This publication represents the views and expert opinions of an IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, which met in Lyon, 10–17 October 2017

LYON, FRANCE - 2018
6. EVALUATION AND RATIONALE

6.1 Cancer in humans

There is sufficient evidence in humans for the carcinogenicity of benzene. Benzene causes acute myeloid leukaemia in adults.

Positive associations have been observed for non-Hodgkin lymphoma, chronic lymphoid leukaemia, multiple myeloma, chronic myeloid leukaemia, acute myeloid leukaemia in children, and cancer of the lung.

A small minority of the Working Group considered that benzene also causes non-Hodgkin lymphoma. A separate small minority considered that a positive association was not observed for cancer of the lung.

6.2 Cancer in experimental animals

There is sufficient evidence in experimental animals for the carcinogenicity of benzene.

6.3 Overall evaluation

Benzene is carcinogenic to humans (Group 1).

6.4 Rationale

Support for Group 1 from mechanistic data

A Group 1 evaluation was supported by mechanistic data demonstrating that benzene exhibits many of the key characteristics of carcinogens. In particular, there is strong evidence, including in exposed humans, that benzene: is metabolically activated to electrophilic metabolites; induces oxidative stress and associated oxidative DNA damage; is genotoxic, inducing DNA damage and chromosomal changes; is immunosuppressive; and causes haematotoxicity.