1,3-BUTADIENE (Group 2B)

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

A retrospective cohort study conducted in two styrene-butadiene rubber plants showed a slight excess of lymphatic and haematopoietic tissue cancers in one plant but not in the other, where exposure levels had been ten-fold higher. Concomitant exposure to styrene (see p. 345) and to traces of benzene (see p. 120) had occurred at least in the first plant[1].

Another cohort study comprised 13 920 men who had worked in eight styrene-butadine rubber polymer manufacturing plants in the USA and Canada for at least one year and who had been followed for deaths from 1943 to 1979. There was no excess of mortality from all cancers or from cancer at any specific site, either in the total cohort or in subcohorts defined on the basis of major work area or salaried and hourly pay grade[2].

Several studies have shown elevated standardized mortality ratios for cancers at various sites among workers in the rubber industry (see p. 332), where there is potential exposure to 1,3-butadiene, among other chemicals[3].

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

1,3-Butadiene was tested for carcinogenicity in mice by inhalation. It was carcinogenic to animals of each sex, producing haemangiosarcomas of the heart, malignant lymphomas, alveolar/bronchiolar adenomas and carcinomas, papillomas and carcinomas of the stomach, hepatocellular adenomas and carcinomas, mammary-gland carcinomas and granulosa-cell tumours of the ovary[1]. Exposure of rats to 1,3-butadiene by inhalation resulted in increased incidences of tumours of the mammary gland, thyroid and pancreas[4].

C. Other relevant data

No data were available on the genetic and related effects of 1,3-butadiene in humans. It induced micronuclei and sister chromatid exchanges in bone-marrow cells of mice but not of rats treated *in vivo*. It was mutagenic to bacteria[5].

References

[1]*IARC Monographs*, *39*, 155-179, 1986

[2]Matanoski, G.M. & Schwartz, L. (1987) Mortality of workers in styrene-butadiene polymer production. *J. occup. Med.*, *29*, 675-680

[3]*IARC Monographs*, *28*, 183-230, 1982

[4]Owen, P.E., Glaister, J.R., Gaunt, I.F. & Pullinger, D.H. (1987) Inhalation toxicity studies with 1,3-butadiene. 3. Two year toxicity/carcinogenicity study in rats. *Am. ind. Hyg. Assoc. J.*, *48*, 407-413

[5]*IARC Monographs*, *Suppl. 6*, 126-128, 1987