epidermodysplasia verruciformis: Langerhans cells, immunologic effect of retinoid treatment and cytogenetics. *Arch. dermatol. Res.*, **279**, 366–373

- Vukasin, P. (2002) Anal condyloma and HIV-associated anal disease. *Surg. Clin. North Am.*, **82**, 1199–1211
- Waddell, K.M., Lewallen, S., Lucas, S.B., Atenyi-Agaba, C., Herrington, C.S. & Liomba, G. (1996) Carcinoma of the conjunctiva and HIV infection in Uganda and Malawi. *Br. J. Ophthalmol.*, **80**, 503–508
- Waddell, K., Magyezi, J., Bousarghin, L., Coursaget, P., Lucas, S., Downing, R., Casabonne, D. & Newton, R. (2003) Antibodies against human papillomavirus type 16 (HPV-16) and conjunctival squamous cell neoplasia in Uganda. *Br. J. Cancer*, **88**, 2002–2003
- Wadler, S., Schwartz, E.L., Haynes, H., Rameau, R., Quish, A., Mandeli, J., Gallagher, R., Hallam, S., Fields, A., Goldberg, G., McGill, F., Jennings, S., Wallach, R.C. & Runowicz, C.D. for the New York Gynecologic Oncology Group (1997) All-trans retinoic acid and interferon- α -2a in patients with metastatic or recurrent carcinoma of the uterine cervix. Clinical and pharmacokinetic studies. *Cancer*, **79**, 1574–1580
- Waggoner, S.E. (2003) Cervical cancer. *Lancet*, **361**, 2217–2225
- Wainfan, E., Kilkenny, M. & Dizik, M. (1988) Comparison of methyltransferase activities of paired rats given adequate or methyl-deficient diets. *Carcinogenesis*, **9**, 861–863
- Walboomers, J.M.M., de Roda Husman, A.-M., Snijders, P.J.F., Stel, H.V., Risse, E.K.J., Helmerhorst, T.J.M., Voorhorst, F.J. & Meijer, C.J.L.M. (1995) Human papillomavirus in false negative archival cervical smears: Implications for screening for cervical cancer. *J. clin. Pathol.*, **48**, 728–732
- Walboomers, J.M.M., Jacobs, M.V., Manos, M.M., Bosch, F.X., Kummer, J.A., Shah, K.V., Snijders, P.J.J., Peto, J., Meijer, C.J.L.M. & Muñoz, N. (1999) Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. *J. Pathol.*, **189**, 12–19
- Walker, P.G., Colley, N.V., Grubb, C., Tejerina, A. & Oriel, J.D. (1983) Abnormalities of the uterine cervix in women with vulval warts. A preliminary communication. *Br. J. Vener. Dis.*, **59**, 120–123
- Walker, J., Bloss, J.D., Liao, S.-Y., Berman, M., Bergen, S. & Wilczynski, S.P. (1989) Human papillomavirus genotype as a prognostic indicator in carcinoma of the uterine cervix. *Obstet. Gynecol.*, **74**, 781–785
- Wallin, K.-L., Wiklund, F., Ångström, T., Bergman, F., Stendahl, U., Wadell, G., Hallmans, G. & Dillner, J. (1999) Type-specific persistence of human papillomavirus DNA before the development of invasive cervical cancer. *New Engl. J. Med.*, **341**, 1633–1638
- Wallin, K.-L., van Doornum, G.J.J., Andersson-Ellström, A., Kallings, I., Wiklund, F., Hallmans, G., Schiller, J. & Dillner, J. (2000) Seroepidemiology of human papillomavirus type 73: A sexually transmitted low-risk virus. *Int. J. Cancer*, **85**, 353–357
- Wallin, K.-L., Wiklund, F., Luostarinen, T., Ångström, T., Anttila, T., Bergman, F., Hallmans, G., Ikäheimo, I., Koskela, P., Lehtinen, M., Stendahl, U., Paavonen, J. & Dillner, J. (2002) A population-based prospective study of *Chlamydia trachomatis* infection and cervical carcinoma. *Int. J. Cancer*, **101**, 371–374
- Walz, C. & Schlehofer, J.R. (1992) Modification of some biological properties of HeLa cells containing adeno-associated virus DNA integrated into chromosome 17. *J. Virol.*, **66**, 2990–3002
- Walz, C., Deprez, A., Dupressoir, T., Dürst, M., Rabreau, M. & Schlehofer, J.R. (1997) Interaction of human papillomavirus type 16 and adeno-associated virus type 2 co-infecting human cervical epithelium. *J. gen. Virol.*, **78**, 1441–1452
- Wang, S.S. & Hildesheim, A. (2003) Viral and host factors in human papillomavirus persistence and progression. *J. natl Cancer Inst. Monogr.*, **31**, 35–40

- Wang, Y., Okan, I., Pokrovskaja, K. & Wiman, K.G. (1996) Abrogation of p53-induced G1 arrest by the HPV 16 E7 protein does not inhibit p53-induced apoptosis. *Oncogene*, **12**, 2731–2735
- Wang, Z., Hansson, B.-G., Forslund, O., Dillner, L., Sapp, M., Schiller, J.T., Bjerre, B. & Dillner, J. (1996) Cervical mucus antibodies against human papillomavirus type 16, 18, and 33 capsids in relation to presence of viral DNA. *J. clin. Microbiol.*, **34**, 3056–3062
- Wang, S.S., Hildesheim, A., Gao, X., Schiffman, M., Herrero, R., Bratti, M.C., Sherman, M.E., Barnes, W.A., Greenberg, M.D., McGowan, L., Mortel, R., Schwartz, P.E., Zaino, R.J., Glass, A.G., Burk, R.D., Karacki, P. & Carrington, M. (2002a) Comprehensive analysis of human leukocyte antigen class I alleles and cervical neoplasia in 3 epidemiologic studies. *J. infect. Dis.*, **186**, 598–605
- Wang, S.S., Hildesheim, A., Gao, X., Schiffman, M., Herrero, R., Bratti, M.C., Sherman, M.E., Barnes, W.A., Greenberg, M.D., McGowan, L., Mortel, R., Schwartz, P.E., Zaino, R.J., Glass, A.G., Burk, R.D., Karacki, P. & Carrington, M. (2002b) Human leukocyte antigen class I alleles and cervical neoplasia: No heterozygote advantage. *Cancer Epidemiol. Biomarkers Prev.*, **11**, 419–420
- Wang, S.S., Schiffman, M., Shields, T.S., Herrero, R., Hildesheim, A., Bratti, M.C., Sherman, M.E., Rodriguez, A.C., Castle, P.E., Morales, J., Alfaro, M., Wright, T., Chen, S., Clayman, B., Burk, R.D. & Viscidi, R.P. (2003) Seroprevalence of human papillomavirus-16, -18, -31, and -45 in a population-based cohort of 10 000 women in Costa Rica. *Br. J. Cancer*, **89**, 1248–1254
- Wang, Q., Griffin, H., Southern, S., Jackson, D., Martin, A., McIntosh, P., Davy, C., Masterson, P.J., Walker, P.A., Laskey, P., Omary, M.B. & Doorbar, J. (2004) Functional analysis of the human papillomavirus type 16 E1=E4 protein provides a mechanism for in vivo and in vitro keratin filament reorganization. *J. Virol.*, **78**, 821–833
- Wang, S.S., Schiffman, M., Herrero, R., Carreon, J., Hildesheim, A., Rodriguez, A.C., Bratti, M.C., Sherman, M.E., Morales, J., Guillen, D., Alfaro, M., Clayman, B., Burk, R.D. & Viscidi, R.P. (2004) Determinants of human papillomavirus 16 serological conversion and persistence in a population-based cohort of 10 000 women in Costa Rica. *Br. J. Cancer*, **91**, 1269–1274
- Wang, X., Sapp, M., Christensen, N.D. & Dillner, J. (2005) Heparin-based ELISA reduces background reactivity in virus-like particle-based papillomavirus serology. *J. gen. Virol.*, **86**, 65–73
- Wang-Johanning, F., Lu, D.W., Wang, Y., Johnson, M.R. & Johanning, G.L. (2002) Quantitation of human papillomavirus 16 E6 and E7 DNA and RNA in residual material from ThinPrep Papanicolaou tests using real-time polymerase chain reaction analysis. *Cancer*, **94**, 2199–2210
- Wank, R. & Thomssen, C. (1991) High risk of squamous cell carcinoma of the cervix for women with HLA-DQw3. *Nature*, **352**, 723–725
- Wank, R., ter Meulen, J., Luande, J., Eberhardt, H.-C. & Pawlita, M. (1993) Cervical intraepithelial neoplasia, cervical carcinoma, and risk for patients with HLA-DQB1*0602, *0301, *0303 alleles (Letter to the Editor). *Lancet*, **341**, 1215
- Warzecha, H., Mason, H.S., Lane, C., Tryggvesson, A., Rybicki, E., Williamson, A.-L., Clements, J.D. & Rose, R.C. (2003) Oral immunogenicity of human papillomavirus-like particles expressed in potato. *J. Virol.*, **77**, 8702–8711
- Watanabe, S., Ogura, H., Fukushima, K. & Yabe, Y. (1993) Comparison of Virapap filter hybridization with polymerase chain reaction and Southern blot hybridization methods for detection of human papillomavirus in tonsillar and pharyngeal cancers. *Eur. Arch. Otorhinolaryngol.*, **250**, 115–119

- Watrach, A.M., Hanson, L.E. & Meyer, R.C. (1969) Canine papilloma: The structural characterization of oral papillomavirus. *J. natl Cancer Inst.*, **43**, 453–458
- Watrach, A.M., Small, E. & Case, M.T. (1970) Canine papilloma: Progression of oral papilloma to carcinoma. *J. natl Cancer Inst.*, **45**, 915–920
- Watson, R.A., Rollason, T.P., Reynolds, G.M., Murray, P.G., Banks, L. & Roberts, S. (2002) Changes in expression of the human homologue of the *Drosophila* discs large tumour suppressor protein in high-grade premalignant cervical neoplasias. *Carcinogenesis*, **23**, 1791–1796
- Watts, D.H., Koutsky, L.A., Holmes, K.K., Goldman, D., Kuypers, J., Kiviat, N.B. & Galloway, D.A. (1998) Low risk of perinatal transmission of human papillomavirus: Results from a prospective cohort study. *Am. J. Obstet. Gynecol.*, **178**, 365–373
- Watts, D.H., Fazarri, M., Minkoff, H., Hillier, S.L., Sha, B., Glesby, M., Levine, A.M., Burk, R., Palefsky, J.M., Moxley, M., Ahdieh-Grant, L. & Strickler, H.D. (2005) Effects of bacterial vaginosis and other genital infections on the natural history of human papillomavirus infection in HIV-1-infected and high-risk HIV-1-uninfected women. *J. Infect. Dis.*, **191**, 1129–1139
- Wazer, D.E., Liu, X.-L., Chu, Q., Gao, Q. & Band, V. (1995) Immortalization of distinct human mammary epithelial cell types by human papilloma virus 16 E6 or E7. *Proc. natl Acad. Sci. USA*, **92**, 3687–3691
- Weaver, B.A., Feng, Q., Holmes, K.K., Kiviat, N., Lee, S.K., Meyer, C., Stern, M. & Koutsky, L.A. (2004) Evaluation of genital sites and sampling techniques for detection of human papillomavirus DNA in men. *J. infect. Dis.*, **189**, 677–685
- Weber, R.S., Shillitoe, E.J., Robbins, K.T., Luna, M.A., Batsakis, J.G., Donovan, D.T. & Adler-Storthz, K. (1988) Prevalence of human papillomavirus in inverted papillomas. *Arch. Otolaryngol. Head Neck Surg.*, **114**, 23–26
- Webster, K., Taylor, A. & Gaston, K. (2001) Oestrogen and progesterone increase the levels of apoptosis induced by the human papillomavirus type 16 E2 and E7 proteins. *J. gen. Virol.*, **82**, 201–213
- Weck, P.K., Brandsma, J.L. & Whisnant, J.K. (1986) Interferons in the treatment of human papillomavirus diseases. *Cancer Metast. Rev.*, **5**, 139–165
- Weinstein, S.J., Ziegler, R.G., Selhub, J., Fears, T.R., Strickler, H.D., Brinton, L.A., Hamman, R.F., Levine, R.S., Mallin, K., & Stolley, P.D. (2001a) Elevated serum homocysteine levels and increased risk of invasive cervical cancer in US women. *Cancer Causes Control*, **12**, 317–324
- Weinstein, S.J., Ziegler, R.G., Frongillo, E.A., Jr, Colman, N., Sauberlich, H.E., Brinton, L.A., Hamman, R.F., Levine, R.S., Mallin, K., Stolley, P.D. & Bisogni, C.A. (2001b) Low serum and red blood cell folate are moderately, but nonsignificantly associated with increased cervical cancer in US women. *J. Nutr.*, **131**, 2040–2048
- Weiss, G.R., Liu, P.Y., Alberts, D.S., Peng, Y.M., Fisher, E., Xu, M.J., Scudder, S.A., Baker, L.H., Moore, D.F., Jr & Lippman, S.M. (1998) 13-*cis*-Retinoic acid or all-*trans*-retinoic acid plus interferon- α in recurrent cervical cancer: A Southwest Oncology Group phase II randomized trial. *Gynecol. Oncol.*, **71**, 386–390
- Weissenborn, S.J., Höpfel, R., Weber, F., Smola, H., Pfister, H.J. & Fuchs, P.G. (1999) High prevalence of a variety of epidermodysplasia verruciformis-associated human papillomaviruses in psoriatic skin of patients treated or not treated with PUVA. *J. invest. Dermatol.*, **113**, 122–126
- Weissenborn, S.J., Nindl, I., Purdie, K., Harwood, C., Proby, C., Breuer, J., Majewski, S., Pfister, H. & Wieland, U. (2005) Human papillomavirus-DNA loads in actinic keratoses exceed those in non-melanoma skin cancers. *J. invest. Dermatol.*, **125**, 93–97

- Wells, S.I., Francis, D.A., Karpova, A.Y., Dowhanick, J.J., Benson, J.D. & Howley, P.M. (2000) Papillomavirus E2 induces senescence in HPV-positive cells via pRB- and p21^{CIP}-dependent pathways. *EMBO J.*, **19**, 5762–5771
- Welt, A., Hummel, M., Niedobitek, G. & Stein, H. (1997) Human papillomavirus infection is not associated with bronchial carcinoma: Evaluation by *in situ* hybridization and the polymerase chain reaction. *J. Pathol.*, **181**, 276–280
- Wensveen, C., Kagie, M., Veldhuizen, R., De Groot, C., Denny, L., Zwinderman, K. & Trimbos, B. (2003) Detection of cervical intraepithelial neoplasia in women with atypical squamous or glandular cells of undetermined significance cytology: A prospective study. *Acta obstet. gynecol. scand.*, **82**, 883–889
- Wentzensen, N., Vinokurova, S. & von Knebel Doeberitz, M. (2004) Systematic review of genomic integration sites of human papillomavirus genomes in epithelial dysplasia and invasive cancer of the female lower genital tract. *Cancer Res.*, **64**, 3878–3884
- Werness, B.A., Levine, A.J., & Howley, P.M. (1990) Association of human papillomavirus types 16 and 18 E6 proteins with p53. *Science*, **248**, 76–79
- Westenend, P.J., Stoop, J.A. & Hendriks, J.G.M. (2001) Human papillomaviruses 6/11, 16/18 and 31/33/51 are not associated with squamous cell carcinoma of the urinary bladder. *Br. J. Urol. int.*, **88**, 198–201
- Wettstein, F.O. (1987) Papillomaviruses and carcinogenic progression. I. Cottontail rabbit (Shope) papillomavirus. In: Selzman, N.P. & Howley, P.M., eds, *The Papoviridae*, Vol. 2, *The Papillomaviruses*, New York, Plenum Press, pp. 167–186
- White, A.E., Livanos, E.M. & Tlsty, T.D. (1994) Differential disruption of genomic integrity and cell cycle regulations in normal human fibroblasts by the HPV oncoproteins. *Genes Dev.*, **8**, 666–677
- White, W.I., Wilson, S.D., Bonnez, W., Rose, R.C., Koenig, S. & Suzich, J.A. (1998) In vitro infection and type-restricted antibody-mediated neutralization of authentic human papillomavirus type 16. *J. Virol.*, **72**, 959–964
- White, W.I., Wilson, S.D., Palmer-Hill, F.J., Woods, R.M., Ghim, S.-J., Hewitt, L.A., Goldman, D.M., Burke, S.J., Jenson, A.B., Koenig, S. & Suzich, J.A. (1999) Characterization of a major neutralizing epitope on human papillomavirus type 16 L1. *J. Virol.*, **73**, 4882–4889
- White, P.W., Pelletier, A., Brault, K., Titolo, S., Welchner, E., Thauvette, L., Fazekas, M., Cordingley, M.G. & Archambault, J. (2001) Characterization of recombinant HPV6 and 11 E1 helicases. Effect of ATP on the interaction of E1 with E2 and mapping of a minimal helicase domain. *J. Biol. Chem.*, **276**, 22426–22438
- Whitehead, N., Reyner, F. & Lindenbaum, J. (1973) Megaloblastic changes in the cervical epithelium. Association with oral contraceptive therapy and reversal with folic acid. *J. Am. med. Assoc.*, **226**, 1421–1424
- Whitehead, N., Reyner, F. & Lindenbaum, J. (1989) Megaloblastic changes in cervical epithelium. Association with oral contraceptive therapy and reversal with folic acid. *Nutr. Rev.*, **47**, 318–321
- Whitney, C.W., Sause, W., Bundy, B.N., Malfetano, J.H., Hannigan, E.V., Fowler, W.C., Jr, Clarke-Pearson, D.L. & Liao, S.-Y. (1999) Randomized comparison of fluorouracil plus cisplatin versus hydroxyurea as an adjunct to radiation therapy in stage IIB–IVA carcinoma of the cervix with negative para-aortic lymph nodes: A Gynecologic Oncology Group and Southwest Oncology Group study. *J. Clin. Oncol.*, **17**, 1339–1348

- Wideroff, L., Schiffman, M.H., Nonnenmacher, B., Hubbert, N., Kirnbauer, R., Greer, C.E., Lowy, D., Lorincz, A.T., Manos, M.M., Glass, A.G., Scott, D.R., Sherman, M.E., Kurman, R.J., Buckland, J., Tarone, R.E. & Schiller, J.T. (1995) Evaluation of seroreactivity to human papillomavirus type 16 virus-like particles in an incident case-control study of cervical neoplasia. *J. infect. Dis.*, **172**, 1425–1430
- Wideroff, L., Schiffman, M.H., Hoover, R., Tarone, R.E., Nonnenmacher, B., Hubbert, N., Kirnbauer, R., Greer, C.E., Lorincz, A.T., Manos, M.M., Glass, A.G., Scott, D.R., Sherman, M.E., Buckland, J., Lowy, D. & Schiller, J. (1996a) Epidemiologic determinants of seroreactivity to human papillomavirus (HPV) type 16 virus-like particles in cervical HPV-16 DNA-positive and -negative women. *J. infect. Dis.*, **174**, 937–943
- Wideroff, L., Schottenfeld, D., Carey, T.E., Beals, T., Fu, G., Sakr, W., Sarkar, F., Schork, A., Grossman, H.B. & Shaw, M.W. (1996b) Human papillomavirus DNA in malignant and hyperplastic prostate tissue of black and white males. *Prostate*, **28**, 117–123
- Wideroff, L., Potischman, N., Glass, A.G., Greer, C.E., Manos, M.M., Scott, D.R., Burk, R.D., Sherman, M.E., Wacholder, S. & Schiffman, M. (1998) A nested case-control study of dietary factors and the risk of incident cytological abnormalities of the cervix. *Nutr. Cancer*, **30**, 130–136
- Widschwendter, A., Blassnig, A., Wiedemair, A., Müller-Holzner, E., Müller, H.M. & Marth, C. (2003) Human papillomavirus DNA in sera of cervical cancer patients as tumor marker. *Cancer Lett.*, **202**, 231–239
- Wieland, U., Ritzkowski, A., Stoltidis, M., Weissenborn, S., Stark, S., Ploner, M., Majewski, S., Jablonska, S., Pfister, H.J. & Fuchs, P.G. (2000) Papillomavirus DNA in basal cell carcinomas of immunocompetent patients: An accidental association? *J. invest. Dermatol.*, **115**, 124–128
- Wiener, J.S. & Walther, P.J. (1994) A high association of oncogenic human papillomaviruses with carcinomas of the female urethra: Polymerase chain reaction-based analysis of multiple histological types. *J. Urol.*, **151**, 49–53
- Wiener, J.S., Liu, E.T. & Walther, P.J. (1992) Oncogenic human papillomavirus type 16 is associated with squamous cell cancer of the male urethra. *Cancer Res.*, **52**, 5018–5023
- Wikström, A., van Doornum, G.J.J., Quint, W.G.V., Schiller, J.T. & Dillner, J. (1995) Identification of human papillomavirus seroconversions. *J. gen. Virol.*, **76**, 529–539
- Wilczynski, S.P., Oft, M., Cook, N., Liao, S.Y. & Iftner, T. (1993) Human papillomavirus type 6 in squamous cell carcinoma of the bladder and cervix. *Hum. Pathol.*, **24**, 96–102
- Wiley, D.J., Douglas, J., Beutner, K., Cox, T., Fife, K., Moscicki, A.-B. & Fukumoto, L. (2002) External genital warts: Diagnosis, treatment, and prevention. *Clin. infect. Dis.*, **35** (Suppl. 2), S210–S224
- Wilkin, T.J., Palmer, S., Brudney, K.F., Chiasson, M.A. & Wright, T.C. (2004) Anal intraepithelial neoplasia in heterosexual and homosexual HIV-positive men with access to antiretroviral therapy. *J. infect. Dis.*, **190**, 1685–1691
- Wilkinson, E.J., Guerrero, E., Daniel, R., Shah, K., Stone, I.K., Hardt, N.S. & Friedrich, E.G., Jr (1993) Vulvar vestibulitis is rarely associated with human papillomavirus infection types 6, 11, 16, or 18. *Int. J. gynecol. Pathol.*, **12**, 344–349
- Willett, G.D., Kurman, R.J., Reid, R., Greenberg, M., Jenson, A.B. & Lorincz, A.T. (1989) Correlation of the histologic appearance of intraepithelial neoplasia of the cervix with human papillomavirus types. *Int. J. gynecol. Pathol.*, **8**, 18–25

- Wiley, J.C., Hei, T.K., Piao, C.Q., Madrid, L., Wiley, J.J., Apostolakos, M.J. & Hukku, B. (1993) Radiation-induced deletion of chromosomal regions containing tumor suppressor genes in human bronchial epithelial cells. *Carcinogenesis*, **14**, 1181–1188
- Williams, (1988) *Cancer of the Uterus. Harveian Lectures for 1886*, London, H.K. Lewis
- Williams, A.B., Darragh, T.M., Vranizan, K., Ochia, C., Moss, A.R. & Palefsky, J.M. (1994) Anal and cervical human papillomavirus infection and risk of anal and cervical epithelial abnormalities in human immunodeficiency virus-infected women. *Obstet. Gynecol.*, **83**, 205–211
- Williams, G.R., Lu, Q.L., Love, S.B., Talbot, I.C., & Northover, J.M.A. (1996) Properties of HPV-positive and HPV-negative anal carcinomas. *J. Pathol.*, **180**, 378–382
- Wilson, C.A., Holmes, S.C., Campo, M.S., White, S.I., Tillman, D., Mackie, R.M. & Thomson, J. (1989) Novel variants of human papillomavirus type 2 in warts from immunocompromised individuals. *Br. J. Dermatol.*, **121**, 571–576
- Wilson, V.G., West, M., Woytek, K. & Rangasamy, D. (2002) Papillomavirus E1 proteins: Form, function, and features. *Virus Genes*, **24**, 275–290
- Winer, R.L. & Koutsky, L.A. (2004) Delivering reassurance to parents: Perinatal human papillomavirus transmission is rare. *Sex Transm. Dis.*, **31**, 63–64
- Winer, R.L., Lee, S.-K., Hughes, J.P., Adam, D.E., Kiviat, N.B. & Koutsky, L.A. (2003) Genital human papillomavirus infection: Incidence and risk factors in a cohort of female university students. *Am. J. Epidemiol.*, **157**, 218–226
- Winer, R.L., Kiviat, N.B., Hughes, J.P., Adam, D.E., Lee, S.-K., Kuypers, J.M. & Koutsky, L.A. (2005) Development and duration of human papillomavirus lesions, after initial infection. *J. infect. Dis.*, **191**, 731–738
- Winkelstein, W., Jr (1986) Cigarette smoking and cancer of the uterine cervix. In: Hoffman, D. & Harris, C.C., eds, *Mechanisms in tobacco carcinogenesis* (Banbury Report No. 23), New York, Cold Spring Harbor Laboratory, pp. 329–341
- Winkelstein, W., Jr (1990) Smoking and cervical cancer — Current status: A review. *Am. J. Epidemiol.*, **131**, 945–957
- Winkler, B., Crum, C.P., Fujii, T., Ferenczy, A., Boon, M., Braun, L., Lancaster, W.D. & Richart, R.M. (1984) Koilocytotic lesions of the cervix. The relationship of mitotic abnormalities to the presence of papillomavirus antigens and nuclear DNA content. *Cancer*, **53**, 1081–1087
- Wistuba, I.I., Montellano, F.D., Milchgrub, S., Virmani, A.K., Behrens, C., Chen, H., Ahmadian, M., Nowak, J.A., Muller, C., Minna, J.D. & Gazdar, A.F. (1997) Deletions of chromosome 3p are frequent and early events in the pathogenesis of uterine cervical carcinoma. *Cancer Res.*, **57**, 3154–3158
- Wistuba, I.I., Behrens, C., Milchgrub, S., Virmani, A.K., Jagirdar, J., Thomas, B., Ioachim, H.L., Litzky, L.A., Brambilla, E.M., Minna, J.D. & Gazdar, A.F. (1998) Comparison of molecular changes in lung cancers in HIV-positive and HIV-indeterminate subjects. *J. Am. med. Assoc.*, **279**, 1554–1559
- Wolf, P., Seidl, H., Bäck, B., Binder, B., Höfler, G., Quehenberger, F., Hoffmann, C., Kerl, H., Stark, S., Pfister, H.J. & Fuchs, P.G. (2004) Increased prevalence of human papillomavirus in hairs plucked from patients with psoriasis treated with psoralen-UV-A. *Arch. Dermatol.*, **140**, 317–324
- Womack, S.D., Chirenje, Z.M., Gaffikin, L., Blumenthal, P.D., McGrath, J.A., Chipato, T., Ngwalle, S., Munjoma, M. & Shah, K.V. (2000) HPV-based cervical cancer screening in a population at high risk for HIV infection. *Int. J. Cancer*, **85**, 206–210

- Wood, C.E., Borgerink, H., Register, T.C., Scott, L. & Cline, J.M. (2004) Cervical and vaginal epithelial neoplasms in cynomolgus monkeys. *Vet. Pathol.*, **41**, 108–115
- Woodman, C.B.J., Collins, S., Winter, H., Bailey, A., Ellis, J., Prior, P., Yates, M., Rollason, T.P., & Young, L.S. (2001) Natural history of cervical human papillomavirus infection in young women: A longitudinal cohort study. *Lancet*, **357**, 1831–1836
- Wools, K., Bryan, J.T., Katz, B.P., Rodriguez, M., Davis, T. & Brown, D.R. (1994) Detection of human papillomavirus L1 protein in condylomata acuminata from various anatomical sites. *Sex. transm. Dis.*, **21**, 103–106
- Wrede, D., Luqmani, Y.A., Coombes, R.C. & Vousden, K.H. (1992) Absence of HPV 16 and 18 DNA in breast cancer. *Br. J. Cancer*, **65**, 891–894
- Wright, T.C., Jr, Ellerbrock, T.V., Chiasson, M.A., Van Devanter, N., Sun, X.-W. and the New York Cervical Disease Study (1994) Cervical intraepithelial neoplasia in women infected with human immunodeficiency virus: Prevalence, risk factors, and validity of Papanicolaou smears. *Obstet. Gynecol.*, **84**, 591–597
- Wright, T.C., Jr, Denny, L., Kuhn, L., Pollack, A. & Lorincz, A. (2000) HPV DNA testing of self-collected vaginal samples compared with cytologic screening to detect cervical cancer. *J. Am. med. Assoc.*, **283**, 81–86
- Wright, T.C., Jr, Cox, J.T., Massad, L.S., Twiggs, L.B. & Wilkinson, E.J. for the ASCP-Sponsored Consensus Conference (2002) 2001 Consensus guidelines for the management of women with cervical cytological abnormalities. *J. Am. med. Assoc.*, **287**, 2120–2129
- Wright, T.C., Jr, Schiffman, M., Solomon, D., Cox, J.T., Garcia, F., Goldie, S., Hatch, K., Noller, K.L., Roach, N., Runowicz, C. & Saslow, D. (2004) Interim guidance for the use of human papillomavirus DNA testing as an adjunct to cervical cytology for screening. *Obstet. Gynecol.*, **103**, 304–309
- Wu, T.-C., Trujillo, J.M., Kashima, H.K. & Mounts, P. (1993) Association of human papillomavirus with nasal neoplasia. *Lancet*, **341**, 522–524
- Wu, Q.-J., Guo, M., Lu, Z.-M., Li, T., Qiao, H.-Z. & Ke, Y. (2003) Detection of human papillomavirus-16 in ovarian malignancy. *Br. J. Cancer*, **89**, 672–675
- Wu, Z., Chen, Z. & Phillips, D.M. (2003) Human genital epithelial cells capture cell-free human immunodeficiency virus type 1 and transmit the virus to CD4+ cells: Implications for mechanisms of sexual transmission. *J. infect. Dis.*, **188**, 1473–1482
- Wu, M.-F., Cheng, Y.-W., Lai, J.-C., Hsu, M.-C., Chen, J.-T., Liu, W.-S., Chiou, M.-C., Chen, C.-Y. & Lee, H. (2005) Frequent p16INK4a promoter hypermethylation in human papillomavirus-infected female lung cancer in Taiwan. *Int. J. Cancer*, **113**, 440–445
- Xi, L.F., Carter, J.J., Galloway, D.A., Kuypers, J., Hughes, J.P., Lee, S.K., Adam, D.E., Kiviat, N.B. & Koutsky, L.A. (2002) Acquisition and natural history of human papillomavirus type 16 variant infection among a cohort of female university students. *Cancer Epidemiol., Biomarkers Prev.*, **11**, 343–351
- Xi, L.F., Touré, P., Critchlow, C.W., Hawes, S.E., Dembele, B., Sow, P.S. & Kiviat, N.B. (2003) Prevalence of specific types of human papillomavirus and cervical squamous intraepithelial lesions in consecutive, previously unscreened, West-African women over 35 years of age. *Int. J. Cancer*, **103**, 803–809
- Xing, L.Q., Liu, H.R. & Si, J.Y. (1994) Analysis of the characteristics of human papilloma virus infection in 85 neoplasms of the respiratory system in adult patients. *Zhonghua Zhong Liu Za Zhi*, **16**, 424–427

- Yabe, Y., Tanimura, Y., Sakai, A., Hitsumoto, T. & Nohara, N. (1989) Molecular characteristics and physical state of human papillomavirus DNA change with progressing malignancy: Studies in a patient with epidermodysplasia verruciformis. *Int. J. Cancer*, **43**, 1022–1028
- Yabe, Y., Sakai, A., Hitsumoto, T., Kato, H. & Ogura, H. (1991) A subtype of human papillomavirus 5 (HPV-5b) and its subgenomic segment amplified in a carcinoma: Nucleotide sequences and genomic organizations. *Virology*, **183**, 793–798
- Yabe, Y., Sakai, A., Hitsumoto, T., Hanafusa, H., Jitsumori, Y. & Ogura, H. (1999) Human papillomavirus-5b DNA integrated in a metastatic tumor: Cloning, nucleotide sequence and genomic organization (Letter to the Editor). *Int. J. Cancer*, **80**, 334–335
- Yadav, M., Arivananthan, M. & Kumar, S. (1996). HHV-6 antigen and viral DNA detected in cervical cells from archived tissue using histochemical staining and hybridization. *Clin. Diagn. Virol.*, **7**, 23–33
- Yamashita, T., Segawa, K., Fujinaga, Y., Nishikawa, T. & Fujinaga, K. (1993) Biological and biochemical activity of E7 genes of the cutaneous human papillomavirus type 5 and 8. *Oncogene*, **8**, 2433–2441
- Yang, L. & Botchan, M. (1990) Replication of bovine papillomavirus type 1 DNA initiates within an E2-responsive enhancer element. *J. Virol.*, **64**, 5903–5911
- Yang, Y.-C., Spalholz, B.A., Rabson, M.S. & Howley, P.M. (1985) Dissociation of transforming and *trans*-activation functions for bovine papillomavirus type 1. *Nature*, **318**, 575–577
- Yang, X., Jin, G., Nakao, Y., Rahimtula, M., Pater, M.M. & Pater, A. (1996) Malignant transformation of HPV 16-immortalized human endocervical cells by cigarette smoke condensate and characterization of multistage carcinogenesis. *Int. J. Cancer*, **65**, 338–344
- Yang, H.-J., Liu, V.W.S., Tsang, P.C.K., Yip, A.M.W., Ng, T.-Y., Cheung, A.N.Y. & Ngan, H.Y.S. (2003) Comparison of human papillomavirus DNA levels in gynecological cancers: Implication for cancer development. *Tumor Biol.*, **24**, 310–316
- Yang, R., Day, P.M., Yutzy, W.H., IV, Lin, K.-Y., Hung, C.-F. & Roden, R.B. (2003a) Cell surface-binding motifs of L2 that facilitate papillomavirus infection. *J. Virol.*, **77**, 3531–3541
- Yang, R., Yutzy, W.H., IV, Viscidi, R.P. & Roden, R.B.S. (2003b) Interaction of L2 with β -actin directs intracellular transport of papillomavirus and infection. *J. biol. Chem.*, **278**, 12546–12553
- Yeager, M.D., Aste-Amezaga, M., Brown, D.R., Martin, M.M., Shah, M.J., Cook, J.C., Christensen, N.D., Ackerson, C., Lowe, R.S., Smith, J.F., Keller, P. & Jansen, K.U. (2000) Neutralization of human papillomavirus (HPV) pseudovirions: A novel and efficient approach to detect and characterize HPV neutralizing antibodies. *Virology*, **278**, 570–577
- Yeaman, G.R., Howell, A.L., Weldon, S., Demian, D.J., Collins, J.E., O'Connell, D.M., Asin, S.N., Wira, C.R. & Fanger, M.W. (2003) Human immunodeficiency virus receptor and coreceptor expression on human uterine epithelial cells: Regulation of expression during the menstrual cycle and implications for human immunodeficiency virus infection. *Immunology*, **109**, 137–146
- Yee, C., Krishnan-Hewlett, I., Baker, C.C., Schlegel, R. & Howley, P.M. (1985) Presence and expression of human papillomavirus sequences in human cervical carcinoma cell lines. *Am. J. Pathol.*, **119**, 361–366
- Yeole, B.B., Sankaranarayanan, R. & Jussawalla, D.J. (1998) Long-term survival from uterine cervical cancer in Mumbai (Bombay), India (Letter to the Editor). *Int. J. Cancer*, **78**, 394–395

- Yliskoski, M., Tervahauta, A., Saarikoski, S., Mäntyjärvi, R. & Syrjänen, K. (1992) Clinical course of cervical human papillomavirus lesions in relation to coexistent cervical infections. *Sex. transm. Dis.*, **19**, 137–139
- Ylitalo, N., Sørensen, P., Josefsson, A., Frisch, M., Sparén, P., Pontén, J., Gyllensten, U., Melbye, M. & Adami H.-O. (1999) Smoking and oral contraceptives as risk factors for cervical carcinoma *in situ*. *Int. J. Cancer*, **81**, 357–365
- Ylitalo, N., Sørensen, P., Josefsson, A.M., Magnusson, P.K.E., Andersen, P.K., Pontén, J., Adami, H.-O., Gyllensten, U.B. & Melbye, M. (2000a) Consistent high viral load of human papillomavirus 16 and risk of cervical carcinoma *in situ*: A nested case–control study. *Lancet*, **355**, 2194–2198
- Ylitalo, N., Josefsson, A., Melbye, M., Sørensen, P., Frisch, M., Andersen, P.K., Sparén, P., Gustafsson, M., Magnusson, P., Pontén, J., Gyllensten, U. & Adami, H.-O. (2000b) A prospective study showing long-term infection with human papillomavirus 16 before the development of cervical carcinoma *in situ*. *Cancer Res.*, **60**, 6027–6032
- Yokoyama, M., Iwasaka, T., Nagata, C., Nozawa, S., Sekiya, S., Hirai, Y., Kanazawa, K., Sato, S., Hoshiai, H., Sugase, M., Kawana, T. & Yoshikawa, H. (2003) Prognostic factors associated with the clinical outcome of cervical intraepithelial neoplasia: A cohort study in Japan. *Cancer Lett.*, **192**, 171–179
- Yoo, K.Y., Kang, D., Koo, H.W., Park, S.K., Kim, D.H., Park, N.H., Song, Y.S., Kang, S.B. & Lee, H.P. (1997) Risk factors associated with uterine cervical cancer in Korea: A case–control study with special reference to sexual behavior. *J. Epidemiol.*, **7**, 117–123
- Yoon, C.-S., Kim, K.-D., Park, S.-N. & Cheong, S.-W. (2001) α_6 Integrin is the main receptor of human papillomavirus type 16 VLP. *Biochem. biophys. Res. Comm.*, **283**, 668–673
- Yoshikawa, H., Nagata, C., Noda, K., Nozawa, S., Yajima, A., Sekiya, S., Sugimori, H., Hirai, Y., Kanazawa, K., Sugase, M., Shimizu, H. & Kawana, T. (1999) Human papillomavirus infection and other risk factors for cervical intraepithelial neoplasia in Japan. *Br. J. Cancer*, **80**, 621–624
- Yoshinouchi, M., Yamada, T., Kizaki, M., Fen, J., Koseki, T., Ikeda, Y., Nishihara, T. & Yamato, K. (2003) *In vitro* and *in vivo* growth suppression of human papillomavirus 16-positive cervical cancer cells by E6 siRNA. *Mol. Ther.*, **8**, 762–768
- You, H., Liu, Y., Agrawal, N., Prasad, C.K., Chiriva-Internati, M., Lowery, C.L., Kay, H.H. & Hermonat, P.L. (2003) Infection, replication, and cytopathology of human papillomavirus type 31 in trophoblasts. *Virology*, **316**, 281–289
- You, J., Croyle, J.L., Nishimura, A., Ozato, K., & Howley, P.M. (2004) Interaction of the bovine papillomavirus E2 protein with Brd4 tethers the viral DNA to host mitotic chromosomes. *Cell*, **117**, 349–360
- Younge, P.A. (1965) The natural history of carcinoma *in situ* of the cervix uteri. *J. Obstet. gynaecol.*, **72**, 9–12
- Yu, Y., Morimoto, T., Sasa, M., Okazaki, K., Harada, Y., Fujiwara, T., Irie, Y., Takahashi, E.-I., Tanigami, A. & Izumi, K. (2000) Human papillomavirus type 33 DNA in breast cancer in Chinese. *Breast Cancer*, **7**, 33–36
- Yuan, H., Estes, P.A., Chen, Y., Newsome, J., Olcese, V.A., Garcea, R.L. & Schlegel, R. (2001) Immunization with a pentameric L1 fusion protein protects against papillomavirus infection. *J. Virol.*, **75**, 7848–7853
- Yutsudo, M. & Hakura, A. (1987) Human papillomavirus type 17 transcripts expressed in skin carcinoma tissue of a patient with epidermodysplasia verruciformis. *Int. J. Cancer*, **39**, 586–589

- Yutsudo, M., Shimakage, T. & Hakura, A. (1985) Human papillomavirus type 17 DNA in skin carcinoma tissue of a patient with epidermodysplasia verruciformis. *Virology*, **144**, 295–298
- Yutsudo, M., Tanigaki, T., Kanda, R., Sasagawa, T., Inoue, T., Jing, P., Yong-IL, H. & Hakura, A. (1994) Involvement of human papillomavirus type 20 in epidermodysplasia verruciformis skin carcinogenesis. *J. clin. Microbiol.*, **32**, 1076–1078
- Zafer, E., Ergun, M.A., Alver, G., Sahin, F.I., Yavuzer, S. & Ekmekci, A. (2004) Detection and typing of human papillomavirus in non-small cell lung cancer. *Respiration*, **71**, 88–90
- Zanetta, G., Maneo, A., Colombo, A., Ragusa, A., Gabriele, A., Placa, F. & Mangioni, C. (1995) HIV infection and invasive cervical carcinoma in an Italian population: The need for closer screening programmes in seropositive patients. *AIDS*, **9**, 909–912
- Zanotti, K.M. & Belinson, J. (2002) Update on the diagnosis and treatment of human papillomavirus infection. *Cleveland Clin. J. Med.*, **69**, 948–961
- Zbar, A.P., Fenger, C., Efron, J., Beer-Gabel, M. & Wexner, S.D. (2002) The pathology and molecular biology of anal intraepithelial neoplasia: Comparisons with cervical and vulvar intraepithelial carcinoma. *Int. J. colorectal Dis.*, **17**, 203–215
- de Zelmanowicz, A.M., Schiffman, M., Herrero, R., Goldstein, A.M., Sherman, M.E., Burk, R.D., Gravitt, P., Viscidi, R., Schwartz, P., Barnes, W., Mortel, R., Silverberg, S.G., Buckland, J. & Hildesheim, A. (2005) Family history as a co-factor for adenocarcinoma and squamous cell carcinoma of the uterine cervix: Results from two studies conducted in Costa Rica and the United States. *Int. J. Cancer*, **116**, 599–605
- Zeltner, R., Borenstein, L.A., Wettstein, F.O. & Iftner, T. (1994) Changes in RNA expression pattern during the malignant progression of cottontail rabbit papillomavirus-induced tumors in rabbits. *J. Virol.*, **68**, 3620–3630
- Zerfass-Thome, K., Zwerschke, W., Mannhardt, B., Tindle, R., Botz, J.W. & Jansen-Dürr, P. (1996) Inactivation of the cdk inhibitor p27^{KIP1} by the human papillomavirus type 16 E7 oncoprotein. *Oncogene*, **13**, 2323–2330
- Zhan, D., Santin, A.D., Liu, Y., Parham, G.P., Li, C., Meyers, C. & Hermonat, P.L. (1999) Binding of the human papillomavirus type 16 p97 promoter by the adeno-associated virus Rep78 major regulatory protein correlates with inhibition. *J. biol. Chem.*, **274**, 31619–31624
- Zhang, Z.-F. & Begg, C.B. (1994) Is *Trichomonas vaginalis* a cause of cervical neoplasia? Results from a combined analysis of 24 studies. *Int. J. Epidemiol.*, **23**, 682–690
- Zhang, Z.-F., Graham, S., Yu, S.-Z., Marshall, J., Zielezny, M., Chen, Y.-X., Sun, M., Tang, S.-L., Liao, C.-S., Xu, J.-L. & Yang, X.-Z. (1995) *Trichomonas vaginalis* and cervical cancer. A prospective study in China. *Ann. Epidemiol.*, **5**, 325–332
- Zhang, P., Nouri, M., Brandsma, J.L., Iftner, T. & Steinberg, B.M. (1999) Induction of E6/E7 expression in cottontail rabbit papillomavirus latency following UV activation. *Virology*, **263**, 388–394
- Zhang, L.F., Zhou, J., Chen, S., Cai, L.L., Bao, Q.Y., Zheng, F.Y., Lu, J.Q., Padmanabha, J., Hengst, K., Malcolm, K. & Frazer, I.H. (2000) HPV6b virus like particles are potent immunogens without adjuvant in man. *Vaccine*, **18**, 1051–1058
- Zhang, B., Spandau, D.F. & Roman, A. (2002) E5 protein of human papillomavirus type 16 protects human foreskin keratinocytes from UV B-irradiation-induced apoptosis. *J. Virol.*, **76**, 220–231

- Zhang, B., Li, P., Wang, E., Brahmi, Z., Dunn, K.W., Blum, J.S. & Roman, A. (2003) The E5 protein of human papillomavirus type 16 perturbs MHC class II antigen maturation in human foreskin keratinocytes treated with interferon- γ . *Virology*, **310**, 100–108
- Zhang, Z.-y., Sdek, P., Cao, J. & Chen, W.-T. (2004) Human papillomavirus type 16 and 18 DNA in oral squamous cell carcinoma and normal mucosa. *Int. J. oral maxillofac. Surg.*, **33**, 71–74
- Zhong, G., Fan, T. & Liu, L. (1999) Chlamydia inhibits interferon γ -inducible major histocompatibility complex class II expression by degradation of upstream stimulatory factor 1. *J. exp. Med.*, **189**, 1931–1938
- Zhong, G., Liu, L., Fan, T., Fan, P. & Ji, H. (2000) Degradation of transcription factor RFX5 during the inhibition of both constitutive and interferon γ -inducible major histocompatibility complex class I expression in chlamydia-infected cells. *J. exp. Med.*, **191**, 1525–1534
- Zhou, J., Sun, X.Y., Davies, H., Crawford, L., Park, D. & Frazer, I.H. (1992) Definition of linear antigenic regions of the HPV16 L1 capsid protein using synthetic virion-like particles. *Virology*, **189**, 592–599
- Zhou, J., Sun, X.-Y., Louis, K. & Frazer, I.H. (1994) Interaction of human papillomavirus (HPV) type 16 capsid proteins with HPV DNA requires an intact L2 N-terminal sequence. *J. Virol.*, **68**, 619–625
- Zhu, W.Y., Leonardi, C. & Penneys, N.S. (1993a) Polymerase chain reaction in detection of human papillomavirus DNA and types of condyloma acuminata. *Chin. med. J. (Engl.)*, **106**, 141–144
- Zhu, W.Y., Leonardi, C., Blauvelt, A., Serfling, U. & Penneys, N.S. (1993b) Human papillomavirus DNA in the dermis of condyloma acuminatum. *J. cutan. Pathol.*, **20**, 447–450
- Zhuang, J.C., Lin, D., Lin, C., Jethwaney, D. & Wogan, G.N. (2002) Genotoxicity associated with NO production in macrophages and co-cultured target cells. *Free Radic. Biol. Med.*, **33**, 94–102
- Ziegert, C., Wentzensen, N., Vinokurova, S., Kisseljov, F., Einkenkel, J., Hoeckel, M. & von Knebel Doeberitz, M. (2003) A comprehensive analysis of HPV integration loci in anogenital lesions combining transcript and genome-based amplification techniques. *Oncogene*, **22**, 3977–3984
- Zielinski, G.D., Snijders, P.J.F., Rozendaal, L., Voorhorst, F.J., Runsink, A.P., de Schipper, F.A. & Meijer, C.J.L.M. (2001a) High-risk HPV testing in women with borderline and mild dyskaryosis: Long-term follow-up data and clinical relevance. *J. Pathol.*, **195**, 300–306
- Zielinski, G.D., Snijders, P.J.F., Rozendaal, L., Voorhorst, F.J., van der Linden, H.C., Runsink, A.P., de Schipper, F.A. & Meijer, C.J.L.M. (2001b) HPV presence precedes abnormal cytology in women developing cervical cancer and signals false negative smears. *Br. J. Cancer*, **85**, 398–404
- Zielinski, G.D., Snijders, P.J.F., Rozendaal, L., Fransen Daalmeijer, N., Risse, E.K.J., Voorhorst, F.J., Jiwa, N.M., van der Linden, H.C., de Schipper, F.A., Runsink, A.P. & Meijer, C.J.L.M. (2003) The presence of high-risk HPV combined with specific p53 and p16^{INK4a} expression patterns points to high-risk HPV as the main causative agent for adenocarcinoma *in situ* and adenocarcinoma of the cervix. *J. Pathol.*, **201**, 535–543
- Zielinski, G.D., Bais, A.G., Helmerhorst, T.J., Verheijen, R.H.M., de Schipper, F.A., Snijders, P.J.F., Voorhorst, F.J., van Kemenade, F.J., Rozendaal, L., & Meijer, C.J.L.M. (2004) HPV testing and monitoring of women after treatment of CIN 3: Review of the literature and meta-analysis. *Obstet. gynecol. Surv.*, **59**, 543–553

- Zimmermann, H., Degenkolbe, R., Bernard, H.-U. & O'Connor, M.J. (1999) The human papillomavirus type 16 E6 oncoprotein can down-regulate p53 activity by targeting the transcriptional coactivator CBP/p300. *J. Virol.*, **73**, 6209–6219
- Zobel, T., Iftner, T. & Stubenrauch, F. (2003) The papillomavirus E8^{E2C} protein represses DNA replication from extrachromosomal origins. *Mol. cell. Biol.*, **23**, 8352–8362
- Zou, N., Lin, B.Y., Duan, F., Lee, K.-Y., Jin, G., Guan, R., Yao, G., Lefkowitz, E.J., Broker, T.R. & Chow, L.T. (2000) The hinge of the human papillomavirus type 11 E2 protein contains major determinants for nuclear localization and nuclear matrix association. *J. Virol.*, **74**, 3761–3770
- Zumbach, K., Hoffmann, M., Kahn, T., Bosch, F., Gottschlich, S., Görögh, T., Rudert, H. & Pawlita, M. (2000a) Antibodies against oncoproteins E6 and E7 of human papillomavirus types 16 and 18 in patients with head-and-neck squamous-cell carcinoma. *Int. J. Cancer*, **85**, 815–818
- Zumbach, K., Kisseljov, F., Sacharova, O., Shaichaev, G., Semjonova, L., Pavlova, L. & Pawlita, M. (2000b) Antibodies against oncoproteins E6 and E7 of human papillomavirus types 16 and 18 in cervical-carcinoma patients from Russia. *Int. J. Cancer*, **85**, 313–318
- Zwaveling, S., Ferreira Mota, S.C., Nouta, J., Johnson, M., Lipford, G.B., Offringa, R., van der Burg, S.H. & Melief, C.J.M. (2002) Established human papillomavirus type 16-expressing tumors are effectively eradicated following vaccination with long peptides. *J. Immunol.*, **169**, 350–358
- Zwerschke, W. & Jansen-Dürr, P. (2000) Cell transformation by the E7 oncoprotein of human papillomavirus type 16: Interactions with nuclear and cytoplasmic target proteins. *Adv. Cancer Res.*, **78**, 1–29

LIST OF ABBREVIATIONS

AAV	Adeno-associated virus
Ad	Adenovirus
ADC	Adenocarcinoma
AIDS	Acquired immune deficiency syndrome
AIN	Anal intraepithelial neoplasia
ALIVE	AIDS Link to Intravenous Drug Experience
ALTS	ASCUS/LSIL Triage Study
AMF-1/Gps2	Autocrine motility factor 1
AP-1	Activator protein 1
ASCUS	Atypical squamous cells of undetermined significance
ATP	Adenosine triphosphate
ATPase	Adenosine triphosphatase
bp	Base pair
BPV	Bovine papillomavirus
BS	Binding site
CC	Carcinoma cuniculatum
CgPV	<i>Colobus guereza</i> papillomavirus
CI	Confidence interval
CIN	Cervical intraepithelial neoplasia
CIS	Carcinoma <i>in situ</i>
CMV	Cytomegalovirus
COPV	Canine oral papillomavirus
CRPV	Cottontail rabbit papillomavirus
CTL	Cytotoxic T lymphocytes
DBD	DNA-binding domain
DLG	<i>Drosophila</i> disc-large tumour-suppressor gene product
DMBA	7,12-Dimethylbenz[<i>a</i>]anthracene
DPV	Deer papillomavirus
DVI	Direct visual inspection
E6-AP	E6-associated protein
E6BP1	E6 binding protein 1
E6TP1	E6 target protein 1
EBV	Epstein-Barr virus
EC	Epithelioma cuniculatum

EEPV	European elk papillomavirus
EGFR	Epidermal growth factor receptor
ELISA	Enzyme-linked immunosorbent assay
EqPV	<i>Equus caballus</i> (horse) papillomavirus
EV	Epidermodysplasia verruciformis
FcPV	<i>Fringilla coelebs</i> (chaffinch) papillomavirus
FdPV	<i>Felix domesticus</i> (cat) papillomavirus
FHIT	Fragile histidine tetrads
FIV	Feline immunodeficiency virus
GAG	Glycosaminoglycan
GFP	Green fluorescent protein
GST	Glutathione <i>S</i> -transferase
HAART	Highly active antiretroviral therapy
HaOPV	Hamster oral papillomavirus
HERS	HIV Epidemiology Research Study
HHV	Human herpesvirus
HIV	Human immunodeficiency virus
HLA	Human leukocyte antigen
HPV	Human papillomavirus
HRA	High-resolution anoscopy
HSIL	High-grade squamous intraepithelial lesion
HSV	Herpes simplex virus
hTERT	Human telomerase reverse transcriptase
ICTV	International Committee on the Taxonomy of Viruses
IFN	Interferon
Ig	Immunoglobulin
IL	Interleukin
IRF	Interferon regulatory factor
ISH	In-situ hybridization
LCR	Long control region
LEEP	Loop electrosurgical excision procedure
LIPA	Reverse line probe assay hybridization
LLETZ	Large loop electrosurgical excision of the transformation zone
LOH	Loss of heterozygosity
LSIL	Low-grade squamous intraepithelial lesion
MAGI	Membrane-associated guanylate kinase inverted protein
MHC	Major histocompatibility complex
MmPV	<i>Micromys minutus</i> papillomavirus
MnPV	<i>Mastomys natalensis</i> papillomavirus
mRNA	Messenger RNA
MTHFR	Methylene tetrahydrofolate reductase
MUPP1	Multiple PDZ protein 1

NASBA	Nucleic acid sequence-based amplification
Nd:YAG	Neodymium:yttrium–aluminium garnet
ND10	Nuclear domain 10
NES	Nuclear export sequence
NF- κ B	Nuclear factor- κ B
NK	Natural killer
NLS	Nuclear localization signal
NURD	Nuclease remodelling and deacetylase
OvPV	Ovine papillomavirus
ORF	Open-reading frame
PI3K	Phosphatidylinositol-3'-kinase
Pap test	Papanicolaou test
PARP	Poly(ADP-ribose) polymerase
PCNA	Proliferating-cell nuclear antigen
PCPV	Pygmy chimpanzee papillomavirus
PCR	Polymerase chain reaction
PDGF	Platelet-derived growth factor
PDZ	PSD-95/Disc-large/ZO1 protein
PePV	<i>Psittacus erithacus timneh</i> (parrot) papillomavirus
PIN	Penile intraepithelial neoplasia
PML	Promyelocytic leukaemia protein
pRb	Retinoblastoma tumour-suppressor protein
PspPV	<i>Phocoena spinipinnis</i> papillomavirus
Rb	Retinoblastoma
RDPV	Red deer papillomavirus
REACH	Reaching for Excellence in Adolescent Care and Health
RFLP	Restriction fragment length polymorphism
RhPV	Rhesus monkey papillomavirus
RLB	Reverse line blotting
RLU	Relative light unit
ROPV	Domestic rabbit oral papillomavirus
RPA	Replication protein A
RPV	Reindeer papillomavirus
RT-PCR	Reverse transcriptase polymerase chain reaction
SCC	Squamous-cell carcinoma
SIL	Squamous intraepithelial lesion
SIR	Standardized incidence ratio
siRNA	Short-interfering RNA
SMR	Standardized mortality ratio
SPP	Suprapubic resection of the prostate
STD	Sexually transmitted disease
TAP	Transporter associated with antigen processing

TBP	TATA box-binding protein
TGF	Transforming growth factor
Th	T-helper
TLR	Toll-like receptor
TNF	Tumour necrosis factor
α -Toc	α -Tocopherol
TopBP1	Topoisomerase II beta-binding protein 1
TPA	12- <i>O</i> -Tetradecanoylphorbol 13-acetate
TRAIL	Tumour necrosis factor-related apoptosis-inducing ligand
TURP	Transurethral resection of the prostate
UV	Ultraviolet
VAIN	Vaginal intraepithelial neoplasia
v-ATPase	Vacuolar H ⁺ adenosine triphosphatase
VC	Verrucous carcinoma
VIA	Visual inspection with acetic acid
VILI	Visual inspection with Lugol's iodine
VIN	Vulvar intraepithelial neoplasia
VLP	Virus-like particle
VSV	Vesicular stomatis virus
WIHS	Women's Interagency HIV Study
WITS	Women and Infant Transmission Study
YB1	Y box-binding transcription factor
YY1	Ying Yang 1 transcription factor

CUMULATIVE CROSS INDEX TO *IARC MONOGRAPHS ON THE EVALUATION OF CARCINOGENIC RISKS TO HUMANS*

The volume, page and year of publication are given. References to corrigenda are given in parentheses.

A

A- α -C	40, 245 (1986); <i>Suppl.</i> 7, 56 (1987)
Acetaldehyde	36, 101 (1985) (<i>corr.</i> 42, 263); <i>Suppl.</i> 7, 77 (1987); 71, 319 (1999)
Acetaldehyde formylmethylhydrazone (<i>see</i> Gyromitrin)	
Acetamide	7, 197 (1974); <i>Suppl.</i> 7, 56, 389 (1987); 71, 1211 (1999)
Acetaminophen (<i>see</i> Paracetamol)	
Aciclovir	76, 47 (2000)
Acid mists (<i>see</i> Sulfuric acid and other strong inorganic acids, occupational exposures to mists and vapours from)	
Acridine orange	16, 145 (1978); <i>Suppl.</i> 7, 56 (1987)
Acriflavinium chloride	13, 31 (1977); <i>Suppl.</i> 7, 56 (1987)
Acrolein	19, 479 (1979); 36, 133 (1985); <i>Suppl.</i> 7, 78 (1987); 63, 337 (1995) (<i>corr.</i> 65, 549)
Acrylamide	39, 41 (1986); <i>Suppl.</i> 7, 56 (1987); 60, 389 (1994)
Acrylic acid	19, 47 (1979); <i>Suppl.</i> 7, 56 (1987); 71, 1223 (1999)
Acrylic fibres	19, 86 (1979); <i>Suppl.</i> 7, 56 (1987)
Acrylonitrile	19, 73 (1979); <i>Suppl.</i> 7, 79 (1987); 71, 43 (1999)
Acrylonitrile-butadiene-styrene copolymers	19, 91 (1979); <i>Suppl.</i> 7, 56 (1987)
Actinolite (<i>see</i> Asbestos)	
Actinomycin D (<i>see also</i> Actinomycins)	<i>Suppl.</i> 7, 80 (1987)
Actinomycins	10, 29 (1976) (<i>corr.</i> 42, 255)
Adriamycin	10, 43 (1976); <i>Suppl.</i> 7, 82 (1987)
AF-2	31, 47 (1983); <i>Suppl.</i> 7, 56 (1987)
Aflatoxins	1, 145 (1972) (<i>corr.</i> 42, 251); 10, 51 (1976); <i>Suppl.</i> 7, 83 (1987); 56, 245 (1993); 82, 171 (2002)
Aflatoxin B ₁ (<i>see</i> Aflatoxins)	
Aflatoxin B ₂ (<i>see</i> Aflatoxins)	
Aflatoxin G ₁ (<i>see</i> Aflatoxins)	
Aflatoxin G ₂ (<i>see</i> Aflatoxins)	
Aflatoxin M ₁ (<i>see</i> Aflatoxins)	
Agaritine	31, 63 (1983); <i>Suppl.</i> 7, 56 (1987)
Alcohol drinking	44 (1988)
Aldicarb	53, 93 (1991)

Aldrin	5, 25 (1974); <i>Suppl.</i> 7, 88 (1987)
Allyl chloride	36, 39 (1985); <i>Suppl.</i> 7, 56 (1987); 71, 1231 (1999)
Allyl isothiocyanate	36, 55 (1985); <i>Suppl.</i> 7, 56 (1987); 73, 37 (1999)
Allyl isovalerate	36, 69 (1985); <i>Suppl.</i> 7, 56 (1987); 71, 1241 (1999)
Aluminium production	34, 37 (1984); <i>Suppl.</i> 7, 89 (1987)
Amaranth	8, 41 (1975); <i>Suppl.</i> 7, 56 (1987)
5-Aminoacenaphthene	16, 243 (1978); <i>Suppl.</i> 7, 56 (1987)
2-Aminoanthraquinone	27, 191 (1982); <i>Suppl.</i> 7, 56 (1987)
<i>para</i> -Aminoazobenzene	8, 53 (1975); <i>Suppl.</i> 7, 56, 390 (1987)
<i>ortho</i> -Aminoazotoluene	8, 61 (1975) (<i>corr.</i> 42, 254); <i>Suppl.</i> 7, 56 (1987)
<i>para</i> -Aminobenzoic acid	16, 249 (1978); <i>Suppl.</i> 7, 56 (1987)
4-Aminobiphenyl	1, 74 (1972) (<i>corr.</i> 42, 251); <i>Suppl.</i> 7, 91 (1987)
2-Amino-3,4-dimethylimidazo[4,5- <i>f</i>]quinoline (<i>see</i> MeIQ)	
2-Amino-3,8-dimethylimidazo[4,5- <i>f</i>]quinoxaline (<i>see</i> MeIQx)	
3-Amino-1,4-dimethyl-5 <i>H</i> -pyrido[4,3- <i>b</i>]indole (<i>see</i> Trp-P-1)	
2-Aminodipyrido[1,2- <i>a</i> :3',2'- <i>d</i>]imidazole (<i>see</i> Glu-P-2)	
1-Amino-2-methylanthraquinone	27, 199 (1982); <i>Suppl.</i> 7, 57 (1987)
2-Amino-3-methylimidazo[4,5- <i>f</i>]quinoline (<i>see</i> IQ)	
2-Amino-6-methyldipyrido[1,2- <i>a</i> :3',2'- <i>d</i>]imidazole (<i>see</i> Glu-P-1)	
2-Amino-1-methyl-6-phenylimidazo[4,5- <i>b</i>]pyridine (<i>see</i> PhIP)	
2-Amino-3-methyl-9 <i>H</i> -pyrido[2,3- <i>b</i>]indole (<i>see</i> MeA- α -C)	
3-Amino-1-methyl-5 <i>H</i> -pyrido[4,3- <i>b</i>]indole (<i>see</i> Trp-P-2)	
2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole	7, 143 (1974); <i>Suppl.</i> 7, 57 (1987)
2-Amino-4-nitrophenol	57, 167 (1993)
2-Amino-5-nitrophenol	57, 177 (1993)
4-Amino-2-nitrophenol	16, 43 (1978); <i>Suppl.</i> 7, 57 (1987)
2-Amino-5-nitrothiazole	31, 71 (1983); <i>Suppl.</i> 7, 57 (1987)
2-Amino-9 <i>H</i> -pyrido[2,3- <i>b</i>]indole (<i>see</i> A- α -C)	
11-Aminoundecanoic acid	39, 239 (1986); <i>Suppl.</i> 7, 57 (1987)
Amitrole	7, 31 (1974); 41, 293 (1986) (<i>corr.</i> 52, 513; <i>Suppl.</i> 7, 92 (1987); 79, 381 (2001)
Ammonium potassium selenide (<i>see</i> Selenium and selenium compounds)	
Amorphous silica (<i>see also</i> Silica)	42, 39 (1987); <i>Suppl.</i> 7, 341 (1987); 68, 41 (1997) (<i>corr.</i> 81, 383)
Amosite (<i>see</i> Asbestos)	
Ampicillin	50, 153 (1990)
Amsacrine	76, 317 (2000)
Anabolic steroids (<i>see</i> Androgenic (anabolic) steroids)	
Anaesthetics, volatile	11, 285 (1976); <i>Suppl.</i> 7, 93 (1987)
Analgesic mixtures containing phenacetin (<i>see also</i> Phenacetin)	<i>Suppl.</i> 7, 310 (1987)
Androgenic (anabolic) steroids	<i>Suppl.</i> 7, 96 (1987)
Angelicin and some synthetic derivatives (<i>see also</i> Angelicins)	40, 291 (1986)
Angelicin plus ultraviolet radiation (<i>see also</i> Angelicin and some synthetic derivatives)	<i>Suppl.</i> 7, 57 (1987)
Angelicins	<i>Suppl.</i> 7, 57 (1987)
Aniline	4, 27 (1974) (<i>corr.</i> 42, 252); 27, 39 (1982); <i>Suppl.</i> 7, 99 (1987)

- ortho*-Anisidine 27, 63 (1982); *Suppl.* 7, 57 (1987); 73, 49 (1999)
- para*-Anisidine 27, 65 (1982); *Suppl.* 7, 57 (1987)
- Anthanthrene 32, 95 (1983); *Suppl.* 7, 57 (1987)
- Anthophyllite (*see* Asbestos)
- Anthracene 32, 105 (1983); *Suppl.* 7, 57 (1987)
- Anthranilic acid 16, 265 (1978); *Suppl.* 7, 57 (1987)
- Anthraquinones 82, 129 (2002)
- Antimony trioxide 47, 291 (1989)
- Antimony trisulfide 47, 291 (1989)
- ANTU (*see* 1-Naphthylthiourea)
- Apholate 9, 31 (1975); *Suppl.* 7, 57 (1987)
- para*-Aramid fibrils 68, 409 (1997)
- Aramite® 5, 39 (1974); *Suppl.* 7, 57 (1987)
- Areca nut (*see also* Betel quid) 85, 39 (2004)
- Aristolochia* species (*see also* Traditional herbal medicines) 82, 69 (2002)
- Aristolochic acids 82, 69 (2002)
- Arsanilic acid (*see* Arsenic and arsenic compounds)
- Arsenic and arsenic compounds 1, 41 (1972); 2, 48 (1973); 23, 39 (1980); *Suppl.* 7, 100 (1987) 84, 39 (2004)
- Arsenic in drinking-water
- Arsenic pentoxide (*see* Arsenic and arsenic compounds)
- Arsenic trioxide (*see* Arsenic in drinking-water)
- Arsenic trisulfide (*see* Arsenic in drinking-water)
- Arsine (*see* Arsenic and arsenic compounds)
- Asbestos 2, 17 (1973) (*corr.* 42, 252); 14 (1977) (*corr.* 42, 256); *Suppl.* 7, 106 (1987) (*corr.* 45, 283) 53, 441 (1991); 73, 59 (1999)
- Atrazine
- Attapulgit (*see* Palygorskite)
- Auramine (technical-grade) 1, 69 (1972) (*corr.* 42, 251); *Suppl.* 7, 118 (1987) *Suppl.* 7, 118 (1987)
- Auramine, manufacture of (*see also* Auramine, technical-grade)
- Aurothioglucose 13, 39 (1977); *Suppl.* 7, 57 (1987)
- Azacitidine 26, 37 (1981); *Suppl.* 7, 57 (1987); 50, 47 (1990)
- 5-Azacytidine (*see* Azacitidine)
- Azaserine 10, 73 (1976) (*corr.* 42, 255); *Suppl.* 7, 57 (1987)
- Azathioprine 26, 47 (1981); *Suppl.* 7, 119 (1987)
- Aziridine 9, 37 (1975); *Suppl.* 7, 58 (1987); 71, 337 (1999)
- 2-(1-Aziridinyl)ethanol 9, 47 (1975); *Suppl.* 7, 58 (1987)
- Aziridyl benzoquinone 9, 51 (1975); *Suppl.* 7, 58 (1987)
- Azobenzene 8, 75 (1975); *Suppl.* 7, 58 (1987)
- AZT (*see* Zidovudine)

B

- Barium chromate (*see* Chromium and chromium compounds)
- Basic chromic sulfate (*see* Chromium and chromium compounds)
- BCNU (*see* Bischloroethyl nitrosourea)
- Benz[*a*]acridine 32, 123 (1983); *Suppl.* 7, 58 (1987)

Benz[<i>c</i>]acridine	3, 241 (1973); 32, 129 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzal chloride (<i>see also</i> α -Chlorinated toluenes and benzoyl chloride)	29, 65 (1982); <i>Suppl.</i> 7, 148 (1987); 71, 453 (1999)
Benz[<i>a</i>]anthracene	3, 45 (1973); 32, 135 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzene	7, 203 (1974) (<i>corr.</i> 42, 254); 29, 93, 391 (1982); <i>Suppl.</i> 7, 120 (1987)
Benzidine	1, 80 (1972); 29, 149, 391 (1982); <i>Suppl.</i> 7, 123 (1987)
Benzidine-based dyes	<i>Suppl.</i> 7, 125 (1987)
Benzo[<i>b</i>]fluoranthene	3, 69 (1973); 32, 147 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>j</i>]fluoranthene	3, 82 (1973); 32, 155 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>k</i>]fluoranthene	32, 163 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>ghi</i>]fluoranthene	32, 171 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>a</i>]fluorene	32, 177 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>b</i>]fluorene	32, 183 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>c</i>]fluorene	32, 189 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzofuran	63, 431 (1995)
Benzo[<i>ghi</i>]perylene	32, 195 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>c</i>]phenanthrene	32, 205 (1983); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>a</i>]pyrene	3, 91 (1973); 32, 211 (1983) (<i>corr.</i> 68, 477); <i>Suppl.</i> 7, 58 (1987)
Benzo[<i>e</i>]pyrene	3, 137 (1973); 32, 225 (1983); <i>Suppl.</i> 7, 58 (1987)
1,4-Benzoquinone (<i>see para</i> -Quinone)	
1,4-Benzoquinone dioxime	29, 185 (1982); <i>Suppl.</i> 7, 58 (1987); 71, 1251 (1999)
Benzotrichloride (<i>see also</i> α -Chlorinated toluenes and benzoyl chloride)	29, 73 (1982); <i>Suppl.</i> 7, 148 (1987); 71, 453 (1999)
Benzoyl chloride (<i>see also</i> α -Chlorinated toluenes and benzoyl chloride)	29, 83 (1982) (<i>corr.</i> 42, 261); <i>Suppl.</i> 7, 126 (1987); 71, 453 (1999)
Benzoyl peroxide	36, 267 (1985); <i>Suppl.</i> 7, 58 (1987); 71, 345 (1999)
Benzyl acetate	40, 109 (1986); <i>Suppl.</i> 7, 58 (1987); 71, 1255 (1999)
Benzyl chloride (<i>see also</i> α -Chlorinated toluenes and benzoyl chloride)	11, 217 (1976) (<i>corr.</i> 42, 256); 29, 49 (1982); <i>Suppl.</i> 7, 148 (1987); 71, 453 (1999)
Benzyl violet 4B	16, 153 (1978); <i>Suppl.</i> 7, 58 (1987)
Bertrandite (<i>see</i> Beryllium and beryllium compounds)	
Beryllium and beryllium compounds	1, 17 (1972); 23, 143 (1980) (<i>corr.</i> 42, 260); <i>Suppl.</i> 7, 127 (1987); 58, 41 (1993)
Beryllium acetate (<i>see</i> Beryllium and beryllium compounds)	
Beryllium acetate, basic (<i>see</i> Beryllium and beryllium compounds)	
Beryllium-aluminium alloy (<i>see</i> Beryllium and beryllium compounds)	
Beryllium carbonate (<i>see</i> Beryllium and beryllium compounds)	
Beryllium chloride (<i>see</i> Beryllium and beryllium compounds)	
Beryllium-copper alloy (<i>see</i> Beryllium and beryllium compounds)	
Beryllium-copper-cobalt alloy (<i>see</i> Beryllium and beryllium compounds)	

- Beryllium fluoride (*see* Beryllium and beryllium compounds)
Beryllium hydroxide (*see* Beryllium and beryllium compounds)
Beryllium-nickel alloy (*see* Beryllium and beryllium compounds)
Beryllium oxide (*see* Beryllium and beryllium compounds)
Beryllium phosphate (*see* Beryllium and beryllium compounds)
Beryllium silicate (*see* Beryllium and beryllium compounds)
Beryllium sulfate (*see* Beryllium and beryllium compounds)
Beryl ore (*see* Beryllium and beryllium compounds)
Betel quid with tobacco 37, 141 (1985); *Suppl.* 7, 128 (1987); 85, 39 (2004)
Betel quid without tobacco 37, 141 (1985); *Suppl.* 7, 128 (1987); 85, 39 (2004)
- BHA (*see* Butylated hydroxyanisole)
BHT (*see* Butylated hydroxytoluene)
Bis(1-aziridiny)morpholinophosphine sulfide 9, 55 (1975); *Suppl.* 7, 58 (1987)
2,2-Bis(bromomethyl)propane-1,3-diol 77, 455 (2000)
Bis(2-chloroethyl)ether 9, 117 (1975); *Suppl.* 7, 58 (1987); 71, 1265 (1999)
N,N-Bis(2-chloroethyl)-2-naphthylamine 4, 119 (1974) (*corr.* 42, 253); *Suppl.* 7, 130 (1987)
Bischloroethyl nitrosourea (*see also* Chloroethyl nitrosoureas)
1,2-Bis(chloromethoxy)ethane 26, 79 (1981); *Suppl.* 7, 150 (1987); 15, 31 (1977); *Suppl.* 7, 58 (1987); 71, 1271 (1999)
1,4-Bis(chloromethoxymethyl)benzene 15, 37 (1977); *Suppl.* 7, 58 (1987); 71, 1273 (1999)
Bis(chloromethyl)ether 4, 231 (1974) (*corr.* 42, 253); *Suppl.* 7, 131 (1987)
Bis(2-chloro-1-methylethyl)ether 41, 149 (1986); *Suppl.* 7, 59 (1987); 71, 1275 (1999)
Bis(2,3-epoxycyclopentyl)ether 47, 231 (1989); 71, 1281 (1999)
Bisphenol A diglycidyl ether (*see also* Glycidyl ethers)
Bisulfites (*see* Sulfur dioxide and some sulfites, bisulfites and metabisulfites)
Bitumens 35, 39 (1985); *Suppl.* 7, 133 (1987)
Bleomycins (*see also* Etoposide)
Blue VRS 26, 97 (1981); *Suppl.* 7, 134 (1987)
16, 163 (1978); *Suppl.* 7, 59 (1987)
Boot and shoe manufacture and repair 25, 249 (1981); *Suppl.* 7, 232 (1987)
Bracken fern 40, 47 (1986); *Suppl.* 7, 135 (1987)
Brilliant Blue FCF, disodium salt 16, 171 (1978) (*corr.* 42, 257); *Suppl.* 7, 59 (1987)
71, 1291 (1999)
Bromochloroacetonitrile (*see also* Halogenated acetonitriles)
Bromodichloromethane 52, 179 (1991); 71, 1295 (1999)
Bromoethane 52, 299 (1991); 71, 1305 (1999)
Bromoform 52, 213 (1991); 71, 1309 (1999)
1,3-Butadiene 39, 155 (1986) (*corr.* 42, 264); *Suppl.* 7, 136 (1987); 54, 237 (1992); 71, 109 (1999)
1,4-Butanediol dimethanesulfonate 4, 247 (1974); *Suppl.* 7, 137 (1987)
2-Butoxyethanol 88, 329
1-*tert*-Butoxypropan-2-ol 88, 415
n-Butyl acrylate 39, 67 (1986); *Suppl.* 7, 59 (1987); 71, 359 (1999)
Butylated hydroxyanisole 40, 123 (1986); *Suppl.* 7, 59 (1987)

- Butylated hydroxytoluene 40, 161 (1986); *Suppl.* 7, 59 (1987)
 Butyl benzyl phthalate 29, 193 (1982) (*corr.* 42, 261);
Suppl. 7, 59 (1987); 73, 115 (1999)
 β -Butyrolactone 11, 225 (1976); *Suppl.* 7, 59
 (1987); 71, 1317 (1999)
 γ -Butyrolactone 11, 231 (1976); *Suppl.* 7, 59
 (1987); 71, 367 (1999)
- C**
- Cabinet-making (*see* Furniture and cabinet-making)
 Cadmium acetate (*see* Cadmium and cadmium compounds)
 Cadmium and cadmium compounds 2, 74 (1973); 11, 39 (1976)
 (*corr.* 42, 255); *Suppl.* 7, 139
 (1987); 58, 119 (1993)
 Cadmium chloride (*see* Cadmium and cadmium compounds)
 Cadmium oxide (*see* Cadmium and cadmium compounds)
 Cadmium sulfate (*see* Cadmium and cadmium compounds)
 Cadmium sulfide (*see* Cadmium and cadmium compounds)
 Caffeic acid 56, 115 (1993)
 Caffeine 51, 291 (1991)
 Calcium arsenate (*see* Arsenic in drinking-water)
 Calcium chromate (*see* Chromium and chromium compounds)
 Calcium cyclamate (*see* Cyclamates)
 Calcium saccharin (*see* Saccharin)
 Cantharidin 10, 79 (1976); *Suppl.* 7, 59 (1987)
 Caprolactam 19, 115 (1979) (*corr.* 42, 258);
 39, 247 (1986) (*corr.* 42, 264);
Suppl. 7, 59, 390 (1987); 71, 383
 (1999)
 Captafol 53, 353 (1991)
 Captan 30, 295 (1983); *Suppl.* 7, 59 (1987)
 Carbaryl 12, 37 (1976); *Suppl.* 7, 59 (1987)
 Carbazole 32, 239 (1983); *Suppl.* 7, 59
 (1987); 71, 1319 (1999)
 3-Carboethoxypsoralen 40, 317 (1986); *Suppl.* 7, 59 (1987)
 Carbon black 3, 22 (1973); 33, 35 (1984);
Suppl. 7, 142 (1987); 65, 149
 (1996)
 Carbon tetrachloride 1, 53 (1972); 20, 371 (1979);
Suppl. 7, 143 (1987); 71, 401
 (1999)
 Carmoisine 8, 83 (1975); *Suppl.* 7, 59 (1987)
 Carpentry and joinery 25, 139 (1981); *Suppl.* 7, 378
 (1987)
 Carrageenan 10, 181 (1976) (*corr.* 42, 255); 31,
 79 (1983); *Suppl.* 7, 59 (1987)
Cassia occidentalis (*see* Traditional herbal medicines)
 Catechol 15, 155 (1977); *Suppl.* 7, 59
 (1987); 71, 433 (1999)
 CCNU (*see* 1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea)
 Ceramic fibres (*see* Man-made vitreous fibres)

- Chemotherapy, combined, including alkylating agents (*see* MOPP and other combined chemotherapy including alkylating agents)
- Chloral (*see also* Chloral hydrate) 63, 245 (1995); 84, 317 (2004)
- Chloral hydrate 63, 245 (1995); 84, 317 (2004)
- Chlorambucil 9, 125 (1975); 26, 115 (1981); *Suppl.* 7, 144 (1987)
- Chloramine 84, 295 (2004)
- Chloramphenicol 10, 85 (1976); *Suppl.* 7, 145 (1987); 50, 169 (1990)
- Chlordane (*see also* Chlordane/Heptachlor) 20, 45 (1979) (*corr.* 42, 258)
- Chlordane and Heptachlor *Suppl.* 7, 146 (1987); 53, 115 (1991); 79, 411 (2001)
- Chlordecone 20, 67 (1979); *Suppl.* 7, 59 (1987)
- Chlordimeform 30, 61 (1983); *Suppl.* 7, 59 (1987)
- Chlorendic acid 48, 45 (1990)
- Chlorinated dibenzodioxins (other than TCDD) (*see also* Polychlorinated dibenzo-*para*-dioxins) 15, 41 (1977); *Suppl.* 7, 59 (1987)
- Chlorinated drinking-water 52, 45 (1991)
- Chlorinated paraffins 48, 55 (1990)
- α -Chlorinated toluenes and benzoyl chloride *Suppl.* 7, 148 (1987); 71, 453 (1999)
- Chlormadinone acetate 6, 149 (1974); 21, 365 (1979); *Suppl.* 7, 291, 301 (1987); 72, 49 (1999)
- Chlornaphazine (*see* *N,N*-Bis(2-chloroethyl)-2-naphthylamine)
- Chloroacetonitrile (*see also* Halogenated acetonitriles) 71, 1325 (1999)
- para*-Chloroaniline 57, 305 (1993)
- Chlorobenzilate 5, 75 (1974); 30, 73 (1983); *Suppl.* 7, 60 (1987)
- Chlorodibromomethane 52, 243 (1991); 71, 1331 (1999)
- 3-Chloro-4-(dichloromethyl)-5-hydroxy-2(5*H*)-furanone 84, 441 (2004)
- Chlorodifluoromethane 41, 237 (1986) (*corr.* 51, 483); *Suppl.* 7, 149 (1987); 71, 1339 (1999)
- Chloroethane 52, 315 (1991); 71, 1345 (1999)
- 1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (*see also* Chloroethyl nitrosoureas) 26, 137 (1981) (*corr.* 42, 260); *Suppl.* 7, 150 (1987)
- 1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (*see also* Chloroethyl nitrosoureas) *Suppl.* 7, 150 (1987)
- Chloroethyl nitrosoureas *Suppl.* 7, 150 (1987)
- Chlorofluoromethane 41, 229 (1986); *Suppl.* 7, 60 (1987); 71, 1351 (1999)
- Chloroform 1, 61 (1972); 20, 401 (1979); *Suppl.* 7, 152 (1987); 73, 131 (1999)
- Chloromethyl methyl ether (technical-grade) (*see also* Bis(chloromethyl)ether) 4, 239 (1974); *Suppl.* 7, 131 (1987)
- (4-Chloro-2-methylphenoxy)acetic acid (*see* MCPA)
- 1-Chloro-2-methylpropene 63, 315 (1995)
- 3-Chloro-2-methylpropene 63, 325 (1995)
- 2-Chloronitrobenzene 65, 263 (1996)
- 3-Chloronitrobenzene 65, 263 (1996)
- 4-Chloronitrobenzene 65, 263 (1996)
- Chlorophenols (*see also* Polychlorophenols and their sodium salts) *Suppl.* 7, 154 (1987)

Chlorophenols (occupational exposures to)	41, 319 (1986)
Chlorophenoxy herbicides	<i>Suppl.</i> 7, 156 (1987)
Chlorophenoxy herbicides (occupational exposures to)	41, 357 (1986)
4-Chloro- <i>ortho</i> -phenylenediamine	27, 81 (1982); <i>Suppl.</i> 7, 60 (1987)
4-Chloro- <i>meta</i> -phenylenediamine	27, 82 (1982); <i>Suppl.</i> 7, 60 (1987)
Chloroprene	19, 131 (1979); <i>Suppl.</i> 7, 160 (1987); 71, 227 (1999)
Chloropropham	12, 55 (1976); <i>Suppl.</i> 7, 60 (1987)
Chloroquine	13, 47 (1977); <i>Suppl.</i> 7, 60 (1987)
Chlorothalonil	30, 319 (1983); <i>Suppl.</i> 7, 60 (1987); 73, 183 (1999)
<i>para</i> -Chloro- <i>ortho</i> -toluidine and its strong acid salts (<i>see also</i> Chlordimeform)	16, 277 (1978); 30, 65 (1983); <i>Suppl.</i> 7, 60 (1987); 48, 123 (1990); 77, 323 (2000)
4-Chloro- <i>ortho</i> -toluidine (<i>see para-chloro-ortho-toluidine</i>)	
5-Chloro- <i>ortho</i> -toluidine	77, 341 (2000)
Chlortrianiene (<i>see also</i> Nonsteroidal oestrogens)	21, 139 (1979); <i>Suppl.</i> 7, 280 (1987)
2-Chloro-1,1,1-trifluoroethane	41, 253 (1986); <i>Suppl.</i> 7, 60 (1987); 71, 1355 (1999)
Chlorozotocin	50, 65 (1990)
Cholesterol	10, 99 (1976); 31, 95 (1983); <i>Suppl.</i> 7, 161 (1987)
Chromic acetate (<i>see</i> Chromium and chromium compounds)	
Chromic chloride (<i>see</i> Chromium and chromium compounds)	
Chromic oxide (<i>see</i> Chromium and chromium compounds)	
Chromic phosphate (<i>see</i> Chromium and chromium compounds)	
Chromite ore (<i>see</i> Chromium and chromium compounds)	
Chromium and chromium compounds (<i>see also</i> Implants, surgical)	2, 100 (1973); 23, 205 (1980); <i>Suppl.</i> 7, 165 (1987); 49, 49 (1990) (<i>corr.</i> 51, 483)
Chromium carbonyl (<i>see</i> Chromium and chromium compounds)	
Chromium potassium sulfate (<i>see</i> Chromium and chromium compounds)	
Chromium sulfate (<i>see</i> Chromium and chromium compounds)	
Chromium trioxide (<i>see</i> Chromium and chromium compounds)	
Chrysazin (<i>see</i> Dantron)	
Chrysene	3, 159 (1973); 32, 247 (1983); <i>Suppl.</i> 7, 60 (1987)
Chrysoidine	8, 91 (1975); <i>Suppl.</i> 7, 169 (1987)
Chrysotile (<i>see</i> Asbestos)	
CI Acid Orange 3	57, 121 (1993)
CI Acid Red 114	57, 247 (1993)
CI Basic Red 9 (<i>see also</i> Magenta)	57, 215 (1993)
Ciclosporin	50, 77 (1990)
CI Direct Blue 15	57, 235 (1993)
CI Disperse Yellow 3 (<i>see</i> Disperse Yellow 3)	
Cimetidine	50, 235 (1990)
Cinnamyl anthranilate	16, 287 (1978); 31, 133 (1983); <i>Suppl.</i> 7, 60 (1987); 77, 177 (2000)
CI Pigment Red 3	57, 259 (1993)
CI Pigment Red 53:1 (<i>see</i> D&C Red No. 9)	
Cisplatin (<i>see also</i> Etoposide)	26, 151 (1981); <i>Suppl.</i> 7, 170 (1987)
Citrinin	40, 67 (1986); <i>Suppl.</i> 7, 60 (1987)

- Citrus Red No. 2 8, 101 (1975) (*corr.* 42, 254);
Suppl. 7, 60 (1987)
- Clinoptilolite (*see* Zeolites)
- Clofibrate 24, 39 (1980); *Suppl.* 7, 171
(1987); 66, 391 (1996)
- Clomiphene citrate 21, 551 (1979); *Suppl.* 7, 172
(1987)
- Clonorchis sinensis* (infection with) 61, 121 (1994)
- Coal dust 68, 337 (1997)
- Coal gasification 34, 65 (1984); *Suppl.* 7, 173 (1987)
- Coal-tar pitches (*see also* Coal-tars) 35, 83 (1985); *Suppl.* 7, 174 (1987)
- Coal-tars 35, 83 (1985); *Suppl.* 7, 175 (1987)
- Cobalt[III] acetate (*see* Cobalt and cobalt compounds)
- Cobalt-aluminium-chromium spinel (*see* Cobalt and cobalt compounds)
- Cobalt and cobalt compounds (*see also* Implants, surgical) 52, 363 (1991)
- Cobalt[II] chloride (*see* Cobalt and cobalt compounds)
- Cobalt-chromium alloy (*see* Chromium and chromium compounds)
- Cobalt-chromium-molybdenum alloys (*see* Cobalt and cobalt compounds)
- Cobalt metal powder (*see* Cobalt and cobalt compounds)
- Cobalt metal with tungsten carbide 86, 37 (2006)
- Cobalt metal without tungsten carbide 86, 37 (2006)
- Cobalt naphthenate (*see* Cobalt and cobalt compounds)
- Cobalt[II] oxide (*see* Cobalt and cobalt compounds)
- Cobalt[II,III] oxide (*see* Cobalt and cobalt compounds)
- Cobalt sulfate and other soluble cobalt(II) salts 86, 37 (2006)
- Cobalt[II] sulfide (*see* Cobalt and cobalt compounds)
- Coffee 51, 41 (1991) (*corr.* 52, 513)
- Coke production 34, 101 (1984); *Suppl.* 7, 176
(1987)
- Combined oral contraceptives (*see* Oral contraceptives, combined)
- Conjugated equine oestrogens 72, 399 (1999)
- Conjugated oestrogens (*see also* Steroidal oestrogens) 21, 147 (1979); *Suppl.* 7, 283
(1987)
- Continuous glass filament (*see* Man-made vitreous fibres)
- Contraceptives, oral (*see* Oral contraceptives, combined;
Sequential oral contraceptives)
- Copper 8-hydroxyquinoline 15, 103 (1977); *Suppl.* 7, 61 (1987)
- Coronene 32, 263 (1983); *Suppl.* 7, 61 (1987)
- Coumarin 10, 113 (1976); *Suppl.* 7, 61
(1987); 77, 193 (2000)
- Creosotes (*see also* Coal-tars)
- meta*-Cresidine 35, 83 (1985); *Suppl.* 7, 177 (1987)
- para*-Cresidine 27, 91 (1982); *Suppl.* 7, 61 (1987)
- 27, 92 (1982); *Suppl.* 7, 61 (1987)
- Crystalalite (*see* Crystalline silica)
- Crocidolite (*see* Asbestos)
- Crotonaldehyde 63, 373 (1995) (*corr.* 65, 549)
- Crude oil 45, 119 (1989)
- Crystalline silica (*see also* Silica) 42, 39 (1987); *Suppl.* 7, 341
(1987); 68, 41 (1997) (*corr.* 81,
383)
- Cycasin (*see also* Methylazoxymethanol) 1, 157 (1972) (*corr.* 42, 251); 10,
121 (1976); *Suppl.* 7, 61 (1987)
- Cyclamates 22, 55 (1980); *Suppl.* 7, 178 (1987);
73, 195 (1999)

Cyclamic acid (<i>see</i> Cyclamates)	
Cyclochlorotine	10, 139 (1976); <i>Suppl.</i> 7, 61 (1987)
Cyclohexanone	47, 157 (1989); 71, 1359 (1999)
Cyclohexylamine (<i>see</i> Cyclamates)	
Cyclopenta[<i>cd</i>]pyrene	32, 269 (1983); <i>Suppl.</i> 7, 61 (1987)
Cyclopropane (<i>see</i> Anaesthetics, volatile)	
Cyclophosphamide	9, 135 (1975); 26, 165 (1981); <i>Suppl.</i> 7, 182 (1987)
Cyproterone acetate	72, 49 (1999)
D	
2,4-D (<i>see also</i> Chlorophenoxy herbicides; Chlorophenoxy herbicides, occupational exposures to)	15, 111 (1977)
Dacarbazine	26, 203 (1981); <i>Suppl.</i> 7, 184 (1987)
Dantron	50, 265 (1990) (<i>corr.</i> 59, 257)
D&C Red No. 9	8, 107 (1975); <i>Suppl.</i> 7, 61 (1987); 57, 203 (1993)
Dapsone	24, 59 (1980); <i>Suppl.</i> 7, 185 (1987)
Daunomycin	10, 145 (1976); <i>Suppl.</i> 7, 61 (1987)
DDD (<i>see</i> DDT)	
DDE (<i>see</i> DDT)	
DDT	5, 83 (1974) (<i>corr.</i> 42, 253); <i>Suppl.</i> 7, 186 (1987); 53, 179 (1991)
Decabromodiphenyl oxide	48, 73 (1990); 71, 1365 (1999)
Deltamethrin	53, 251 (1991)
Deoxynivalenol (<i>see</i> Toxins derived from <i>Fusarium graminearum</i> , <i>F. culmorum</i> and <i>F. crookwellense</i>)	
Diacetylaminoazotoluene	8, 113 (1975); <i>Suppl.</i> 7, 61 (1987)
<i>N,N'</i> -Diacetylbenzidine	16, 293 (1978); <i>Suppl.</i> 7, 61 (1987)
Diallate	12, 69 (1976); 30, 235 (1983); <i>Suppl.</i> 7, 61 (1987)
2,4-Diaminoanisole and its salts	16, 51 (1978); 27, 103 (1982); <i>Suppl.</i> 7, 61 (1987); 79, 619 (2001)
4,4'-Diaminodiphenyl ether	16, 301 (1978); 29, 203 (1982); <i>Suppl.</i> 7, 61 (1987)
1,2-Diamino-4-nitrobenzene	16, 63 (1978); <i>Suppl.</i> 7, 61 (1987)
1,4-Diamino-2-nitrobenzene	16, 73 (1978); <i>Suppl.</i> 7, 61 (1987); 57, 185 (1993)
2,6-Diamino-3-(phenylazo)pyridine (<i>see</i> Phenazopyridine hydrochloride)	
2,4-Diaminotoluene (<i>see also</i> Toluene diisocyanates)	16, 83 (1978); <i>Suppl.</i> 7, 61 (1987)
2,5-Diaminotoluene (<i>see also</i> Toluene diisocyanates)	16, 97 (1978); <i>Suppl.</i> 7, 61 (1987)
<i>ortho</i> -Dianisidine (<i>see</i> 3,3'-Dimethoxybenzidine)	
Diatomaceous earth, uncalcined (<i>see</i> Amorphous silica)	
Diazepam	13, 57 (1977); <i>Suppl.</i> 7, 189 (1987); 66, 37 (1996)
Diazomethane	7, 223 (1974); <i>Suppl.</i> 7, 61 (1987)
Dibenz[<i>a,h</i>]acridine	3, 247 (1973); 32, 277 (1983); <i>Suppl.</i> 7, 61 (1987)
Dibenz[<i>a,i</i>]acridine	3, 254 (1973); 32, 283 (1983); <i>Suppl.</i> 7, 61 (1987)

- Dibenz[*a,c*]anthracene 32, 289 (1983) (*corr.* 42, 262);
Suppl. 7, 61 (1987)
- Dibenz[*a,h*]anthracene 3, 178 (1973) (*corr.* 43, 261);
32, 299 (1983); *Suppl.* 7, 61 (1987)
- Dibenz[*a,f*]anthracene 32, 309 (1983); *Suppl.* 7, 61 (1987)
- 7*H*-Dibenzo[*c,g*]carbazole 3, 260 (1973); 32, 315 (1983);
Suppl. 7, 61 (1987)
- Dibenzodioxins, chlorinated (other than TCDD)
(*see* Chlorinated dibenzodioxins (other than TCDD))
- Dibenzo[*a,e*]fluoranthene 32, 321 (1983); *Suppl.* 7, 61 (1987)
- Dibenzo[*h,rst*]pentaphene 3, 197 (1973); *Suppl.* 7, 62 (1987)
- Dibenzo[*a,e*]pyrene 3, 201 (1973); 32, 327 (1983);
Suppl. 7, 62 (1987)
- Dibenzo[*a,h*]pyrene 3, 207 (1973); 32, 331 (1983);
Suppl. 7, 62 (1987)
- Dibenzo[*a,i*]pyrene 3, 215 (1973); 32, 337 (1983);
Suppl. 7, 62 (1987)
- Dibenzo[*a,l*]pyrene 3, 224 (1973); 32, 343 (1983);
Suppl. 7, 62 (1987)
- Dibenzo-*para*-dioxin 69, 33 (1997)
- Dibromoacetonitrile (*see also* Halogenated acetonitriles)
1,2-Dibromo-3-chloropropane 71, 1369 (1999)
15, 139 (1977); 20, 83 (1979);
Suppl. 7, 191 (1987); 71, 479
(1999)
- 1,2-Dibromoethane (*see* Ethylene dibromide)
- 2,3-Dibromopropan-1-ol 77, 439 (2000)
- Dichloroacetic acid 63, 271 (1995); 84, 359 (2004)
- Dichloroacetonitrile (*see also* Halogenated acetonitriles)
71, 1375 (1999)
- Dichloroacetylene 39, 369 (1986); *Suppl.* 7, 62
(1987); 71, 1381 (1999)
- ortho*-Dichlorobenzene 7, 231 (1974); 29, 213 (1982);
Suppl. 7, 192 (1987); 73, 223 (1999)
- meta*-Dichlorobenzene 73, 223 (1999)
- para*-Dichlorobenzene 7, 231 (1974); 29, 215 (1982);
Suppl. 7, 192 (1987); 73, 223 (1999)
- 3,3'-Dichlorobenzidine 4, 49 (1974); 29, 239 (1982);
Suppl. 7, 193 (1987)
- trans*-1,4-Dichlorobutene 15, 149 (1977); *Suppl.* 7, 62
(1987); 71, 1389 (1999)
- 3,3'-Dichloro-4,4'-diaminodiphenyl ether 16, 309 (1978); *Suppl.* 7, 62 (1987)
- 1,2-Dichloroethane 20, 429 (1979); *Suppl.* 7, 62
(1987); 71, 501 (1999)
- Dichloromethane 20, 449 (1979); 41, 43 (1986);
Suppl. 7, 194 (1987); 71, 251
(1999)
- 2,4-Dichlorophenol (*see* Chlorophenols; Chlorophenols,
occupational exposures to; Polychlorophenols and their sodium salts)
(2,4-Dichlorophenoxy)acetic acid (*see* 2,4-D)
- 2,6-Dichloro-*para*-phenylenediamine 39, 325 (1986); *Suppl.* 7, 62 (1987)
- 1,2-Dichloropropane 41, 131 (1986); *Suppl.* 7, 62
(1987); 71, 1393 (1999)
- 1,3-Dichloropropene (technical-grade) 41, 113 (1986); *Suppl.* 7, 195
(1987); 71, 933 (1999)

Dichlorvos	20, 97 (1979); <i>Suppl.</i> 7, 62 (1987); 53, 267 (1991)
Dicofol	30, 87 (1983); <i>Suppl.</i> 7, 62 (1987)
Dicyclohexylamine (<i>see</i> Cyclamates)	
Didanosine	76, 153 (2000)
Dieldrin	5, 125 (1974); <i>Suppl.</i> 7, 196 (1987)
Dienoestrol (<i>see also</i> Nonsteroidal oestrogens)	21, 161 (1979); <i>Suppl.</i> 7, 278 (1987)
Diepoxybutane (<i>see also</i> 1,3-Butadiene)	11, 115 (1976) (<i>corr.</i> 42, 255); <i>Suppl.</i> 7, 62 (1987); 71, 109 (1999)
Diesel and gasoline engine exhausts	46, 41 (1989)
Diesel fuels	45, 219 (1989) (<i>corr.</i> 47, 505)
Diethanolamine	77, 349 (2000)
Diethyl ether (<i>see</i> Anaesthetics, volatile)	
Di(2-ethylhexyl) adipate	29, 257 (1982); <i>Suppl.</i> 7, 62 (1987); 77, 149 (2000)
Di(2-ethylhexyl) phthalate	29, 269 (1982) (<i>corr.</i> 42, 261); <i>Suppl.</i> 7, 62 (1987); 77, 41 (2000)
1,2-Diethylhydrazine	4, 153 (1974); <i>Suppl.</i> 7, 62 (1987); 71, 1401 (1999)
Diethylstilboestrol	6, 55 (1974); 21, 173 (1979) (<i>corr.</i> 42, 259); <i>Suppl.</i> 7, 273 (1987)
Diethylstilboestrol dipropionate (<i>see</i> Diethylstilboestrol)	
Diethyl sulfate	4, 277 (1974); <i>Suppl.</i> 7, 198 (1987); 54, 213 (1992); 71, 1405 (1999)
<i>N,N</i> -Diethylthiourea	79, 649 (2001)
Diglycidyl resorcinol ether	11, 125 (1976); 36, 181 (1985); <i>Suppl.</i> 7, 62 (1987); 71, 1417 (1999)
Dihydrosafrole	1, 170 (1972); 10, 233 (1976) <i>Suppl.</i> 7, 62 (1987)
1,8-Dihydroxyanthraquinone (<i>see</i> Dantron)	
Dihydroxybenzenes (<i>see</i> Catechol; Hydroquinone; Resorcinol)	
1,3-Dihydroxy-2-hydroxymethylanthraquinone	82, 129 (2002)
Dihydroxymethylfuratrizine	24, 77 (1980); <i>Suppl.</i> 7, 62 (1987)
Diisopropyl sulfate	54, 229 (1992); 71, 1421 (1999)
Dimethisterone (<i>see also</i> Progestins; Sequential oral contraceptives)	6, 167 (1974); 21, 377 (1979)
Dimethoxane	15, 177 (1977); <i>Suppl.</i> 7, 62 (1987)
3,3'-Dimethoxybenzidine	4, 41 (1974); <i>Suppl.</i> 7, 198 (1987)
3,3'-Dimethoxybenzidine-4,4'-diisocyanate	39, 279 (1986); <i>Suppl.</i> 7, 62 (1987)
<i>para</i> -Dimethylaminoazobenzene	8, 125 (1975); <i>Suppl.</i> 7, 62 (1987)
<i>para</i> -Dimethylaminoazobenzenediazo sodium sulfonate	8, 147 (1975); <i>Suppl.</i> 7, 62 (1987)
<i>trans</i> -2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)- vinyl]-1,3,4-oxadiazole	7, 147 (1974) (<i>corr.</i> 42, 253); <i>Suppl.</i> 7, 62 (1987)
4,4'-Dimethylangelicin plus ultraviolet radiation (<i>see also</i> Angelicin and some synthetic derivatives)	<i>Suppl.</i> 7, 57 (1987)
4,5'-Dimethylangelicin plus ultraviolet radiation (<i>see also</i> Angelicin and some synthetic derivatives)	<i>Suppl.</i> 7, 57 (1987)
2,6-Dimethylaniline	57, 323 (1993)
<i>N,N</i> -Dimethylaniline	57, 337 (1993)
Dimethylarsinic acid (<i>see</i> Arsenic and arsenic compounds)	
3,3'-Dimethylbenzidine	1, 87 (1972); <i>Suppl.</i> 7, 62 (1987)

- Dimethylcarbamoyl chloride
12, 77 (1976); *Suppl.* 7, 199 (1987); 71, 531 (1999)
- Dimethylformamide
47, 171 (1989); 71, 545 (1999)
- 1,1-Dimethylhydrazine
4, 137 (1974); *Suppl.* 7, 62 (1987); 71, 1425 (1999)
- 1,2-Dimethylhydrazine
4, 145 (1974) (*corr.* 42, 253); *Suppl.* 7, 62 (1987); 71, 947 (1999)
- Dimethyl hydrogen phosphite
48, 85 (1990); 71, 1437 (1999)
- 1,4-Dimethylphenanthrene
32, 349 (1983); *Suppl.* 7, 62 (1987)
- Dimethyl sulfate
4, 271 (1974); *Suppl.* 7, 200 (1987); 71, 575 (1999)
- 3,7-Dinitrofluoranthene
46, 189 (1989); 65, 297 (1996)
- 3,9-Dinitrofluoranthene
46, 195 (1989); 65, 297 (1996)
- 1,3-Dinitropyrene
46, 201 (1989)
- 1,6-Dinitropyrene
46, 215 (1989)
- 1,8-Dinitropyrene
33, 171 (1984); *Suppl.* 7, 63 (1987); 46, 231 (1989)
- Dinitrosopentamethylenetetramine
11, 241 (1976); *Suppl.* 7, 63 (1987)
- 2,4-Dinitrotoluene
65, 309 (1996) (*corr.* 66, 485)
- 2,6-Dinitrotoluene
65, 309 (1996) (*corr.* 66, 485)
- 3,5-Dinitrotoluene
65, 309 (1996)
- 1,4-Dioxane
11, 247 (1976); *Suppl.* 7, 201 (1987); 71, 589 (1999)
- 2,4'-Diphenyldiamine
16, 313 (1978); *Suppl.* 7, 63 (1987)
- Direct Black 38 (*see also* Benzidine-based dyes)
29, 295 (1982) (*corr.* 42, 261)
- Direct Blue 6 (*see also* Benzidine-based dyes)
29, 311 (1982)
- Direct Brown 95 (*see also* Benzidine-based dyes)
29, 321 (1982)
- Disperse Blue 1
48, 139 (1990)
- Disperse Yellow 3
8, 97 (1975); *Suppl.* 7, 60 (1987); 48, 149 (1990)
- Disulfiram
12, 85 (1976); *Suppl.* 7, 63 (1987)
- Dithranol
13, 75 (1977); *Suppl.* 7, 63 (1987)
- Divinyl ether (*see* Anaesthetics, volatile)
- Doxefazepam
66, 97 (1996)
- Doxylamine succinate
79, 145 (2001)
- Droloxifene
66, 241 (1996)
- Dry cleaning
63, 33 (1995)
- Dulcin
12, 97 (1976); *Suppl.* 7, 63 (1987)

E

- Endrin
5, 157 (1974); *Suppl.* 7, 63 (1987)
- Enflurane (*see* Anaesthetics, volatile)
- Eosin
15, 183 (1977); *Suppl.* 7, 63 (1987)
- Epichlorohydrin
11, 131 (1976) (*corr.* 42, 256); *Suppl.* 7, 202 (1987); 71, 603 (1999)
- 1,2-Epoxybutane
47, 217 (1989); 71, 629 (1999)
- 1-Epoxyethyl-3,4-epoxycyclohexane (*see* 4-Vinylcyclohexene diepoxide)
- 3,4-Epoxy-6-methylcyclohexylmethyl 3,4-epoxy-6-methylcyclohexane carboxylate
11, 147 (1976); *Suppl.* 7, 63 (1987); 71, 1441 (1999)
- cis*-9,10-Epoxy stearic acid
11, 153 (1976); *Suppl.* 7, 63 (1987); 71, 1443 (1999)

Epstein-Barr virus	70, 47 (1997)
<i>d</i> -Equilenin	72, 399 (1999)
Equilin	72, 399 (1999)
Erionite	42, 225 (1987); <i>Suppl.</i> 7, 203 (1987)
Estazolam	66, 105 (1996)
Ethinylestradiol	6, 77 (1974); 21, 233 (1979); <i>Suppl.</i> 7, 286 (1987); 72, 49 (1999)
Ethionamide	13, 83 (1977); <i>Suppl.</i> 7, 63 (1987)
Ethyl acrylate	19, 57 (1979); 39, 81 (1986); <i>Suppl.</i> 7, 63 (1987); 71, 1447 (1999)
Ethylbenzene	77, 227 (2000)
Ethylene	19, 157 (1979); <i>Suppl.</i> 7, 63 (1987); 60, 45 (1994); 71, 1447 (1999)
Ethylene dibromide	15, 195 (1977); <i>Suppl.</i> 7, 204 (1987); 71, 641 (1999)
Ethylene oxide	11, 157 (1976); 36, 189 (1985) (<i>corr.</i> 42, 263); <i>Suppl.</i> 7, 205 (1987); 60, 73 (1994)
Ethylene sulfide	11, 257 (1976); <i>Suppl.</i> 7, 63 (1987)
Ethylenethiourea	7, 45 (1974); <i>Suppl.</i> 7, 207 (1987); 79, 659 (2001)
2-Ethylhexyl acrylate	60, 475 (1994)
Ethyl methanesulfonate	7, 245 (1974); <i>Suppl.</i> 7, 63 (1987)
<i>N</i> -Ethyl- <i>N</i> -nitrosourea	1, 135 (1972); 17, 191 (1978); <i>Suppl.</i> 7, 63 (1987)
Ethyl selenac (<i>see also</i> Selenium and selenium compounds)	12, 107 (1976); <i>Suppl.</i> 7, 63 (1987)
Ethyl tellurac	12, 115 (1976); <i>Suppl.</i> 7, 63 (1987)
Ethynodiol diacetate	6, 173 (1974); 21, 387 (1979); <i>Suppl.</i> 7, 292 (1987); 72, 49 (1999)
Etoposide	76, 177 (2000)
Eugenol	36, 75 (1985); <i>Suppl.</i> 7, 63 (1987)
Evans blue	8, 151 (1975); <i>Suppl.</i> 7, 63 (1987)
Extremely low-frequency electric fields	80 (2002)
Extremely low-frequency magnetic fields	80 (2002)

F

Fast Green FCF	16, 187 (1978); <i>Suppl.</i> 7, 63 (1987)
Fenvalerate	53, 309 (1991)
Ferbam	12, 121 (1976) (<i>corr.</i> 42, 256); <i>Suppl.</i> 7, 63 (1987)
Ferric oxide	1, 29 (1972); <i>Suppl.</i> 7, 216 (1987)
Ferrocromium (<i>see</i> Chromium and chromium compounds)	
Fluometuron	30, 245 (1983); <i>Suppl.</i> 7, 63 (1987)
Fluoranthene	32, 355 (1983); <i>Suppl.</i> 7, 63 (1987)
Fluorene	32, 365 (1983); <i>Suppl.</i> 7, 63 (1987)
Fluorescent lighting (exposure to) (<i>see</i> Ultraviolet radiation)	
Fluorides (inorganic, used in drinking-water)	27, 237 (1982); <i>Suppl.</i> 7, 208 (1987)

- 5-Fluorouracil 26, 217 (1981); *Suppl.* 7, 210 (1987)
- Fluorspar (*see* Fluorides)
- Fluosilicic acid (*see* Fluorides)
- Fluroxene (*see* Anaesthetics, volatile)
- Foreign bodies 74 (1999)
- Formaldehyde 29, 345 (1982); *Suppl.* 7, 211 (1987); 62, 217 (1995) (*corr.* 65, 549; *corr.* 66, 485); 88, 39
- 2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole 7, 151 (1974) (*corr.* 42, 253); *Suppl.* 7, 63 (1987)
- Frusemide (*see* Furosemide)
- Fuel oils (heating oils) 45, 239 (1989) (*corr.* 47, 505)
- Fumonisin B₁ (*see* also Toxins derived from *Fusarium moniliforme*) 82, 301 (2002)
- Fumonisin B₂ (*see* Toxins derived from *Fusarium moniliforme*)
- Furan 63, 393 (1995)
- Furazolidone 31, 141 (1983); *Suppl.* 7, 63 (1987)
- Furfural 63, 409 (1995)
- Furniture and cabinet-making 25, 99 (1981); *Suppl.* 7, 380 (1987)
- Furosemide 50, 277 (1990)
- 2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide (*see* AF-2)
- Fusarenon-X (*see* Toxins derived from *Fusarium graminearum*, *F. culmorum* and *F. crookwellense*)
- Fusarenone-X (*see* Toxins derived from *Fusarium graminearum*, *F. culmorum* and *F. crookwellense*)
- Fusarin C (*see* Toxins derived from *Fusarium moniliforme*)
- G**
- Gallium arsenide 86, 163 (2006)
- Gamma (γ)-radiation 75, 121 (2000)
- Gasoline 45, 159 (1989) (*corr.* 47, 505)
- Gasoline engine exhaust (*see* Diesel and gasoline engine exhausts)
- Gemfibrozil 66, 427 (1996)
- Glass fibres (*see* Man-made mineral fibres)
- Glass manufacturing industry, occupational exposures in 58, 347 (1993)
- Glass wool (*see* Man-made vitreous fibres)
- Glass filaments (*see* Man-made mineral fibres)
- Glu-P-1 40, 223 (1986); *Suppl.* 7, 64 (1987)
- Glu-P-2 40, 235 (1986); *Suppl.* 7, 64 (1987)
- L-Glutamic acid, 5-[2-(4-hydroxymethyl)phenylhydrazide] (*see* Agaritine)
- Glycidaldehyde 11, 175 (1976); *Suppl.* 7, 64 (1987); 71, 1459 (1999)
- Glycidol 77, 469 (2000)
- Glycidyl ethers 47, 237 (1989); 71, 1285, 1417, 1525, 1539 (1999)
- Glycidyl oleate 11, 183 (1976); *Suppl.* 7, 64 (1987)
- Glycidyl stearate 11, 187 (1976); *Suppl.* 7, 64 (1987)
- Griseofulvin 10, 153 (1976); *Suppl.* 7, 64, 391 (1987); 79, 289 (2001)
- Guinea Green B 16, 199 (1978); *Suppl.* 7, 64 (1987)

Gyromitrin	31, 163 (1983); <i>Suppl.</i> 7, 64, 391 (1987)
H	
Haematite	1, 29 (1972); <i>Suppl.</i> 7, 216 (1987)
Haematite and ferric oxide	<i>Suppl.</i> 7, 216 (1987)
Haematite mining, underground, with exposure to radon	1, 29 (1972); <i>Suppl.</i> 7, 216 (1987)
Hairdressers and barbers (occupational exposure as)	57, 43 (1993)
Hair dyes, epidemiology of	16, 29 (1978); 27, 307 (1982);
Halogenated acetonitriles	52, 269 (1991); 71, 1325, 1369, 1375, 1533 (1999)
Halothane (<i>see</i> Anaesthetics, volatile)	
HC Blue No. 1	57, 129 (1993)
HC Blue No. 2	57, 143 (1993)
α -HCH (<i>see</i> Hexachlorocyclohexanes)	
β -HCH (<i>see</i> Hexachlorocyclohexanes)	
γ -HCH (<i>see</i> Hexachlorocyclohexanes)	
HC Red No. 3	57, 153 (1993)
HC Yellow No. 4	57, 159 (1993)
Heating oils (<i>see</i> Fuel oils)	
<i>Helicobacter pylori</i> (infection with)	61, 177 (1994)
Hepatitis B virus	59, 45 (1994)
Hepatitis C virus	59, 165 (1994)
Hepatitis D virus	59, 223 (1994)
Heptachlor (<i>see also</i> Chlordane/Heptachlor)	5, 173 (1974); 20, 129 (1979)
Hexachlorobenzene	20, 155 (1979); <i>Suppl.</i> 7, 219 (1987); 79, 493 (2001)
Hexachlorobutadiene	20, 179 (1979); <i>Suppl.</i> 7, 64 (1987); 73, 277 (1999)
Hexachlorocyclohexanes	5, 47 (1974); 20, 195 (1979) (<i>corr.</i> 42, 258); <i>Suppl.</i> 7, 220 (1987)
Hexachlorocyclohexane, technical-grade (<i>see</i> Hexachlorocyclohexanes)	
Hexachloroethane	20, 467 (1979); <i>Suppl.</i> 7, 64 (1987); 73, 295 (1999)
Hexachlorophene	20, 241 (1979); <i>Suppl.</i> 7, 64 (1987)
Hexamethylphosphoramide	15, 211 (1977); <i>Suppl.</i> 7, 64 (1987); 71, 1465 (1999)
Hexoestrol (<i>see also</i> Nonsteroidal oestrogens)	<i>Suppl.</i> 7, 279 (1987)
Hormonal contraceptives, progestogens only	72, 339 (1999)
Human herpesvirus 8	70, 375 (1997)
Human immunodeficiency viruses	67, 31 (1996)
Human papillomaviruses	64 (1995) (<i>corr.</i> 66, 485); 90 (2007)
Human T-cell lymphotropic viruses	67, 261 (1996)
Hycanthone mesylate	13, 91 (1977); <i>Suppl.</i> 7, 64 (1987)
Hydralazine	24, 85 (1980); <i>Suppl.</i> 7, 222 (1987)
Hydrazine	4, 127 (1974); <i>Suppl.</i> 7, 223 (1987); 71, 991 (1999)
Hydrochloric acid	54, 189 (1992)
Hydrochlorothiazide	50, 293 (1990)

- Hydrogen peroxide 36, 285 (1985); *Suppl.* 7, 64 (1987); 71, 671 (1999)
- Hydroquinone 15, 155 (1977); *Suppl.* 7, 64 (1987); 71, 691 (1999)
- 1-Hydroxyanthraquinone 82, 129 (2002)
- 4-Hydroxyazobenzene 8, 157 (1975); *Suppl.* 7, 64 (1987)
- 17 α -Hydroxyprogesterone caproate (*see also* Progestins) 21, 399 (1979) (*corr.* 42, 259)
- 8-Hydroxyquinoline 13, 101 (1977); *Suppl.* 7, 64 (1987)
- 8-Hydroxysenkirkine 10, 265 (1976); *Suppl.* 7, 64 (1987)
- Hydroxyurea 76, 347 (2000)
- Hypochlorite salts 52, 159 (1991)
- I**
- Implants, surgical 74, 1999
- Indeno[1,2,3-*cd*]pyrene 3, 229 (1973); 32, 373 (1983); *Suppl.* 7, 64 (1987)
- Indium phosphide 86, 197 (2006)
- Inorganic acids (*see* Sulfuric acid and other strong inorganic acids, occupational exposures to mists and vapours from)
- Inorganic lead compounds *Suppl.* 7, 230 (1987); 87 (2006)
- Insecticides, occupational exposures in spraying and application of 53, 45 (1991)
- Insulation glass wool (*see* Man-made vitreous fibres)
- Involuntary smoking 83, 1189 (2004)
- Ionizing radiation (*see* Neutrons, γ - and X-radiation)
- IQ 40, 261 (1986); *Suppl.* 7, 64 (1987); 56, 165 (1993)
- Iron and steel founding 34, 133 (1984); *Suppl.* 7, 224 (1987)
- Iron-dextran complex 2, 161 (1973); *Suppl.* 7, 226 (1987)
- Iron-dextrin complex 2, 161 (1973) (*corr.* 42, 252); *Suppl.* 7, 64 (1987)
- Iron oxide (*see* Ferric oxide)
- Iron oxide, saccharated (*see* Saccharated iron oxide)
- Iron sorbitol-citric acid complex 2, 161 (1973); *Suppl.* 7, 64 (1987)
- Isatidine 10, 269 (1976); *Suppl.* 7, 65 (1987)
- Isoflurane (*see* Anaesthetics, volatile)
- Isoniazid (*see* Isonicotinic acid hydrazide)
- Isonicotinic acid hydrazide 4, 159 (1974); *Suppl.* 7, 227 (1987)
- Isophosphamide 26, 237 (1981); *Suppl.* 7, 65 (1987)
- Isoprene 60, 215 (1994); 71, 1015 (1999)
- Isopropanol 15, 223 (1977); *Suppl.* 7, 229 (1987); 71, 1027 (1999)
- Isopropanol manufacture (strong-acid process) (*see also* Isopropanol; Sulfuric acid and other strong inorganic acids, occupational exposures to mists and vapours from) *Suppl.* 7, 229 (1987)
- Isopropyl oils 15, 223 (1977); *Suppl.* 7, 229 (1987); 71, 1483 (1999)
- Isosafrole 1, 169 (1972); 10, 232 (1976); *Suppl.* 7, 65 (1987)

J

- Jacobine 10, 275 (1976); *Suppl.* 7, 65 (1987)
 Jet fuel 45, 203 (1989)
 Joinery (*see* Carpentry and joinery)

K

- Kaempferol 31, 171 (1983); *Suppl.* 7, 65 (1987)
 Kaposi's sarcoma herpesvirus 70, 375 (1997)
 Kepone (*see* Chlordecone)
 Kojic acid 79, 605 (2001)

L

- Lasiocarpine 10, 281 (1976); *Suppl.* 7, 65 (1987)
 Lauroyl peroxide 36, 315 (1985); *Suppl.* 7, 65 (1987); 71, 1485 (1999)
 Lead acetate (*see* Lead and lead compounds)
 Lead and lead compounds (*see also* Foreign bodies) 1, 40 (1972) (*corr.* 42, 251); 2, 52, 150 (1973); 12, 131 (1976); 23, 40, 208, 209, 325 (1980); *Suppl.* 7, 230 (1987); 87 (2006)
 Lead arsenate (*see* Arsenic and arsenic compounds)
 Lead carbonate (*see* Lead and lead compounds)
 Lead chloride (*see* Lead and lead compounds)
 Lead chromate (*see* Chromium and chromium compounds)
 Lead chromate oxide (*see* Chromium and chromium compounds)
 Lead compounds, inorganic and organic *Suppl.* 7, 230 (1987); 87 (2006)
 Lead naphthenate (*see* Lead and lead compounds)
 Lead nitrate (*see* Lead and lead compounds)
 Lead oxide (*see* Lead and lead compounds)
 Lead phosphate (*see* Lead and lead compounds)
 Lead subacetate (*see* Lead and lead compounds)
 Lead tetroxide (*see* Lead and lead compounds)
 Leather goods manufacture 25, 279 (1981); *Suppl.* 7, 235 (1987)
 Leather industries 25, 199 (1981); *Suppl.* 7, 232 (1987)
 Leather tanning and processing 25, 201 (1981); *Suppl.* 7, 236 (1987)
 Ledate (*see also* Lead and lead compounds) 12, 131 (1976)
 Levonorgestrel 72, 49 (1999)
 Light Green SF 16, 209 (1978); *Suppl.* 7, 65 (1987)
d-Limonene 56, 135 (1993); 73, 307 (1999)
 Lindane (*see* Hexachlorocyclohexanes)
 Liver flukes (*see* *Clonorchis sinensis*, *Opisthorchis felineus* and *Opisthorchis viverrini*)
 Lucidin (*see* 1,3-Dihydro-2-hydroxymethylanthraquinone)
 Lumber and sawmill industries (including logging) 25, 49 (1981); *Suppl.* 7, 383 (1987)
 Luteoskyrin 10, 163 (1976); *Suppl.* 7, 65 (1987)

- Lynoestrenol 21, 407 (1979); *Suppl.* 7, 293 (1987); 72, 49 (1999)
- M**
- Madder root (*see also Rubia tinctorum*) 82, 129 (2002)
- Magenta 4, 57 (1974) (*corr.* 42, 252); *Suppl.* 7, 238 (1987); 57, 215 (1993)
- Magenta, manufacture of (*see also* Magenta) *Suppl.* 7, 238 (1987); 57, 215 (1993)
- Malathion 30, 103 (1983); *Suppl.* 7, 65 (1987)
- Maleic hydrazide 4, 173 (1974) (*corr.* 42, 253); *Suppl.* 7, 65 (1987)
- Malonaldehyde 36, 163 (1985); *Suppl.* 7, 65 (1987); 71, 1037 (1999)
- Malondialdehyde (*see* Malonaldehyde)
- Maneb 12, 137 (1976); *Suppl.* 7, 65 (1987)
- Man-made mineral fibres (*see* Man-made vitreous fibres)
- Man-made vitreous fibres 43, 39 (1988); 81 (2002)
- Mannomustine 9, 157 (1975); *Suppl.* 7, 65 (1987)
- Mate 51, 273 (1991)
- MCPA (*see also* Chlorophenoxy herbicides; Chlorophenoxy herbicides, occupational exposures to) 30, 255 (1983)
- MeA- α -C 40, 253 (1986); *Suppl.* 7, 65 (1987)
- Medphalan 9, 168 (1975); *Suppl.* 7, 65 (1987)
- Medroxyprogesterone acetate 6, 157 (1974); 21, 417 (1979) (*corr.* 42, 259); *Suppl.* 7, 289 (1987); 72, 339 (1999)
- Megestrol acetate *Suppl.* 7, 293 (1987); 72, 49 (1999)
- MeIQ 40, 275 (1986); *Suppl.* 7, 65 (1987); 56, 197 (1993)
- MeIQx 40, 283 (1986); *Suppl.* 7, 65 (1987) 56, 211 (1993)
- Melamine 39, 333 (1986); *Suppl.* 7, 65 (1987); 73, 329 (1999)
- Melphalan 9, 167 (1975); *Suppl.* 7, 239 (1987)
- 6-Mercaptopurine 26, 249 (1981); *Suppl.* 7, 240 (1987)
- Mercuric chloride (*see* Mercury and mercury compounds)
- Mercury and mercury compounds 58, 239 (1993)
- Merphalan 9, 169 (1975); *Suppl.* 7, 65 (1987)
- Mestranol 6, 87 (1974); 21, 257 (1979) (*corr.* 42, 259); *Suppl.* 7, 288 (1987); 72, 49 (1999)
- Metabisulfites (*see* Sulfur dioxide and some sulfites, bisulfites and metabisulfites)
- Metallic mercury (*see* Mercury and mercury compounds)
- Methanearsonic acid, disodium salt (*see* Arsenic and arsenic compounds)
- Methanearsonic acid, monosodium salt (*see* Arsenic and arsenic compounds)
- Methimazole 79, 53 (2001)
- Methotrexate 26, 267 (1981); *Suppl.* 7, 241 (1987)
- Methoxsalen (*see* 8-Methoxypsoralen)

- Methoxychlor 5, 193 (1974); 20, 259 (1979);
Suppl. 7, 66 (1987)
- Methoxyflurane (*see* Anaesthetics, volatile)
- 5-Methoxypsoralen 40, 327 (1986); *Suppl.* 7, 242
(1987)
- 8-Methoxypsoralen (*see also* 8-Methoxypsoralen plus ultraviolet
radiation) 24, 101 (1980)
- 8-Methoxypsoralen plus ultraviolet radiation *Suppl.* 7, 243 (1987)
- Methyl acrylate 19, 52 (1979); 39, 99 (1986);
Suppl. 7, 66 (1987); 71, 1489
(1999)
- 5-Methylangelicin plus ultraviolet radiation (*see also* Angelicin
and some synthetic derivatives) *Suppl.* 7, 57 (1987)
- 2-Methylaziridine 9, 61 (1975); *Suppl.* 7, 66 (1987);
71, 1497 (1999)
- Methylazoxymethanol acetate (*see also* Cycasin) 1, 164 (1972); 10, 131 (1976);
Suppl. 7, 66 (1987)
- Methyl bromide 41, 187 (1986) (*corr.* 45, 283);
Suppl. 7, 245 (1987); 71, 721
(1999)
- Methyl *tert*-butyl ether 73, 339 (1999)
- Methyl carbamate 12, 151 (1976); *Suppl.* 7, 66 (1987)
- Methyl-CCNU (*see* 1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-
1-nitrosourea)
- Methyl chloride 41, 161 (1986); *Suppl.* 7, 246
(1987); 71, 737 (1999)
- 1-, 2-, 3-, 4-, 5- and 6-Methylchrysenes 32, 379 (1983); *Suppl.* 7, 66 (1987)
- N*-Methyl-*N*,4-dinitrosoaniline 1, 141 (1972); *Suppl.* 7, 66 (1987)
- 4,4'-Methylene bis(2-chloroaniline) 4, 65 (1974) (*corr.* 42, 252);
Suppl. 7, 246 (1987); 57, 271
(1993)
- 4,4'-Methylene bis(*N,N*-dimethyl)benzenamine 27, 119 (1982); *Suppl.* 7, 66 (1987)
- 4,4'-Methylene bis(2-methylaniline) 4, 73 (1974); *Suppl.* 7, 248 (1987)
- 4,4'-Methylenedianiline 4, 79 (1974) (*corr.* 42, 252);
39, 347 (1986); *Suppl.* 7, 66 (1987)
- 4,4'-Methylenediphenyl diisocyanate 19, 314 (1979); *Suppl.* 7, 66
(1987); 71, 1049 (1999)
- 2-Methylfluoranthene 32, 399 (1983); *Suppl.* 7, 66 (1987)
- 3-Methylfluoranthene 32, 399 (1983); *Suppl.* 7, 66 (1987)
- Methylglyoxal 51, 443 (1991)
- Methyl iodide 15, 245 (1977); 41, 213 (1986);
Suppl. 7, 66 (1987); 71, 1503
(1999)
- Methylmercury chloride (*see* Mercury and mercury compounds)
- Methylmercury compounds (*see* Mercury and mercury compounds)
- Methyl methacrylate 19, 187 (1979); *Suppl.* 7, 66
(1987); 60, 445 (1994)
- Methyl methanesulfonate 7, 253 (1974); *Suppl.* 7, 66 (1987);
71, 1059 (1999)
- 2-Methyl-1-nitroanthraquinone 27, 205 (1982); *Suppl.* 7, 66 (1987)
- N*-Methyl-*N*'-nitro-*N*-nitrosoguanidine 4, 183 (1974); *Suppl.* 7, 248 (1987)
- 3-Methylnitrosaminopropionaldehyde [*see* 3-(*N*-Nitrosomethylamino)-
propionaldehyde]

- 3-Methylnitrosaminopropionitrile [*see* 3-(*N*-Nitrosomethylamino)-propionitrile]
- 4-(Methylnitrosamino)-4-(3-pyridyl)-1-butanal [*see* 4-(*N*-Nitrosomethylamino)-4-(3-pyridyl)-1-butanal]
- 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone [*see* 4-(*N*-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone]
- N*-Methyl-*N*-nitrosourea 1, 125 (1972); 17, 227 (1978);
Suppl. 7, 66 (1987)
- N*-Methyl-*N*-nitrosourethane 4, 211 (1974); *Suppl.* 7, 66 (1987)
- N*-Methylolacrylamide 60, 435 (1994)
- Methyl parathion 30, 131 (1983); *Suppl.* 7, 66, 392 (1987)
- 1-Methylphenanthrene 32, 405 (1983); *Suppl.* 7, 66 (1987)
- 7-Methylpyrido[3,4-*c*]psoralen 40, 349 (1986); *Suppl.* 7, 71 (1987)
- Methyl red 8, 161 (1975); *Suppl.* 7, 66 (1987)
- Methyl selenac (*see also* Selenium and selenium compounds) 12, 161 (1976); *Suppl.* 7, 66 (1987)
- Methylthiouracil 7, 53 (1974); *Suppl.* 7, 66 (1987);
79, 75 (2001)
- Metronidazole 13, 113 (1977); *Suppl.* 7, 250 (1987)
- Mineral oils 3, 30 (1973); 33, 87 (1984)
(*corr.* 42, 262); *Suppl.* 7, 252 (1987)
- Mirex 5, 203 (1974); 20, 283 (1979)
(*corr.* 42, 258); *Suppl.* 7, 66 (1987)
- Mists and vapours from sulfuric acid and other strong inorganic acids 54, 41 (1992)
- Mitomycin C 10, 171 (1976); *Suppl.* 7, 67 (1987)
- Mitoxantrone 76, 289 (2000)
- MNNG (*see N*-Methyl-*N*-nitro-*N*-nitrosoguanidine)
- MOCA (*see* 4,4'-Methylene bis(2-chloroaniline))
- Modacrylic fibres 19, 86 (1979); *Suppl.* 7, 67 (1987)
- Monochloramine (*see* Chloramine)
- Monocrotaline 10, 291 (1976); *Suppl.* 7, 67 (1987)
- Monuron 12, 167 (1976); *Suppl.* 7, 67 (1987);
53, 467 (1991)
- MOPP and other combined chemotherapy including alkylating agents
Suppl. 7, 254 (1987)
- Mordanite (*see* Zeolites)
- Morinda officinalis* (*see also* Traditional herbal medicines) 82, 129 (2002)
- Morpholine 47, 199 (1989); 71, 1511 (1999)
- 5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene)amino]-2-oxazolidinone 7, 161 (1974); *Suppl.* 7, 67 (1987)
- Musk ambrette 65, 477 (1996)
- Musk xylene 65, 477 (1996)
- Mustard gas 9, 181 (1975) (*corr.* 42, 254);
Suppl. 7, 259 (1987)
- Myleran (*see* 1,4-Butanediol dimethanesulfonate)

N

Nafenopin	24, 125 (1980); <i>Suppl.</i> 7, 67 (1987)
Naphthalene	82, 367 (2002)
1,5-Naphthalenediamine	27, 127 (1982); <i>Suppl.</i> 7, 67 (1987)
1,5-Naphthalene diisocyanate	19, 311 (1979); <i>Suppl.</i> 7, 67 (1987); 71, 1515 (1999)
1-Naphthylamine	4, 87 (1974) (<i>corr.</i> 42, 253); <i>Suppl.</i> 7, 260 (1987)
2-Naphthylamine	4, 97 (1974); <i>Suppl.</i> 7, 261 (1987)
1-Naphthylthiourea	30, 347 (1983); <i>Suppl.</i> 7, 263 (1987)
Neutrons	75, 361 (2000)
Nickel acetate (<i>see</i> Nickel and nickel compounds)	
Nickel ammonium sulfate (<i>see</i> Nickel and nickel compounds)	
Nickel and nickel compounds (<i>see also</i> Implants, surgical)	2, 126 (1973) (<i>corr.</i> 42, 252); 11, 75 (1976); <i>Suppl.</i> 7, 264 (1987) (<i>corr.</i> 45, 283); 49, 257 (1990) (<i>corr.</i> 67, 395)
Nickel carbonate (<i>see</i> Nickel and nickel compounds)	
Nickel carbonyl (<i>see</i> Nickel and nickel compounds)	
Nickel chloride (<i>see</i> Nickel and nickel compounds)	
Nickel-gallium alloy (<i>see</i> Nickel and nickel compounds)	
Nickel hydroxide (<i>see</i> Nickel and nickel compounds)	
Nickelocene (<i>see</i> Nickel and nickel compounds)	
Nickel oxide (<i>see</i> Nickel and nickel compounds)	
Nickel subsulfide (<i>see</i> Nickel and nickel compounds)	
Nickel sulfate (<i>see</i> Nickel and nickel compounds)	
Niridazole	13, 123 (1977); <i>Suppl.</i> 7, 67 (1987)
Nithiazide	31, 179 (1983); <i>Suppl.</i> 7, 67 (1987)
Nitrioltriacetic acid and its salts	48, 181 (1990); 73, 385 (1999)
5-Nitroacenaphthene	16, 319 (1978); <i>Suppl.</i> 7, 67 (1987)
5-Nitro- <i>ortho</i> -anisidine	27, 133 (1982); <i>Suppl.</i> 7, 67 (1987)
2-Nitroanisole	65, 369 (1996)
9-Nitroanthracene	33, 179 (1984); <i>Suppl.</i> 7, 67 (1987)
7-Nitrobenz[<i>a</i>]anthracene	46, 247 (1989)
Nitrobenzene	65, 381 (1996)
6-Nitrobenzo[<i>a</i>]pyrene	33, 187 (1984); <i>Suppl.</i> 7, 67 (1987); 46, 255 (1989)
4-Nitrobiphenyl	4, 113 (1974); <i>Suppl.</i> 7, 67 (1987)
6-Nitrochrysene	33, 195 (1984); <i>Suppl.</i> 7, 67 (1987); 46, 267 (1989)
Nitrofen (technical-grade)	30, 271 (1983); <i>Suppl.</i> 7, 67 (1987)
3-Nitrofluoranthene	33, 201 (1984); <i>Suppl.</i> 7, 67 (1987)
2-Nitrofluorene	46, 277 (1989)
Nitrofural	7, 171 (1974); <i>Suppl.</i> 7, 67 (1987); 50, 195 (1990)
5-Nitro-2-furaldehyde semicarbazone (<i>see</i> Nitrofural)	
Nitrofurantoin	50, 211 (1990)
Nitrofurazone (<i>see</i> Nitrofural)	
1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone	7, 181 (1974); <i>Suppl.</i> 7, 67 (1987)
<i>N</i> -[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide	1, 181 (1972); 7, 185 (1974); <i>Suppl.</i> 7, 67 (1987)
Nitrogen mustard	9, 193 (1975); <i>Suppl.</i> 7, 269 (1987)

- Nitrogen mustard *N*-oxide 9, 209 (1975); *Suppl.* 7, 67 (1987)
- Nitromethane 77, 487 (2000)
- 1-Nitronaphthalene 46, 291 (1989)
- 2-Nitronaphthalene 46, 303 (1989)
- 3-Nitroperylene 46, 313 (1989)
- 2-Nitro-*para*-phenylenediamine (*see* 1,4-Diamino-2-nitrobenzene)
- 2-Nitropropane 29, 331 (1982); *Suppl.* 7, 67 (1987); 71, 1079 (1999)
- 1-Nitropyrene 33, 209 (1984); *Suppl.* 7, 67 (1987); 46, 321 (1989)
- 2-Nitropyrene 46, 359 (1989)
- 4-Nitropyrene 46, 367 (1989)
- N*-Nitrosatable drugs 24, 297 (1980) (*corr.* 42, 260)
- N*-Nitrosatable pesticides 30, 359 (1983)
- N'*-Nitrosoanabasine (NAB) 37, 225 (1985); *Suppl.* 7, 67 (1987); 89 (2007)
- N'*-Nitrosoanatabine (NAT) 37, 233 (1985); *Suppl.* 7, 67 (1987); 89 (2007)
- N*-Nitrosodi-*n*-butylamine 4, 197 (1974); 17, 51 (1978); *Suppl.* 7, 67 (1987)
- N*-Nitrosodiethanolamine 17, 77 (1978); *Suppl.* 7, 67 (1987); 77, 403 (2000)
- N*-Nitrosodiethylamine 1, 107 (1972) (*corr.* 42, 251); 17, 83 (1978) (*corr.* 42, 257); *Suppl.* 7, 67 (1987)
- N*-Nitrosodimethylamine 1, 95 (1972); 17, 125 (1978) (*corr.* 42, 257); *Suppl.* 7, 67 (1987)
- N*-Nitrosodiphenylamine 27, 213 (1982); *Suppl.* 7, 67 (1987)
- para*-Nitrosodiphenylamine 27, 227 (1982) (*corr.* 42, 261); *Suppl.* 7, 68 (1987)
- N*-Nitrosodi-*n*-propylamine 17, 177 (1978); *Suppl.* 7, 68 (1987)
- N*-Nitroso-*N*-ethylurea (*see* *N*-Ethyl-*N*-nitrosourea)
- N*-Nitrosolic acid 17, 217 (1978); *Suppl.* 7, 68 (1987)
- N*-Nitrosoguvacine 37, 263 (1985); *Suppl.* 7, 68 (1987); 85, 281 (2004)
- N*-Nitrosoguvacoline 37, 263 (1985); *Suppl.* 7, 68 (1987); 85, 281 (2004)
- N*-Nitrosohydroxyproline 17, 304 (1978); *Suppl.* 7, 68 (1987)
- 3-(*N*-Nitrosomethylamino)propionaldehyde 37, 263 (1985); *Suppl.* 7, 68 (1987); 85, 281 (2004)
- 3-(*N*-Nitrosomethylamino)propionitrile 37, 263 (1985); *Suppl.* 7, 68 (1987); 85, 281 (2004)
- 4-(*N*-Nitrosomethylamino)-4-(3-pyridyl)-1-butanal 37, 205 (1985); *Suppl.* 7, 68 (1987)
- 4-(*N*-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK) 37, 209 (1985); *Suppl.* 7, 68 (1987); 89 (2007)
- N*-Nitrosomethylethylamine 17, 221 (1978); *Suppl.* 7, 68 (1987)
- N*-Nitroso-*N*-methylurea (*see* *N*-Methyl-*N*-nitrosourea)
- N*-Nitroso-*N*-methylurethane (*see* *N*-Methyl-*N*-nitrosourethane)
- N*-Nitrosomethylvinylamine 17, 257 (1978); *Suppl.* 7, 68 (1987)
- N*-Nitrosomorpholine 17, 263 (1978); *Suppl.* 7, 68 (1987)
- N'*-Nitrososornicotine (NNN) 17, 281 (1978); 37, 241 (1985); *Suppl.* 7, 68 (1987); 89 (2007)
- N*-Nitrosopiperidine 17, 287 (1978); *Suppl.* 7, 68 (1987)
- N*-Nitrosoproline 17, 303 (1978); *Suppl.* 7, 68 (1987)

- N*-Nitrosopyrrolidine 17, 313 (1978); *Suppl.* 7, 68 (1987)
N-Nitrososarcosine 17, 327 (1978); *Suppl.* 7, 68 (1987)
 Nitrosoureas, chloroethyl (*see* Chloroethyl nitrosoureas)
 5-Nitro-*ortho*-toluidine 48, 169 (1990)
 2-Nitrotoluene 65, 409 (1996)
 3-Nitrotoluene 65, 409 (1996)
 4-Nitrotoluene 65, 409 (1996)
 Nitrous oxide (*see* Anaesthetics, volatile)
 Nitrovin 31, 185 (1983); *Suppl.* 7, 68 (1987)
 Nivalenol (*see* Toxins derived from *Fusarium graminearum*,
F. culmorum and *F. crookwellense*)
 NNK (*see* 4-(*N*-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone)
 NNN (*see N*-Nitrosornornicotine)
 Nonsteroidal oestrogens *Suppl.* 7, 273 (1987)
 Norethisterone 6, 179 (1974); 21, 461 (1979);
Suppl. 7, 294 (1987); 72, 49
 (1999)
 Norethisterone acetate 72, 49 (1999)
 Norethynodrel 6, 191 (1974); 21, 461 (1979)
 (*corr.* 42, 259); *Suppl.* 7, 295
 (1987); 72, 49 (1999)
 Norgestrel 6, 201 (1974); 21, 479 (1979);
Suppl. 7, 295 (1987); 72, 49 (1999)
 Nylon 6 19, 120 (1979); *Suppl.* 7, 68 (1987)
- O**
- Ochratoxin A 10, 191 (1976); 31, 191 (1983)
 (*corr.* 42, 262); *Suppl.* 7, 271
 (1987); 56, 489 (1993)
 Oestradiol 6, 99 (1974); 21, 279 (1979);
Suppl. 7, 284 (1987); 72, 399
 (1999)
 Oestradiol-17 β (*see* Oestradiol)
 Oestradiol 3-benzoate (*see* Oestradiol)
 Oestradiol dipropionate (*see* Oestradiol)
 Oestradiol mustard 9, 217 (1975); *Suppl.* 7, 68 (1987)
 Oestradiol valerate (*see* Oestradiol)
 Oestriol 6, 117 (1974); 21, 327 (1979);
Suppl. 7, 285 (1987); 72, 399
 (1999)
 Oestrogen-progestin combinations (*see* Oestrogens,
 progestins (progestogens) and combinations)
 Oestrogen-progestin replacement therapy (*see* Post-menopausal
 oestrogen-progestogen therapy)
 Oestrogen replacement therapy (*see* Post-menopausal oestrogen
 therapy)
 Oestrogens (*see* Oestrogens, progestins and combinations)
 Oestrogens, conjugated (*see* Conjugated oestrogens)
 Oestrogens, nonsteroidal (*see* Nonsteroidal oestrogens)
 Oestrogens, progestins (progestogens) and combinations 6 (1974); 21 (1979); *Suppl.* 7, 272
 (1987); 72, 49, 339, 399, 531
 (1999)

- Oestrogens, steroidal (*see* Steroidal oestrogens)
- Oestrone 6, 123 (1974); 21, 343 (1979)
(*corr.* 42, 259); *Suppl.* 7, 286
(1987); 72, 399 (1999)
- Oestrone benzoate (*see* Oestrone)
- Oil Orange SS 8, 165 (1975); *Suppl.* 7, 69 (1987)
- Opisthorchis felineus* (infection with) 61, 121 (1994)
- Opisthorchis viverrini* (infection with) 61, 121 (1994)
- Oral contraceptives, combined *Suppl.* 7, 297 (1987); 72, 49 (1999)
- Oral contraceptives, sequential (*see* Sequential oral contraceptives)
- Orange I 8, 173 (1975); *Suppl.* 7, 69 (1987)
- Orange G 8, 181 (1975); *Suppl.* 7, 69 (1987)
- Organic lead compounds *Suppl.* 7, 230 (1987); 87 (2006)
- Organolead compounds (*see* Organic lead compounds)
- Oxazepam 13, 58 (1977); *Suppl.* 7, 69 (1987);
66, 115 (1996)
- Oxymetholone (*see also* Androgenic (anabolic) steroids) 13, 131 (1977)
- Oxyphenbutazone 13, 185 (1977); *Suppl.* 7, 69 (1987)
- P**
- Paint manufacture and painting (occupational exposures in) 47, 329 (1989)
- Palygorskite 42, 159 (1987); *Suppl.* 7, 117
(1987); 68, 245 (1997)
- Panfuran S (*see also* Dihydroxymethylfuratrizine) 24, 77 (1980); *Suppl.* 7, 69 (1987)
- Paper manufacture (*see* Pulp and paper manufacture)
- Paracetamol 50, 307 (1990); 73, 401 (1999)
- Parasorbic acid 10, 199 (1976) (*corr.* 42, 255);
Suppl. 7, 69 (1987)
- Parathion 30, 153 (1983); *Suppl.* 7, 69 (1987)
- Patulin 10, 205 (1976); 40, 83 (1986);
Suppl. 7, 69 (1987)
- Penicillic acid 10, 211 (1976); *Suppl.* 7, 69 (1987)
- Pentachloroethane 41, 99 (1986); *Suppl.* 7, 69 (1987);
71, 1519 (1999)
- Pentachloronitrobenzene (*see* Quintozene)
- Pentachlorophenol (*see also* Chlorophenols; Chlorophenols,
occupational exposures to; Polychlorophenols and their sodium salts) 20, 303 (1979); 53, 371 (1991)
- Permethrin 53, 329 (1991)
- Perylene 32, 411 (1983); *Suppl.* 7, 69 (1987)
- Petasitenine 31, 207 (1983); *Suppl.* 7, 69 (1987)
- Petasites japonicus (*see also* Pyrrolizidine alkaloids) 10, 333 (1976)
- Petroleum refining (occupational exposures in) 45, 39 (1989)
- Petroleum solvents 47, 43 (1989)
- Phenacetin 13, 141 (1977); 24, 135 (1980);
Suppl. 7, 310 (1987)
- Phenanthrene 32, 419 (1983); *Suppl.* 7, 69 (1987)
- Phenazopyridine hydrochloride 8, 117 (1975); 24, 163 (1980)
(*corr.* 42, 260); *Suppl.* 7, 312
(1987)
- Phenelzine sulfate 24, 175 (1980); *Suppl.* 7, 312
(1987)
- Phenicarbazide 12, 177 (1976); *Suppl.* 7, 70 (1987)

Phenobarbital and its sodium salt	13, 157 (1977); <i>Suppl.</i> 7, 313 (1987); 79, 161 (2001)
Phenol	47, 263 (1989) (<i>corr.</i> 50, 385); 71, 749 (1999)
Phenolphthalein	76, 387 (2000)
Phenoxyacetic acid herbicides (<i>see</i> Chlorophenoxy herbicides)	
Phenoxybenzamine hydrochloride	9, 223 (1975); 24, 185 (1980); <i>Suppl.</i> 7, 70 (1987)
Phenylbutazone	13, 183 (1977); <i>Suppl.</i> 7, 316 (1987)
<i>meta</i> -Phenylenediamine	16, 111 (1978); <i>Suppl.</i> 7, 70 (1987)
<i>para</i> -Phenylenediamine	16, 125 (1978); <i>Suppl.</i> 7, 70 (1987)
Phenyl glycidyl ether (<i>see also</i> Glycidyl ethers)	71, 1525 (1999)
<i>N</i> -Phenyl-2-naphthylamine	16, 325 (1978) (<i>corr.</i> 42, 257); <i>Suppl.</i> 7, 318 (1987)
<i>ortho</i> -Phenylphenol	30, 329 (1983); <i>Suppl.</i> 7, 70 (1987); 73, 451 (1999)
Phenytoin	13, 201 (1977); <i>Suppl.</i> 7, 319 (1987); 66, 175 (1996)
Phillipsite (<i>see</i> Zeolites)	
PhIP	56, 229 (1993)
Pickled vegetables	56, 83 (1993)
Picloram	53, 481 (1991)
Piperazine oestrone sulfate (<i>see</i> Conjugated oestrogens)	
Piperonyl butoxide	30, 183 (1983); <i>Suppl.</i> 7, 70 (1987)
Pitches, coal-tar (<i>see</i> Coal-tar pitches)	
Polyacrylic acid	19, 62 (1979); <i>Suppl.</i> 7, 70 (1987)
Polybrominated biphenyls	18, 107 (1978); 41, 261 (1986); <i>Suppl.</i> 7, 321 (1987)
Polychlorinated biphenyls	7, 261 (1974); 18, 43 (1978) (<i>corr.</i> 42, 258); <i>Suppl.</i> 7, 322 (1987)
Polychlorinated camphenes (<i>see</i> Toxaphene)	
Polychlorinated dibenzo- <i>para</i> -dioxins (other than 2,3,7,8-tetrachlorodibenzodioxin)	69, 33 (1997)
Polychlorinated dibenzofurans	69, 345 (1997)
Polychlorophenols and their sodium salts	71, 769 (1999)
Polychloroprene	19, 141 (1979); <i>Suppl.</i> 7, 70 (1987)
Polyethylene (<i>see also</i> Implants, surgical)	19, 164 (1979); <i>Suppl.</i> 7, 70 (1987)
Poly(glycolic acid) (<i>see</i> Implants, surgical)	
Polymethylene polyphenyl isocyanate (<i>see also</i> 4,4'-Methylenediphenyl diisocyanate)	19, 314 (1979); <i>Suppl.</i> 7, 70 (1987)
Polymethyl methacrylate (<i>see also</i> Implants, surgical)	19, 195 (1979); <i>Suppl.</i> 7, 70 (1987)
Polyoestradiol phosphate (<i>see</i> Oestradiol-17 β)	
Polypropylene (<i>see also</i> Implants, surgical)	19, 218 (1979); <i>Suppl.</i> 7, 70 (1987)
Polystyrene (<i>see also</i> Implants, surgical)	19, 245 (1979); <i>Suppl.</i> 7, 70 (1987)
Polytetrafluoroethylene (<i>see also</i> Implants, surgical)	19, 288 (1979); <i>Suppl.</i> 7, 70 (1987)
Polyurethane foams (<i>see also</i> Implants, surgical)	19, 320 (1979); <i>Suppl.</i> 7, 70 (1987)
Polyvinyl acetate (<i>see also</i> Implants, surgical)	19, 346 (1979); <i>Suppl.</i> 7, 70 (1987)
Polyvinyl alcohol (<i>see also</i> Implants, surgical)	19, 351 (1979); <i>Suppl.</i> 7, 70 (1987)
Polyvinyl chloride (<i>see also</i> Implants, surgical)	7, 306 (1974); 19, 402 (1979); <i>Suppl.</i> 7, 70 (1987)
Polyvinyl pyrrolidone	19, 463 (1979); <i>Suppl.</i> 7, 70 (1987); 71, 1181 (1999)

- Ponceau MX 8, 189 (1975); *Suppl.* 7, 70 (1987)
 Ponceau 3R 8, 199 (1975); *Suppl.* 7, 70 (1987)
 Ponceau SX 8, 207 (1975); *Suppl.* 7, 70 (1987)
 Post-menopausal oestrogen therapy *Suppl.* 7, 280 (1987); 72, 399 (1999)
 Post-menopausal oestrogen-progestogen therapy *Suppl.* 7, 308 (1987); 72, 531 (1999)
- Potassium arsenate (*see* Arsenic and arsenic compounds)
 Potassium arsenite (*see* Arsenic and arsenic compounds)
 Potassium bis(2-hydroxyethyl)dithiocarbamate 12, 183 (1976); *Suppl.* 7, 70 (1987)
 Potassium bromate 40, 207 (1986); *Suppl.* 7, 70 (1987); 73, 481 (1999)
- Potassium chromate (*see* Chromium and chromium compounds)
 Potassium dichromate (*see* Chromium and chromium compounds)
 Prazepam 66, 143 (1996)
 Prednimustine 50, 115 (1990)
 Prednisone 26, 293 (1981); *Suppl.* 7, 326 (1987)
- Printing processes and printing inks 65, 33 (1996)
 Procarbazine hydrochloride 26, 311 (1981); *Suppl.* 7, 327 (1987)
- Proflavine salts 24, 195 (1980); *Suppl.* 7, 70 (1987)
 Progesterone (*see also* Progestins; Combined oral contraceptives) 6, 135 (1974); 21, 491 (1979) (*corr.* 42, 259)
- Progestins (*see* Progestogens)
 Progestogens *Suppl.* 7, 289 (1987); 72, 49, 339, 531 (1999)
- Pronetolol hydrochloride 13, 227 (1977) (*corr.* 42, 256); *Suppl.* 7, 70 (1987)
- 1,3-Propane sultone 4, 253 (1974) (*corr.* 42, 253); *Suppl.* 7, 70 (1987); 71, 1095 (1999)
- Propham 12, 189 (1976); *Suppl.* 7, 70 (1987)
 β -Propiolactone 4, 259 (1974) (*corr.* 42, 253); *Suppl.* 7, 70 (1987); 71, 1103 (1999)
- n*-Propyl carbamate 12, 201 (1976); *Suppl.* 7, 70 (1987)
 Propylene 19, 213 (1979); *Suppl.* 7, 71 (1987); 60, 161 (1994)
- Propyleneimine (*see* 2-Methylaziridine)
 Propylene oxide 11, 191 (1976); 36, 227 (1985) (*corr.* 42, 263); *Suppl.* 7, 328 (1987); 60, 181 (1994)
- Propylthiouracil 7, 67 (1974); *Suppl.* 7, 329 (1987); 79, 91 (2001)
- Ptaquiloside (*see also* Bracken fern)
 Pulp and paper manufacture 40, 55 (1986); *Suppl.* 7, 71 (1987)
 25, 157 (1981); *Suppl.* 7, 385 (1987)
- Pyrene 32, 431 (1983); *Suppl.* 7, 71 (1987)
 Pyridine 77, 503 (2000)
 Pyrido[3,4-*c*]psoralen 40, 349 (1986); *Suppl.* 7, 71 (1987)
 Pyrimethamine 13, 233 (1977); *Suppl.* 7, 71 (1987)

Pyrolizidine alkaloids (*see* Hydroxysenkirkine; Isatidine; Jacobine; Lasiocarpine; Monocrotaline; Retrorsine; Riddelliine; Seneciphylline; Senkirkine)

Q

Quartz (*see* Crystalline silica)
 Quercetin (*see also* Bracken fern) 31, 213 (1983); *Suppl.* 7, 71 (1987); 73, 497 (1999)
para-Quinone 15, 255 (1977); *Suppl.* 7, 71 (1987); 71, 1245 (1999)
 Quintozene 5, 211 (1974); *Suppl.* 7, 71 (1987)

R

Radiation (*see* gamma-radiation, neutrons, ultraviolet radiation, X-radiation)
 Radionuclides, internally deposited 78 (2001)
 Radon 43, 173 (1988) (*corr.* 45, 283)
 Refractory ceramic fibres (*see* Man-made vitreous fibres)
 Reserpine 10, 217 (1976); 24, 211 (1980) (*corr.* 42, 260); *Suppl.* 7, 330 (1987)
 Resorcinol 15, 155 (1977); *Suppl.* 7, 71 (1987); 71, 1119 (1990)
 Retrorsine 10, 303 (1976); *Suppl.* 7, 71 (1987)
 Rhodamine B 16, 221 (1978); *Suppl.* 7, 71 (1987)
 Rhodamine 6G 16, 233 (1978); *Suppl.* 7, 71 (1987)
 Riddelliine 10, 313 (1976); *Suppl.* 7, 71 (1987); 82, 153 (2002)
 Rifampicin 24, 243 (1980); *Suppl.* 7, 71 (1987)
 Ripazepam 66, 157 (1996)
 Rock (stone) wool (*see* Man-made vitreous fibres)
 Rubber industry 28 (1982) (*corr.* 42, 261); *Suppl.* 7, 332 (1987)
Rubia tinctorum (*see also* Madder root, Traditional herbal medicines) 82, 129 (2002)
 Rugulosin 40, 99 (1986); *Suppl.* 7, 71 (1987)

S

Saccharated iron oxide 2, 161 (1973); *Suppl.* 7, 71 (1987)
 Saccharin and its salts 22, 111 (1980) (*corr.* 42, 259); *Suppl.* 7, 334 (1987); 73, 517 (1999)
 Safrole 1, 169 (1972); 10, 231 (1976); *Suppl.* 7, 71 (1987)
 Salted fish 56, 41 (1993)
 Sawmill industry (including logging) (*see* Lumber and sawmill industry (including logging))
 Scarlet Red 8, 217 (1975); *Suppl.* 7, 71 (1987)
Schistosoma haematobium (infection with) 61, 45 (1994)
Schistosoma japonicum (infection with) 61, 45 (1994)

- Schistosoma mansoni* (infection with) 61, 45 (1994)
 Selenium and selenium compounds 9, 245 (1975) (*corr.* 42, 255);
Suppl. 7, 71 (1987)
- Selenium dioxide (*see* Selenium and selenium compounds)
 Selenium oxide (*see* Selenium and selenium compounds)
 Semicarbazide hydrochloride 12, 209 (1976) (*corr.* 42, 256);
Suppl. 7, 71 (1987)
- Senecio jacobaea* L. (*see also* Pyrrolizidine alkaloids) 10, 333 (1976)
Senecio longilobus (*see also* Pyrrolizidine alkaloids, Traditional
 herbal medicines) 10, 334 (1976); 82, 153 (2002)
Senecio riddellii (*see also* Traditional herbal medicines) 82, 153 (1982)
 Seneciphylline 10, 319, 335 (1976); *Suppl.* 7, 71
 (1987)
- Senkirkine 10, 327 (1976); 31, 231 (1983);
Suppl. 7, 71 (1987)
- Sepiolite 42, 175 (1987); *Suppl.* 7, 71
 (1987); 68, 267 (1997)
Suppl. 7, 296 (1987)
- Sequential oral contraceptives (*see also* Oestrogens, progestins
 and combinations)
- Shale-oils 35, 161 (1985); *Suppl.* 7, 339
 (1987)
- Shikimic acid (*see also* Bracken fern) 40, 55 (1986); *Suppl.* 7, 71 (1987)
- Shoe manufacture and repair (*see* Boot and shoe manufacture
 and repair)
- Silica (*see also* Amorphous silica; Crystalline silica) 42, 39 (1987)
- Silicone (*see* Implants, surgical)
- Simazine 53, 495 (1991); 73, 625 (1999)
- Slag wool (*see* Man-made vitreous fibres)
- Sodium arsenate (*see* Arsenic and arsenic compounds)
 Sodium arsenite (*see* Arsenic and arsenic compounds)
 Sodium cacodylate (*see* Arsenic and arsenic compounds)
- Sodium chlorite 52, 145 (1991)
- Sodium chromate (*see* Chromium and chromium compounds)
 Sodium cyclamate (*see* Cyclamates)
 Sodium dichromate (*see* Chromium and chromium compounds)
- Sodium diethyldithiocarbamate 12, 217 (1976); *Suppl.* 7, 71 (1987)
- Sodium equilin sulfate (*see* Conjugated oestrogens)
 Sodium fluoride (*see* Fluorides)
 Sodium monofluorophosphate (*see* Fluorides)
 Sodium oestrone sulfate (*see* Conjugated oestrogens)
 Sodium *ortho*-phenylphenate (*see also ortho*-Phenylphenol) 30, 329 (1983); *Suppl.* 7, 71, 392
 (1987); 73, 451 (1999)
- Sodium saccharin (*see* Saccharin)
 Sodium selenate (*see* Selenium and selenium compounds)
 Sodium selenite (*see* Selenium and selenium compounds)
 Sodium silicofluoride (*see* Fluorides)
- Solar radiation 55 (1992)
- Soots 3, 22 (1973); 35, 219 (1985);
Suppl. 7, 343 (1987)
- Special-purpose glass fibres such as E-glass and '475' glass fibres
 (*see* Man-made vitreous fibres)
- Spirolactone 24, 259 (1980); *Suppl.* 7, 344
 (1987); 79, 317 (2001)
- Stannous fluoride (*see* Fluorides)

Static electric fields	80 (2002)
Static magnetic fields	80 (2002)
Steel founding (<i>see</i> Iron and steel founding)	
Steel, stainless (<i>see</i> Implants, surgical)	
Sterigmatocystin	1, 175 (1972); 10, 245 (1976); <i>Suppl.</i> 7, 72 (1987)
Steroidal oestrogens	<i>Suppl.</i> 7, 280 (1987)
Streptozotocin	4, 221 (1974); 17, 337 (1978); <i>Suppl.</i> 7, 72 (1987)
Strobane® (<i>see</i> Terpene polychlorinates)	
Strong-inorganic-acid mists containing sulfuric acid (<i>see</i> Mists and vapours from sulfuric acid and other strong inorganic acids)	
Strontium chromate (<i>see</i> Chromium and chromium compounds)	
Styrene	19, 231 (1979) (<i>corr.</i> 42, 258); <i>Suppl.</i> 7, 345 (1987); 60, 233 (1994) (<i>corr.</i> 65, 549); 82, 437 (2002)
Styrene-acrylonitrile copolymers	19, 97 (1979); <i>Suppl.</i> 7, 72 (1987)
Styrene-butadiene copolymers	19, 252 (1979); <i>Suppl.</i> 7, 72 (1987)
Styrene-7,8-oxide	11, 201 (1976); 19, 275 (1979); 36, 245 (1985); <i>Suppl.</i> 7, 72 (1987); 60, 321 (1994)
Succinic anhydride	15, 265 (1977); <i>Suppl.</i> 7, 72 (1987)
Sudan I	8, 225 (1975); <i>Suppl.</i> 7, 72 (1987)
Sudan II	8, 233 (1975); <i>Suppl.</i> 7, 72 (1987)
Sudan III	8, 241 (1975); <i>Suppl.</i> 7, 72 (1987)
Sudan Brown RR	8, 249 (1975); <i>Suppl.</i> 7, 72 (1987)
Sudan Red 7B	8, 253 (1975); <i>Suppl.</i> 7, 72 (1987)
Sulfadimidine (<i>see</i> Sulfamethazine)	
Sulfafurazole	24, 275 (1980); <i>Suppl.</i> 7, 347 (1987)
Sulfallate	30, 283 (1983); <i>Suppl.</i> 7, 72 (1987)
Sulfamethazine and its sodium salt	79, 341 (2001)
Sulfamethoxazole	24, 285 (1980); <i>Suppl.</i> 7, 348 (1987); 79, 361 (2001)
Sulfites (<i>see</i> Sulfur dioxide and some sulfites, bisulfites and metabisulfites)	
Sulfur dioxide and some sulfites, bisulfites and metabisulfites	54, 131 (1992)
Sulfur mustard (<i>see</i> Mustard gas)	
Sulfuric acid and other strong inorganic acids, occupational exposures to mists and vapours from	54, 41 (1992)
Sulfur trioxide	54, 121 (1992)
Sulphisoxazole (<i>see</i> Sulfafurazole)	
Sunset Yellow FCF	8, 257 (1975); <i>Suppl.</i> 7, 72 (1987)
Symphytine	31, 239 (1983); <i>Suppl.</i> 7, 72 (1987)
T	
2,4,5-T (<i>see also</i> Chlorophenoxy herbicides; Chlorophenoxy herbicides, occupational exposures to)	15, 273 (1977)
Talc	42, 185 (1987); <i>Suppl.</i> 7, 349 (1987)
Tamoxifen	66, 253 (1996)

- Tannic acid 10, 253 (1976) (*corr.* 42, 255);
Suppl. 7, 72 (1987)
- Tannins (*see also* Tannic acid) 10, 254 (1976); *Suppl.* 7, 72 (1987)
- TCDD (*see* 2,3,7,8-Tetrachlorodibenzo-*para*-dioxin)
- TDE (*see* DDT)
- Tea 51, 207 (1991)
- Temazepam 66, 161 (1996)
- Teniposide 76, 259 (2000)
- Terpene polychlorinates 5, 219 (1974); *Suppl.* 7, 72 (1987)
- Testosterone (*see also* Androgenic (anabolic) steroids) 6, 209 (1974); 21, 519 (1979)
- Testosterone oenanthate (*see* Testosterone)
- Testosterone propionate (*see* Testosterone)
- 2,2',5,5'-Tetrachlorobenzidine 27, 141 (1982); *Suppl.* 7, 72 (1987)
- 2,3,7,8-Tetrachlorodibenzo-*para*-dioxin 15, 41 (1977); *Suppl.* 7, 350 (1987); 69, 33 (1997)
- 1,1,1,2-Tetrachloroethane 41, 87 (1986); *Suppl.* 7, 72 (1987); 71, 1133 (1999)
- 1,1,2,2-Tetrachloroethane 20, 477 (1979); *Suppl.* 7, 354 (1987); 71, 817 (1999)
- Tetrachloroethylene 20, 491 (1979); *Suppl.* 7, 355 (1987); 63, 159 (1995) (*corr.* 65, 549)
- 2,3,4,6-Tetrachlorophenol (*see* Chlorophenols; Chlorophenols, occupational exposures to; Polychlorophenols and their sodium salts)
- Tetrachlorvinphos 30, 197 (1983); *Suppl.* 7, 72 (1987)
- Tetraethyllead (*see* Lead and lead compounds)
- Tetrafluoroethylene 19, 285 (1979); *Suppl.* 7, 72 (1987); 71, 1143 (1999)
- Tetrakis(hydroxymethyl)phosphonium salts 48, 95 (1990); 71, 1529 (1999)
- Tetramethyllead (*see* Lead and lead compounds)
- Tetranitromethane 65, 437 (1996)
- Textile manufacturing industry, exposures in 48, 215 (1990) (*corr.* 51, 483)
- Theobromine 51, 421 (1991)
- Theophylline 51, 391 (1991)
- Thioacetamide 7, 77 (1974); *Suppl.* 7, 72 (1987)
- 4,4'-Thiodianiline 16, 343 (1978); 27, 147 (1982); *Suppl.* 7, 72 (1987)
- Thiotepa 9, 85 (1975); *Suppl.* 7, 368 (1987); 50, 123 (1990)
- Thiouracil 7, 85 (1974); *Suppl.* 7, 72 (1987); 79, 127 (2001)
- Thiourea 7, 95 (1974); *Suppl.* 7, 72 (1987); 79, 703 (2001)
- Thiram 12, 225 (1976); *Suppl.* 7, 72 (1987); 53, 403 (1991)
- Titanium (*see* Implants, surgical)
- Titanium dioxide 47, 307 (1989)
- Tobacco
- Involuntary smoking 83, 1189 (2004)
- Smokeless tobacco 37 (1985) (*corr.* 42, 263; 52, 513); *Suppl.* 7, 357 (1987); 89 (2007)
- Tobacco smoke 38 (1986) (*corr.* 42, 263); *Suppl.* 7, 359 (1987); 83, 51 (2004)
- ortho*-Tolidine (*see* 3,3'-Dimethylbenzidine)

2,4-Toluene diisocyanate (<i>see also</i> Toluene diisocyanates)	19, 303 (1979); 39, 287 (1986)
2,6-Toluene diisocyanate (<i>see also</i> Toluene diisocyanates)	19, 303 (1979); 39, 289 (1986)
Toluene	47, 79 (1989); 71, 829 (1999)
Toluene diisocyanates	39, 287 (1986) (<i>corr.</i> 42, 264); Suppl. 7, 72 (1987); 71, 865 (1999)
Toluenes, α -chlorinated (<i>see</i> α -Chlorinated toluenes and benzoyl chloride)	
<i>ortho</i> -Toluenesulfonamide (<i>see</i> Saccharin)	
<i>ortho</i> -Toluidine	16, 349 (1978); 27, 155 (1982) (<i>corr.</i> 68, 477); Suppl. 7, 362 (1987); 77, 267 (2000)
Toremifene	66, 367 (1996)
Toxaphene	20, 327 (1979); Suppl. 7, 72 (1987); 79, 569 (2001)
T-2 Toxin (<i>see</i> Toxins derived from <i>Fusarium sporotrichioides</i>)	
Toxins derived from <i>Fusarium graminearum</i> , <i>F. culmorum</i> and <i>F. crookwellense</i>	11, 169 (1976); 31, 153, 279 (1983); Suppl. 7, 64, 74 (1987); 56, 397 (1993)
Toxins derived from <i>Fusarium moniliforme</i>	56, 445 (1993)
Toxins derived from <i>Fusarium sporotrichioides</i>	31, 265 (1983); Suppl. 7, 73 (1987); 56, 467 (1993)
Traditional herbal medicines	82, 41 (2002)
Tremolite (<i>see</i> Asbestos)	
Treosulfan	26, 341 (1981); Suppl. 7, 363 (1987)
Triaziquone (<i>see</i> Tris(aziridinyl)- <i>para</i> -benzoquinone)	
Trichlorfon	30, 207 (1983); Suppl. 7, 73 (1987)
Trichlormethine	9, 229 (1975); Suppl. 7, 73 (1987); 50, 143 (1990)
Trichloroacetic acid	63, 291 (1995) (<i>corr.</i> 65, 549); 84 (2004)
Trichloroacetonitrile (<i>see also</i> Halogenated acetonitriles)	71, 1533 (1999)
1,1,1-Trichloroethane	20, 515 (1979); Suppl. 7, 73 (1987); 71, 881 (1999)
1,1,2-Trichloroethane	20, 533 (1979); Suppl. 7, 73 (1987); 52, 337 (1991); 71, 1153 (1999)
Trichloroethylene	11, 263 (1976); 20, 545 (1979); Suppl. 7, 364 (1987); 63, 75 (1995) (<i>corr.</i> 65, 549)
2,4,5-Trichlorophenol (<i>see also</i> Chlorophenols; Chlorophenols, occupational exposures to; Polychlorophenols and their sodium salts)	20, 349 (1979)
2,4,6-Trichlorophenol (<i>see also</i> Chlorophenols; Chlorophenols, occupational exposures to; Polychlorophenols and their sodium salts)	20, 349 (1979)
(2,4,5-Trichlorophenoxy)acetic acid (<i>see</i> 2,4,5-T)	
1,2,3-Trichloropropane	63, 223 (1995)
Trichlorotriethylamine-hydrochloride (<i>see</i> Trichlormethine)	
T ₂ -Trichothecene (<i>see</i> Toxins derived from <i>Fusarium sporotrichioides</i>)	
Tridymite (<i>see</i> Crystalline silica)	
Triethanolamine	77, 381 (2000)
Triethylene glycol diglycidyl ether	11, 209 (1976); Suppl. 7, 73 (1987); 71, 1539 (1999)
Trifluralin	53, 515 (1991)
4,4',6-Trimethylangelicin plus ultraviolet radiation (<i>see also</i> Angelicin and some synthetic derivatives)	Suppl. 7, 57 (1987)

- 2,4,5-Trimethylaniline 27, 177 (1982); *Suppl.* 7, 73 (1987)
2,4,6-Trimethylaniline 27, 178 (1982); *Suppl.* 7, 73 (1987)
4,5',8-Trimethylpsoralen 40, 357 (1986); *Suppl.* 7, 366 (1987)
- Trimustine hydrochloride (*see* Trichlormethine)
- 2,4,6-Trinitrotoluene 65, 449 (1996)
- Triphenylene 32, 447 (1983); *Suppl.* 7, 73 (1987)
- Tris(aziridinyl)-*para*-benzoquinone 9, 67 (1975); *Suppl.* 7, 367 (1987)
- Tris(1-aziridinyl)phosphine-oxide 9, 75 (1975); *Suppl.* 7, 73 (1987)
- Tris(1-aziridinyl)phosphine-sulphide (*see* Thiotepa)
- 2,4,6-Tris(1-aziridinyl)-*s*-triazine 9, 95 (1975); *Suppl.* 7, 73 (1987)
- Tris(2-chloroethyl) phosphate 48, 109 (1990); 71, 1543 (1999)
- 1,2,3-Tris(chloromethoxy)propane 15, 301 (1977); *Suppl.* 7, 73 (1987); 71, 1549 (1999)
- Tris(2,3-dibromopropyl) phosphate 20, 575 (1979); *Suppl.* 7, 369 (1987); 71, 905 (1999)
- Tris(2-methyl-1-aziridinyl)phosphine-oxide 9, 107 (1975); *Suppl.* 7, 73 (1987)
- Trp-P-1 31, 247 (1983); *Suppl.* 7, 73 (1987)
- Trp-P-2 31, 255 (1983); *Suppl.* 7, 73 (1987)
- Trypan blue 8, 267 (1975); *Suppl.* 7, 73 (1987)
- Tussilago farfara* L. (*see also* Pyrrolizidine alkaloids) 10, 334 (1976)
- U**
- Ultraviolet radiation 40, 379 (1986); 55 (1992)
- Underground haematite mining with exposure to radon 1, 29 (1972); *Suppl.* 7, 216 (1987)
- Uracil mustard 9, 235 (1975); *Suppl.* 7, 370 (1987)
- Uranium, depleted (*see* Implants, surgical)
- Urethane 7, 111 (1974); *Suppl.* 7, 73 (1987)
- V**
- Vanadium pentoxide 86, 227 (2006)
- Vat Yellow 4 48, 161 (1990)
- Vinblastine sulfate 26, 349 (1981) (*corr.* 42, 261); *Suppl.* 7, 371 (1987)
- Vincristine sulfate 26, 365 (1981); *Suppl.* 7, 372 (1987)
- Vinyl acetate 19, 341 (1979); 39, 113 (1986); *Suppl.* 7, 73 (1987); 63, 443 (1995)
- Vinyl bromide 19, 367 (1979); 39, 133 (1986); *Suppl.* 7, 73 (1987); 71, 923 (1999)
- Vinyl chloride 7, 291 (1974); 19, 377 (1979) (*corr.* 42, 258); *Suppl.* 7, 373 (1987)
- Vinyl chloride-vinyl acetate copolymers 7, 311 (1976); 19, 412 (1979) (*corr.* 42, 258); *Suppl.* 7, 73 (1987)
- 4-Vinylcyclohexene 11, 277 (1976); 39, 181 (1986) *Suppl.* 7, 73 (1987); 60, 347 (1994)
- 4-Vinylcyclohexene diepoxide 11, 141 (1976); *Suppl.* 7, 63 (1987); 60, 361 (1994)

- Vinyl fluoride 39, 147 (1986); *Suppl. 7*, 73 (1987); 63, 467 (1995)
- Vinylidene chloride 19, 439 (1979); 39, 195 (1986); *Suppl. 7*, 376 (1987); 71, 1163 (1999)
- Vinylidene chloride-vinyl chloride copolymers 19, 448 (1979) (*corr.* 42, 258); *Suppl. 7*, 73 (1987)
- Vinylidene fluoride 39, 227 (1986); *Suppl. 7*, 73 (1987); 71, 1551 (1999)
- N-Vinyl-2-pyrrolidone 19, 461 (1979); *Suppl. 7*, 73 (1987); 71, 1181 (1999)
- Vinyl toluene 60, 373 (1994)
- Vitamin K substances 76, 417 (2000)
- W**
- Welding 49, 447 (1990) (*corr.* 52, 513)
- Wollastonite 42, 145 (1987); *Suppl. 7*, 377 (1987); 68, 283 (1997)
- Wood dust 62, 35 (1995)
- Wood industries 25 (1981); *Suppl. 7*, 378 (1987)
- X**
- X-radiation 75, 121 (2000)
- Xylenes 47, 125 (1989); 71, 1189 (1999)
- 2,4-Xylidine 16, 367 (1978); *Suppl. 7*, 74 (1987)
- 2,5-Xylidine 16, 377 (1978); *Suppl. 7*, 74 (1987)
- 2,6-Xylidine (*see* 2,6-Dimethylaniline)
- Y**
- Yellow AB 8, 279 (1975); *Suppl. 7*, 74 (1987)
- Yellow OB 8, 287 (1975); *Suppl. 7*, 74 (1987)
- Z**
- Zalcitabine 76, 129 (2000)
- Zearalenone (*see* Toxins derived from *Fusarium graminearum*, *F. culmorum* and *F. crookwellense*)
- Zectran 12, 237 (1976); *Suppl. 7*, 74 (1987)
- Zeolites other than erionite 68, 307 (1997)
- Zidovudine 76, 73 (2000)
- Zinc beryllium silicate (*see* Beryllium and beryllium compounds)
- Zinc chromate (*see* Chromium and chromium compounds)
- Zinc chromate hydroxide (*see* Chromium and chromium compounds)
- Zinc potassium chromate (*see* Chromium and chromium compounds)
- Zinc yellow (*see* Chromium and chromium compounds)
- Zineb 12, 245 (1976); *Suppl. 7*, 74 (1987)
- Ziram 12, 259 (1976); *Suppl. 7*, 74 (1987); 53, 423 (1991)

List of IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*

- Volume 1
Some Inorganic Substances, Chlorinated Hydrocarbons, Aromatic Amines, N-Nitroso Compounds, and Natural Products
1972; 184 pages (*out-of-print*)
- Volume 2
Some Inorganic and Organometallic Compounds
1973; 181 pages (*out-of-print*)
- Volume 3
Certain Polycyclic Aromatic Hydrocarbons and Heterocyclic Compounds
1973; 271 pages (*out-of-print*)
- Volume 4
Some Aromatic Amines, Hydrazine and Related Substances, N-Nitroso Compounds and Miscellaneous Alkylating Agents
1974; 286 pages (*out-of-print*)
- Volume 5
Some Organochlorine Pesticides
1974; 241 pages (*out-of-print*)
- Volume 6
Sex Hormones
1974; 243 pages (*out-of-print*)
- Volume 7
Some Anti-Thyroid and Related Substances, Nitrofurans and Industrial Chemicals
1974; 326 pages (*out-of-print*)
- Volume 8
Some Aromatic Azo Compounds
1975; 357 pages (*out-of-print*)
- Volume 9
Some Aziridines, N-, S- and O-Mustards and Selenium
1975; 268 pages (*out-of-print*)
- Volume 10
Some Naturally Occurring Substances
1976; 353 pages (*out-of-print*)
- Volume 11
Cadmium, Nickel, Some Epoxides, Miscellaneous Industrial Chemicals and General Considerations on Volatile Anaesthetics
1976; 306 pages (*out-of-print*)
- Volume 12
Some Carbamates, Thiocarbamates and Carbazides
1976; 282 pages (*out-of-print*)
- Volume 13
Some Miscellaneous Pharmaceutical Substances
1977; 255 pages
- Volume 14
Asbestos
1977; 106 pages (*out-of-print*)
- Volume 15
Some Fumigants, the Herbicides 2,4-D and 2,4,5-T, Chlorinated Dibenzodioxins and Miscellaneous Industrial Chemicals
1977; 354 pages (*out-of-print*)
- Volume 16
Some Aromatic Amines and Related Nitro Compounds—Hair Dyes, Colouring Agents and Miscellaneous Industrial Chemicals
1978; 400 pages
- Volume 17
Some N-Nitroso Compounds
1978; 365 pages
- Volume 18
Polychlorinated Biphenyls and Polybrominated Biphenyls
1978; 140 pages (*out-of-print*)
- Volume 19
Some Monomers, Plastics and Synthetic Elastomers, and Acrolein
1979; 513 pages (*out-of-print*)
- Volume 20
Some Halogenated Hydrocarbons
1979; 609 pages (*out-of-print*)
- Volume 21
Sex Hormones (II)
1979; 583 pages
- Volume 22
Some Non-Nutritive Sweetening Agents
1980; 208 pages
- Volume 23
Some Metals and Metallic Compounds
1980; 438 pages (*out-of-print*)
- Volume 24
Some Pharmaceutical Drugs
1980; 337 pages
- Volume 25
Wood, Leather and Some Associated Industries
1981; 412 pages
- Volume 26
Some Antineoplastic and Immunosuppressive Agents
1981; 411 pages (*out-of-print*)
- Volume 27
Some Aromatic Amines, Anthraquinones and Nitroso Compounds, and Inorganic Fluorides Used in Drinking-water and Dental Preparations
1982; 341 pages (*out-of-print*)
- Volume 28
The Rubber Industry
1982; 486 pages (*out-of-print*)
- Volume 29
Some Industrial Chemicals and Dyestuffs
1982; 416 pages (*out-of-print*)
- Volume 30
Miscellaneous Pesticides
1983; 424 pages (*out-of-print*)

*High-quality photocopies of all out-of-print volumes may be purchased from University Microfilms International, 300 North Zeeb Road, Ann Arbor, MI 48106-1346, USA (Tel.: +1 313-761-4700, +1 800-521-0600).

Volume 31
Some Food Additives, Feed Additives and Naturally Occurring Substances
1983; 314 pages (out-of-print)

Volume 32
Polynuclear Aromatic Compounds, Part 1: Chemical, Environmental and Experimental Data
1983; 477 pages (out-of-print)

Volume 33
Polynuclear Aromatic Compounds, Part 2: Carbon Blacks, Mineral Oils and Some Nitroarenes
1984; 245 pages (out-of-print)

Volume 34
Polynuclear Aromatic Compounds, Part 3: Industrial Exposures in Aluminium Production, Coal Gasification, Coke Production, and Iron and Steel Founding
1984; 219 pages (out-of-print)

Volume 35
Polynuclear Aromatic Compounds, Part 4: Bitumens, Coal-tars and Derived Products, Shale-oils and Soots
1985; 271 pages

Volume 36
Allyl Compounds, Aldehydes, Epoxides and Peroxides
1985; 369 pages

Volume 37
Tobacco Habits Other than Smoking; Betel-Quid and Areca-Nut Chewing; and Some Related Nitrosamines
1985; 291 pages (out-of-print)

Volume 38
Tobacco Smoking
1986; 421 pages

Volume 39
Some Chemicals Used in Plastics and Elastomers
1986; 403 pages (out-of-print)

Volume 40
Some Naturally Occurring and Synthetic Food Components, Furocoumarins and Ultraviolet Radiation
1986; 444 pages (out-of-print)

Volume 41
Some Halogenated Hydrocarbons and Pesticide Exposures
1986; 434 pages (out-of-print)

Volume 42
Silica and Some Silicates
1987; 289 pages

Volume 43
Man-Made Mineral Fibres and Radon
1988; 300 pages (out-of-print)

Volume 44
Alcohol Drinking
1988; 416 pages

Volume 45
Occupational Exposures in Petroleum Refining; Crude Oil and Major Petroleum Fuels
1989; 322 pages

Volume 46
Diesel and Gasoline Engine Exhausts and Some Nitroarenes
1989; 458 pages

Volume 47
Some Organic Solvents, Resin Monomers and Related Compounds, Pigments and Occupational Exposures in Paint Manufacture and Painting
1989; 535 pages (out-of-print)

Volume 48
Some Flame Retardants and Textile Chemicals, and Exposures in the Textile Manufacturing Industry
1990; 345 pages

Volume 49
Chromium, Nickel and Welding
1990; 677 pages

Volume 50
Pharmaceutical Drugs
1990; 415 pages

Volume 51
Coffee, Tea, Mate, Methyl-xanthines and Methylglyoxal
1991; 513 pages

Volume 52
Chlorinated Drinking-water; Chlorination By-products; Some Other Halogenated Compounds; Cobalt and Cobalt Compounds
1991; 544 pages

Volume 53
Occupational Exposures in Insecticide Application, and Some Pesticides
1991; 612 pages

Volume 54
Occupational Exposures to Mists and Vapours from Strong Inorganic Acids; and Other Industrial Chemicals
1992; 336 pages

Volume 55
Solar and Ultraviolet Radiation
1992; 316 pages

Volume 56
Some Naturally Occurring Substances: Food Items and Constituents, Heterocyclic Aromatic Amines and Mycotoxins
1993; 599 pages

Volume 57
Occupational Exposures of Hairdressers and Barbers and Personal Use of Hair Colourants; Some Hair Dyes, Cosmetic Colourants, Industrial Dyestuffs and Aromatic Amines
1993; 428 pages

Volume 58
Beryllium, Cadmium, Mercury, and Exposures in the Glass Manufacturing Industry
1993; 444 pages

Volume 59
Hepatitis Viruses
1994; 286 pages

Volume 60
Some Industrial Chemicals
1994; 560 pages

Volume 61
Schistosomes, Liver Flukes and *Helicobacter pylori*
1994; 270 pages

Volume 62
Wood Dust and Formaldehyde
1995; 405 pages

Volume 63
Dry Cleaning, Some Chlorinated Solvents and Other Industrial Chemicals
1995; 551 pages

Volume 64
Human Papillomaviruses
1995; 409 pages

Volume 65
Printing Processes and Printing Inks, Carbon Black and Some Nitro Compounds
1996; 578 pages

Volume 66
Some Pharmaceutical Drugs
1996; 514 pages

Volume 67
Human Immunodeficiency Viruses and Human T-Cell Lymphotropic Viruses
1996; 424 pages

Volume 68
Silica, Some Silicates, Coal Dust and *para*-Aramid Fibrils
1997; 506 pages

Volume 69
Polychlorinated Dibenzo-*para*-Dioxins and Polychlorinated Dibenzofurans
1997; 666 pages

Volume 70
Epstein-Barr Virus and Kaposi's Sarcoma Herpesvirus/Human Herpesvirus 8
1997; 524 pages

Volume 71
Re-evaluation of Some Organic Chemicals, Hydrazine and Hydrogen Peroxide
1999; 1586 pages

Volume 72
Hormonal Contraception and Post-menopausal Hormonal Therapy
1999; 660 pages

Volume 73
Some Chemicals that Cause Tumours of the Kidney or Urinary Bladder in Rodents and Some Other Substances
1999; 674 pages

Volume 74
Surgical Implants and Other Foreign Bodies
1999; 409 pages

Volume 75
Ionizing Radiation, Part 1, X-Radiation and γ -Radiation, and Neutrons
2000; 492 pages

Volume 76
Some Antiviral and Anti-neoplastic Drugs, and Other Pharmaceutical Agents
2000; 522 pages

Volume 77
Some Industrial Chemicals
2000; 563 pages

Volume 78
Ionizing Radiation, Part 2, Some Internally Deposited Radionuclides
2001; 595 pages

Volume 79
Some Thyrotropic Agents
2001; 763 pages

Volume 80
Non-ionizing Radiation, Part 1: Static and Extremely Low-Frequency (ELF) Electric and Magnetic Fields
2002; 429 pages

Volume 81
Man-made Vitreous Fibres
2002; 418 pages

Volume 82
Some Traditional Herbal Medicines, Some Mycotoxins, Naphthalene and Styrene
2002; 590 pages

Volume 83
Tobacco Smoke and Involuntary Smoking
2004; 1452 pages

Volume 84
Some Drinking-Water Disinfectants and Contaminants, including Arsenic
2004; 512 pages

Volume 85
Betel-quin and Areca-nut Chewing and Some Areca-nut-derived Nitrosamines
2004; 334 pages

Volume 86
Cobalt in Hard Metals and Cobalt Sulfate, Gallium Arsenide, Indium Phosphide and Vanadium Pentoxide
2006; 330 pages

Volume 87
Inorganic and Organic Lead Compounds
2006; 506 pages

Volume 88
Formaldehyde, 2-Butoxyethanol and 1-*tert*-Butoxypropan-2-ol
2006; 478 pages

Volume 89
Smokeless Tobacco and Some Related Nitrosamines
2007

Volume 90
Human Papillomaviruses
2007, 670 pages

Supplement No. 1
Chemicals and Industrial Processes Associated with Cancer in Humans (IARC Monographs, Volumes 1 to 20)
1979; 71 pages (out-of-print)

Supplement No. 2
Long-term and Short-term Screening Assays for Carcinogens: A Critical Appraisal
1980; 426 pages (out-of-print)
(updated as IARC Scientific Publications No. 83, 1986)

Supplement No. 3
Cross Index of Synonyms and Trade Names in Volumes 1 to 26 of the IARC Monographs
1982; 199 pages (*out-of-print*)

Supplement No. 4
Chemicals, Industrial Processes and Industries Associated with Cancer in Humans (IARC Monographs, Volumes 1 to 29)
1982; 292 pages (*out-of-print*)

Supplement No. 5
Cross Index of Synonyms and Trade Names in Volumes 1 to 36 of the IARC Monographs
1985; 259 pages (*out-of-print*)

Supplement No. 6
Genetic and Related Effects: An Updating of Selected IARC Monographs from Volumes 1 to 42
1987; 729 pages (*out-of-print*)

Supplement No. 7
Overall Evaluations of Carcinogenicity: An Updating of IARC Monographs Volumes 1–42
1987; 440 pages (*out-of-print*)

Supplement No. 8
Cross Index of Synonyms and Trade Names in Volumes 1 to 46 of the IARC Monographs
1990; 346 pages (*out-of-print*)

Achévé d'imprimer sur rotative par l'imprimerie Darantière
à Dijon-Quetigny en décembre 2007

Dépôt légal : décembre 2007 - N° d'impression : 27-1473

Imprimé en France

