

ETHYLENE DIBROMIDE (Group 2A)

A. Evidence for carcinogenicity to humans (*inadequate*)

In one study, the mortality of 161 men exposed to ethylene dibromide in two factories since the mid-1920s and 1942, respectively, was investigated. By 1 January 1976, 36 workers had died, seven of them from cancer (5.8 expected)¹. In another study, the mortality of 2510 male workers employed at a chemical plant was investigated. Ethylene dibromide was one of several chemicals used and was apparently a minor component of the mixed exposure. No statistically significant excess of cancer at any site was found². An excess of lymphoma was detected in a mortality study of grain workers in the USA who may have had exposure to ethylene dibromide, among other compounds³.

B. Evidence for carcinogenicity to animals (*sufficient*)

Ethylene dibromide has been tested for carcinogenicity by oral administration and by inhalation in mice and rats and by skin application in mice. Following its oral administration, it produced squamous-cell carcinomas of the forestomach in animals of each species, an increased incidence of alveolar/bronchiolar lung tumours in mice of each sex, liver carcinomas in female rats, haemangiosarcomas in male rats and oesophageal papillomas in female mice⁴⁻⁶. Following its inhalation, ethylene dibromide produced adenomas and carcinomas of the nasal cavity, haemangiosarcomas of the spleen, mammary tumours, subcutaneous mesenchymal tumours, an increased incidence of alveolar/bronchiolar lung tumours in animals of each species⁷⁻⁹, and an increased incidence of peritoneal mesotheliomas in male rats⁷. Ethylene dibromide induced skin and lung tumours in mice after skin application¹⁰.

C. Other relevant data

Ethylene dibromide did not induce chromosomal aberrations or sister chromatid exchanges in exposed pine-tree sprayers and fruit packers¹¹.

Ethylene dibromide did not induce dominant lethal mutations in mice or rats or chromosomal aberrations or micronuclei in bone-marrow cells of mice treated *in vivo*; however, a weak sister chromatid exchange response was observed. It bound covalently to DNA in rat hepatocytes and induced DNA strand breaks in mouse and rat hepatocytes and in rat testicular cells in studies of rodents treated *in vivo*. Sister chromatid exchanges, mutation and unscheduled DNA synthesis were induced in human cells *in vitro*, and chromosomal aberrations, sister chromatid exchanges, mutation, DNA strand breaks and unscheduled DNA synthesis in rodent cells *in vitro*. Ethylene dibromide induced sex-linked recessive lethal mutations in *Drosophila* and chromosomal aberrations and mutation in plants. It was mutagenic to fungi and bacteria and produced DNA damage in bacteria. Ethylene dibromide bound covalently to isolated DNA¹¹.

References

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