

PROPYLENE OXIDE (Group 2A)

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

In a cohort study of 602 workers, some of whom were exposed to propylene oxide, as well as to ethylene oxide (see p. 205) and a mixture of other chemicals (including benzene

[see p. 120] and ethylene chlorohydrin), there was no statistically significant excess of cancer deaths. The study is uninformative in relation to the carcinogenicity of propylene oxide¹.

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

Propylene oxide was tested by oral gavage in rats and produced local tumours, mainly squamous-cell carcinomas and papillomas of the forestomach¹. When tested by inhalation in mice and in rats, it produced haemangiomas and haemangiosarcomas of the nasal submucosa in mice and an increased incidence of papillary adenomas of the nasal turbinates in rats^{1,2}. In one experiment by inhalation in male rats, an increased incidence of adrenal pheochromocytomas and of peritoneal mesotheliomas was observed¹. Propylene oxide was also tested by subcutaneous administration in mice, inducing local sarcomas, mainly fibrosarcomas¹.

C. Other relevant data

Propylene oxide is structurally related to ethylene oxide.

No data were available on the genetic effects of propylene oxide in humans. Haemoglobin alkylation was observed in exposed workers³.

Propylene oxide induced micronuclei in mice but did not cause dominant lethal mutations in mice or rats exposed *in vivo*. It induced chromosomal aberrations in human cells *in vitro* and DNA strand breaks, mutation, sister chromatid exchanges and chromosomal aberrations in rodent cells *in vitro*. It induced sex-linked recessive lethal mutations in *Drosophila*, mutation in fungi and bacteria and DNA damage in bacteria³.

References

¹IARC Monographs, 36, 227-243, 1985

²Renne, R.A., Giddens, W.E., Boorman, G.A., Kovatch, R., Haseman, J.E. & Clarke, W.J. (1986) Nasal cavity neoplasia in F344/N rats and (C57BL/6 × C3H)F₁ mice inhaling propylene oxide for up to two years. *J. natl Cancer Inst.*, 77, 573-582

³IARC Monographs, Suppl. 6, 482-484, 1987