Amphetamine and Its Salts

Amphetamine is a central nervous system (CNS) stimulant that exerts its effects by modulating several key neurotransmitters in the brain, including dopamine, serotonin, and norepinephrine. It is used as an appetite suppressant and as a drug for treating attention deficit disorder / attention deficit hyperactivity disorder in adults and children, and narcolepsy in adults. Amphetamine is also used illegally as a performance enhancer and as a CNS stimulant. Amphetamine has been detected in surface and urban waste waters. The form in which amphetamine is taken may include one or both of its enantiomers (dextro-amphetamine and levo-amphetamine). It may also be taken as an amphetamine salt, such as the hydrochloride or the sulfate salt. Exposure occurs through intentional consumption of the drug. It is unclear the extent to which the general population may be exposed as a result of the presence of amphetamine in some surface and urban waste waters or in structures formerly containing illegal drug laboratories.

Amphetamine and its salts passed the human data screen, underwent a preliminary toxicological evaluation, and is being brought to the Carcinogen Identification Committee for consultation. This is a compilation of the relevant studies identified during the preliminary toxicological evaluation.

Epidemiological data

- Case-control studies
  - Study of Hodgkin’s Disease: Newell et al. (1973)
  - Multiple population-based studies of kidney cancer or renal cell carcinoma: Yu et al. (1986); McCredie and Stewart (1992); Lindblad et al. (1994); Mellemgaard et al. (1995); Yuan et al. (1998)
  - Study of ovarian cancer: Harlow et al. (1998)

- Case-control study in children

Animal carcinogenicity data

- Two-year feeding studies
  - Studies of dl-amphetamine sulfate in male and female B6C3F1 mice: NTP (1991)
• Tumor promotion/metastases studies
  o Mammary tumor promotion study in female C3H/He mice carrying the mammary tumor virus: Freire-Garabal et al. (1992)
  o Tumor promotion study in female Balb/c mice infected with Moloney sarcoma virus: Freire-Garabal et al. (1998)
  o Tumor metastases study of Walker-256 carcinoma in male Sprage-Dawley rats: Freire-Garabal et al. (1996)

Other relevant data

• Genotoxicity
  o In vitro DNA-cell-binding assay: Kubinski et al. (1981)
  o In vivo mouse bone marrow micronucleus assay: Tariq et al. (1987)
  o In vivo DNA damage assays in rat hippocampus: Andreazza et al. (2008)
  o Dominant lethal assay in rats: Larez et al. (1979)

• Immune suppression: reviewed in Freire-Garabal et al. (1996)

References


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1 Copies of these listed references, as either the abstract, the relevant sections of the publication, or the complete publication, have been provided to members of the Carcinogen Identification Committee. These references have been provided in the order in which they are discussed in this document.


