POLYCHLORINATED BIPHENYLS

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5. Summary of Data Reported and Evaluation[1]

5.1 Experimental data

Five polychlorinated biphenyl mixtures have been tested in mice and/or rats only by oral administration. Kanechlor 500 and Aroclor 1254 are carcinogenic in mice, and Aroclor 1260 is carcinogenic in rats; all induced benign and malignant liver-cell tumours. In an experiment in rats of only one year's duration, Kanechlor 500, 400 and 300 induced liver lesions described as multiple hyperplastic nodules.

[1]Subsequent to the finalization of this monograph by the Working Group in October 1977, the Secretariat became aware of a study carried out under the NCI Bioassay Programme (NCI, 1978). Groups of 24 male and 24 female Fischer 344 rats were given Aroclor 1254 at concentrations of 25, 50 or 100 mg/kg of diet for 104-105 weeks, when surviving animals were killed. No statistically significant differences between tumour incidences in experimental and control animals were seen. However, a few carcinomas and adenocarcinomas of the gastrointestinal tract were observed in treated animals; no such tumours occurred in controls. Hepatocellular hyperplastic nodules were observed in 11/48, 17/46 and 29/48 treated animals, compared with none in controls.

5.2 Human data

Human exposure to small amounts of polychlorinated biphenyls is widespread as a result of environmental contamination and the high stability of these compounds. They are commonly found in human tissues. Unusually high levels of exposure to polychlorinated biphenyls have occurred among workers manufacturing or using them and in Japanese who consumed rice oil accidentally contaminated with Kanechlor 400. The latter showed acute and chronic toxic effects.

An apparent excess of malignant melanoma has been reported in workers exposed to Aroclor 1254. No melanomas were reported in 9 persons who died from cancer among the 1200 Japanese heavily exposed to Kanechlor 400, but these deaths all occurred within 5 1/2 years of first exposure. Neither the workers exposed occupationally nor the Japanese were exposed solely to polychlorinated biphenyls.

5.3 Evaluation

There is experimental evidence of a carcinogenic effect of some polychlorinated biphenyls in rodents. The epidemiological data provide suggestive evidence of a relationship between exposure to polychlorinated biphenyls and the development of malignant melanoma. Efforts should be made to obtain both confirmatory experimental and epidemiological evidence; in particular, continuing follow-up of survivors of the Yusho episode is necessary. In the meantime, for practical purposes, polychlorinated biphenyls should be regarded as if they were carcinogenic to humans.

Almost without exception, polychlorinated biphenyls contain various levels of polychlorinated dibenzofurans as contaminants, and the polychlorinated biphenyls responsible for the Yusho episode in Japan were found to contain an unusually high level of polychlorinated dibenzofurans. It is not known if

and to what extent polychlorinated dibenzofurans play a role in the observed carcinogenic effects of polychlorinated biphenyls.

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Subsequent evaluation: Suppl. 7 (1987)

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