POLYBROMINATED BIPHENYLS (Group 2B)

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

The mortality has been studied of a cohort of over 3500 male workers with potential exposure to several brominated compounds, including polybrominated biphenyls, who were employed between 1935 and 1976 at chemical plants. Due to a lack of quantitative data, potential exposures of workers to polybrominated biphenyls were categorized as 'routine' and 'nonroutine'. Of the 91 workers potentially exposed on a 'routine' basis, none

died during the study period; among the 237 'nonroutinely' exposed, two deaths were observed, with 6.4 expected, one of which was due to cancer of the large intestine[1].

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

The carcinogenicity of a commercial preparation of polybrominated biphenyls (FireMaster FF-1, various lots), composed primarily of hexabromobiphenyl with smaller amounts of penta- and heptabrominated isomers, was tested by oral administration in mice and rats. In mice, it produced malignant liver tumours. In five studies in rats, it produced benign and malignant hepatic tumours, including cholangiocarcinomas, depending on the exposure conditions. Oral administration of polybrominated biphenyls enhanced the incidence of liver nodules induced by *N*-nitrosodiethylamine[2], but cutaneous application did not increase the incidence of skin tumours induced by 2-acetylaminofluorene[1].

C. Other relevant data

No data were available on the genetic and related effects of polybrominated biphenyls in humans.

Polybrominated biphenyls did not induce chromosomal aberrations in bone-marrow cells of rats or mice nor in rat spermatogonia and did not induce micronuclei in mice treated *in vivo*. They did not induce mutation in human or rodent cells *in vitro* or unscheduled DNA synthesis in rodent hepatocytes *in vitro*. Polybrominated biphenyls were not mutagenic to bacteria *in vitro* or in a host-mediated assay[3].

2,4,5,2′,4′,5′-Hexabromobiphenyl, 2,3,4,5,2′,4′,5′-heptabromobiphenyl and 2,3,4,5,2′,3′,4′,5′-octabromobiphenyl inhibited intercellular communication in Chinese hamster V79 cells; other congeners tested were only weakly active or were inactive[3].

References

[1] *IARC Monographs*, *41*, 261-292, 1986

[2] Jensen, R.K. & Sleight, S.D. (1986) Sequential study on the synergistic effects of 2,2′,4,4′,5,5′-hexabromobiphenyl and 3,3′,4,4′,5,5′-hexabromobiphenyl on hepatic tumour promotion. *Carcinogenesis*, *7*, 1771-1774

[3] *IARC Monographs*, *Suppl. 6*, 466-468, 1987