



WORLD HEALTH ORGANIZATION
INTERNATIONAL AGENCY FOR RESEARCH ON CANCER

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans

Volume 14

Asbestos

Summary of Data Reported and Evaluation

[Asbestos](#)

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5. Summary of Data Reported and Evaluation

5.1 Animal data

All commercial forms of asbestos tested are carcinogenic in mice, rats, hamsters and rabbits. In mice, mesotheliomas were induced following intraperitoneal injection of asbestos fibres. In rats, various types of asbestos produced lung carcinomas and mesotheliomas following their inhalation and mesotheliomas and sarcomas following their intrapleural or intraperitoneal injection. The oral administration of asbestos filter material to rats also resulted in an increased incidence of tumours. Mesotheliomas were produced in hamsters and rabbits after intrapleural injection of a number of types of asbestos fibre.

The size and shape of the fibres influence the incidence of tumours; fibres less than 0.5 µm in diameter are more active in producing tumours. Glass fibres and nemalite of a similar size can also produce mesotheliomas following their intrapleural or intraperitoneal injection in rats.

5.2 Human data

In humans, occupational exposure to chrysotile, amosite, anthophyllite and mixed fibres containing crocidolite has resulted in a high incidence of lung cancer; a predominantly tremolitic material mixed with anthophyllite and small amounts of chrysotile has also caused an increased incidence of lung cancer. Many pleural and peritoneal mesotheliomas have been observed after occupational exposure to crocidolite, amosite and chrysotile. An excess risk of gastrointestinal tract cancers has been demonstrated in groups exposed occupationally to amosite, chrysotile or mixed fibres containing crocidolite. An excess of cancers of the larynx was also observed in exposed workers. Mesotheliomas also occur in individuals living in the neighbourhood of asbestos factories and crocidolite mines and in household contacts of asbestos workers.

Occupational exposure to asbestos may occur during the mining of fibrous minerals, as well as of minerals embodied in rocks, which may contain asbestiform fibres as a contaminant.

Both cigarette smoking and occupational exposure to asbestos fibres independently increase lung cancer incidence, but when they are present together they act in a multiplicative fashion.

The general population may also be exposed to asbestos fibres in air, beverages, drinking-water, food and pharmaceutical and dental preparations and by consumer use of asbestos-containing products. The presence of asbestos and asbestiform minerals from natural sources in the environment, other than mines or quarries, has only recently shown itself to be a further potential problem.

At present, it is not possible to assess whether there is a level of exposure in humans below which an increased risk of cancer would not occur.

Previous evaluation: [Vol. 2 \(1973\)](#)

Subsequent evaluation: [Suppl. 7 \(1987\)](#)