

Chapter 11

Evaluation

Cancer-preventive activity

Humans

There is *sufficient evidence* in humans for a cancer-preventive effect of avoidance of weight gain. This evidence has been obtained for cancers of the colon, breast (postmenopausal), endometrium, kidney (renal-cell) and oesophagus (adenocarcinoma).

For premenopausal breast cancer, the available evidence on the avoidance of weight gain *suggests lack of a cancer-preventive effect*.

For all other sites, the evidence is *inadequate*.

There is *inadequate evidence* in humans for a cancer-preventive effect of intentional weight loss for any cancer site.

There is *sufficient evidence* in humans for a cancer-preventive effect of physical activity. This has been obtained for cancers of the colon and breast.

For cancers of the endometrium and prostate, there is *limited evidence* for a cancer-preventive effect of physical activity.

For all other sites, the evidence is *inadequate*.

Experimental animals

There is *sufficient evidence* in experimental animals for a cancer-preventive effect of avoidance of weight gain by restriction of dietary energy intake. This evidence has been obtained for spontaneous and chemically induced cancers of the mammary gland, liver and pituitary gland (adenoma), for chemically induced cancers of the colon and the skin (non-melanoma) and for spontaneous and genetically induced lymphoma.

For chemically induced cancers of the prostate, and for spontaneous and chemically induced cancers of the acinar pancreas, there is *limited evidence* in experimental animals for a cancer-preventive effect of avoidance of weight gain by restriction of dietary energy intake.

There is *limited evidence* in experimental animals for a cancer-preventive effect of avoidance of weight gain by physical activity for spontaneous mammary tumours and for chemically induced mammary and colon cancers. For all other cancer sites, the evidence is *inadequate*.

There are data in experimental animals indicating that diet restriction (reduction of all dietary components but with vitamin supplements) gives rise to a decrease in the spontaneous incidence of tumours in lung, testis, thyroid follicular cells, preputial and clitoral gland, and of adrenal pheochromocytomas.

Overall evaluation

The prevalence of overweight and obesity in adults and children has increased rapidly over the last two decades in most countries. In many developed countries half or more of the adult population is now overweight or obese, and similar prevalence rates have been reached in urban areas of some developing countries.

- Decreased levels of overall physical activity are a major contributor to the rise in rates of overweight and obesity.
- Epidemiological studies, animal experiments and mechanistic investigations all support a beneficial effect of weight control and physical activity in the prevention of cancer.
- Limiting weight gain during adult life, thereby avoiding overweight and obesity, reduces the risk of postmenopausal breast cancer, and cancers of the colon, uterus (endometrium), kidney (renal cell) and oesophagus (adenocarcinoma).
- Weight loss among overweight or obese persons possibly reduces risks of these cancers, but no firm conclusion can be drawn because of the sparsity of the epidemiological evidence.
- Regular physical activity reduces the risk of breast and colon cancer, and possibly reduces risk of uterine (endometrial) and prostate cancers. These effects seem to be in part independent of that of weight control.
- Taken together, excess body weight and physical inactivity account for approximately one fourth to one third of breast cancer, and cancers of the colon, endometrium, kidney (renal cell) and oesophagus (adenocarcinoma). Thus adiposity and inactivity appear to be the most important avoidable causes of postmenopausal breast cancer, endometrial cancer, renal-cell cancer, and adenocarcinoma of the oesophagus, and among the most important avoidable causes of colon cancer.
- In addition to the important reductions in cancer incidence, weight control and regular physical activity will lead to substantial decreases in cardiovascular disease, type II diabetes, and other chronic diseases.
- Control of the obesity epidemic will require the participation of all segments of society and substantial investments, particularly in public education, community environments that promote walking and other physical activities, work-site and school programmes that include at least one hour of physical activity on most days, and transportation systems that encourage walking and use of bicycles.