Review Summary of the NTP Executive Committee Working Group for the Report on Carcinogens (RG2)

Nomination: Diethanolamine (DEA)

Review committee: NTP Executive Committee Working Group for the Report on Carcinogens - RG2

Meeting Date: 05/02/2002

Application of criteria:

- Exposure

  The RG2 felt there was sufficient evidence of human exposure to diethanolamine as it is associated with both occupational (textile processing, as an anticorrosion agent in metalworking fluids and in the preparation of agricultural chemicals) and consumer (surfactant used in liquid laundry and dishwashing detergents, cosmetics, shampoos and hair conditioners) uses. NIOSH estimates that approximately 573,025 to 1,284,534 workers are potentially exposed to DEA.

- Carcinogenicity

  The RG2 felt that there was insufficient evidence of carcinogenicity of DEA in experimental animals. DEA was carcinogenic in one species (mice) and at one tumor site (liver). The NTP conducted two-year dermal bioassays in $B6C3F_1$ mice and F344/N rats. Dermal administration of DEA induced a significant increased incidence of liver tumors in both male and female mice including hepatocellular adenomas, hepatocellular carcinomas, and hepatoblastomas. Significant increased incidences of renal tubule adenomas were also observed in male mice but there was no significant increase in renal tubule carcinomas in this study the RG2 did not feel that these renal tumors represented a second tumor site. Dermal administration of DEA was not carcinogenic in rats or transgenic mice.

Other Scientific Concerns:

- Human studies

  There are no human studies reported in which exposure solely to DEA is specifically mentioned. The human cancer studies on metalworking fluids are not relevant for the evaluation of the carcinogenicity of DEA because the effects of DEA cannot be separated from the other components of metalworking fluids.

- Studies of DEA condensates in experimental animals

  DEA was one of four chemically related compounds studied by the NTP. The other materials studied included coconut oil acid DEA condensate, lauric acid DEA condensate and oleic acid DEA condensate. Although an association between the concentration of free DEA in the condensates tested and the incidences of hepatocellular neoplasms was observed in male and female mice, these condensates studies are of mixtures containing free DEA and do not provide direct evidence for the carcinogenicity of DEA alone.

- Genotoxicity

  DEA does not appear to be mutagenic or genotoxic.

- Mechanism Issues

  DEA may cause toxicity by incorporation as the head group to form aberrant phospholipids presumably by the same pathways that utilize ethanolamine, resulting in disruption of choline utilization. The resultant choline deficiency may be related to the observed DEA-induced hepatocarcinogenesis.

Recommendation:

- Motion

  Recommended that Diethanolamine not be listed in the Report on Carcinogens.

  Vote on the motion: 9 yes votes to 0 no votes