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Overall Evaluations of Carcinogenicity to Humans

Group 1: Carcinogenic to humans

As evaluated in *IARC Monographs Volumes 1-99*

This list contains all hazards evaluated to date, according to the type of hazard posed and to the type of exposure. Where appropriate, chemical abstract numbers are given [in square brackets]. For details of the evaluation, the relevant Monograph should be consulted (volume number given in round brackets, followed by year of publication of latest evaluation). Use a free-text search to find a particular compound.

Group 1: Carcinogenic to humans (105)

Agents and groups of agents

4-Aminobiphenyl [92-67-1] (Vol. 1, Suppl. 7, Vol. 99; in preparation)

Arsenic [7440-38-2] and arsenic compounds (Vol. 23, Suppl. 7; 1987)

(NB: This evaluation applies to the group of compounds as a whole and not necessarily to all individual compounds within the group)

Asbestos [1332-21-4] (Vol. 14, Suppl. 7; 1987)

Azathioprine [446-86-6] (Vol. 26, Suppl. 7; 1987)

Benzene [71-43-2] (Vol. 29, Suppl. 7; 1987)

Benzidine [92-87-5] (Vol. 29, Suppl. 7, Vol. 99; in preparation)

Benzo[*a*]pyrene [50-32-8] (Vol. 32, Suppl. 7, Vol. 92; in preparation)

(NB: Overall evaluation upgraded from 2B to 1 based on mechanistic and other relevant data)

Beryllium [7440-41-7] and beryllium compounds (Vol. 58; 1993)

N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine) [494-03-1] (Vol. 4, Suppl. 7; 1987)

Bis(chloromethyl)ether [542-88-1] and chloromethyl methyl ether [107-30-2] (technical-grade) (Vol. 4, Suppl. 7; 1987)

1,3-Butadiene [106-99-0] (Vol. 71, Vol. 97; in preparation)

1,4-Butanediol dimethanesulfonate (Busulphan; Myleran) [55-98-1] (Vol. 4, Suppl. 7; 1987)

Cadmium [7440-43-9] and cadmium compounds (Vol. 58; 1993)

Chlorambucil [305-03-3] (Vol. 26, Suppl. 7; 1987)

1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU; Semustine) [13909-09-6] (Suppl. 7; 1987)

Chromium[VI] (Vol. 49; 1990)

Ciclosporin [79217-60-0] (Vol. 50; 1990)

- Cyclophosphamide [50-18-0] [6055-19-2] (Vol. 26, Suppl. 7; 1987)
- Diethylstilboestrol [56-53-1] (Vol. 21, Suppl. 7; 1987)
- Dyes metabolized to benzidine (Vol. 99; in preparation)
(NB: Overall evaluation upgraded to Group 1 based on mechanistic and other relevant data)
- Epstein-Barr virus (Vol. 70; 1997)
- Erionite [66733-21-9] (Vol. 42, Suppl. 7; 1987)
- Estrogen-progestogen menopausal therapy (combined) (Vol. 72, Vol. 91; 2007)
- Estrogen-progestogen oral contraceptives (combined) (Vol. 72, Vol. 91; 2007)
(NB: There is also convincing evidence in humans that these agents confer a protective effect against cancer in the endometrium and ovary)
- Estrogens, nonsteroidal (Suppl. 7; 1987)
(NB: This evaluation applies to the group of compounds as a whole and not necessarily to all individual compounds within the group)
- Estrogens, steroidal (Suppl. 7; 1987)
(NB: This evaluation applies to the group of compounds as a whole and not necessarily to all individual compounds within the group)
- Estrogen therapy, postmenopausal (Vol. 72; 1999)
- Ethanol [64-17-5] in alcoholic beverages (Vol. 96; in preparation)
- Ethylene oxide [75-21-8] (Vol. 60, Vol. 97; in preparation)
(NB: Overall evaluation upgraded from 2A to 1 based on mechanistic and other relevant data)
- Etoposide [33419-42-0] in combination with cisplatin and bleomycin (Vol. 76; 2000)
- Formaldehyde [50-00-0] (Vol. 88; 2006)
- Gallium arsenide [1303-00-0] (Vol. 86; 2006)
- [Gamma Radiation: see X- and Gamma (γ)-Radiation]
- Helicobacter pylori* (infection with) (Vol. 61; 1994)
- Hepatitis B virus (chronic infection with) (Vol. 59; 1994)
- Hepatitis C virus (chronic infection with) (Vol. 59; 1994)
- Human immunodeficiency virus type 1 (infection with) (Vol. 67; 1996)
- Human papillomavirus types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 66 (Vol. 64, Vol. 90; 2007)
(NB: The HPV types that have been classified as *carcinogenic to humans* can differ by an order of magnitude in risk for cervical cancer)
- Human T-cell lymphotropic virus type I (Vol. 67; 1996)
- Melphalan [148-82-3] (Vol. 9, Suppl. 7; 1987)
- 8-Methoxypsoralen (Methoxsalen) [298-81-7] plus ultraviolet A radiation (Vol. 24, Suppl. 7; 1987)
- Methylenebis(chloroaniline) (MOCA) [101-14-4] (Vol. 57, Vol. 99; in preparation)
(NB: Overall evaluation upgraded to Group 1 based on mechanistic and other relevant data)
- MOPP and other combined chemotherapy including alkylating agents (Suppl. 7; 1987)
- Mustard gas (Sulfur mustard) [505-60-2] (Vol. 9, Suppl. 7; 1987)

2-Naphthylamine [91-59-8] (Vol. 4, Suppl. 7, Vol. 99; in preparation)

Neutrons (Vol. 75; 2000)

(NB: Overall evaluation upgraded from 2B to 1 with supporting evidence from other relevant data)

Nickel compounds (Vol. 49; 1990)

N'-Nitrosornicotine (NNN) [16543-55-8] and 4-(*N*-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK) [64091-91-4] (Vol. 37, Suppl. 7, Vol. 89; 2007)

(NB: Overall evaluation upgraded from 2B to 1 based on mechanistic and other relevant data)

[Oestrogen: see Estrogen]

Opisthorchis viverrini (infection with) (Vol. 61; 1994)

[Oral contraceptives, combined estrogen-progestogen: see Estrogen-progestogen oral contraceptives (combined)]

Oral contraceptives, sequential (Suppl. 7; 1987)

Phosphorus-32, as phosphate (Vol. 78; 2001)

Plutonium-239 and its decay products (may contain plutonium-240 and other isotopes), as aerosols (Vol. 78; 2001)

Radioiodines, short-lived isotopes, including iodine-131, from atomic reactor accidents and nuclear weapons detonation (exposure during childhood) (Vol. 78; 2001)

Radionuclides, α -particle-emitting, internally deposited (Vol. 78; 2001)

(NB: Specific radionuclides for which there is *sufficient* evidence for carcinogenicity to humans are also listed individually as Group 1 agents)

Radionuclides, β -particle-emitting, internally deposited (Vol. 78; 2001)

(NB: Specific radionuclides for which there is *sufficient* evidence for carcinogenicity to humans are also listed individually as Group 1 agents)

Radium-224 and its decay products (Vol. 78; 2001)

Radium-226 and its decay products (Vol. 78; 2001)

Radium-228 and its decay products (Vol. 78; 2001)

Radon-222 [10043-92-2] and its decay products (Vol. 43, Vol. 78; 2001)

Schistosoma haematobium (infection with) (Vol. 61; 1994)

Silica [14808-60-7], crystalline (inhaled in the form of quartz or cristobalite from occupational sources) (Vol. 68; 1997)

Solar radiation (Vol. 55; 1992)

Talc containing asbestiform fibres (Vol. 42, Suppl. 7; 1987)

Tamoxifen [10540-29-1] (Vol. 66; 1996)

(NB: There is also conclusive evidence that tamoxifen reduces the risk of contralateral breast cancer)

2,3,7,8-Tetrachlorodibenzo-*para*-dioxin [1746-01-6] (Vol. 69; 1997)

(NB: Overall evaluation upgraded from 2A to 1 with supporting evidence from other relevant data)

Thiotepa [52-24-4] (Vol. 50; 1990)

Thorium-232 and its decay products, administered intravenously as a colloidal dispersion of thorium-232 dioxide (Vol. 78; 2001)

ortho-Toluidine [95-53-4] (Vol. 77, Vol. 99; in preparation)

Treosulfan [299-75-2] (Vol. 26, Suppl. 7; 1987)

Vinyl chloride [75-01-4] (Vol. 19, Suppl. 7, Vol. 97; in preparation)

X- and Gamma (γ)-Radiation (Vol. 75; 2000)

Mixtures

Aflatoxins (naturally occurring mixtures of) [1402-68-2] (Vol. 56, Vol. 82; 2002)

Alcoholic beverages (Vol. 44, Vol. 96; in preparation)

Areca nut (Vol. 85; 2004)

(NB: Overall evaluation based on human data, animal data, and mechanistic and other relevant data)

Betel quid with tobacco (Vol. 85; 2004)

Betel quid without tobacco (Vol. 85; 2004)

Coal-tar pitches [65996-93-2] (Vol. 35, Suppl. 7; 1987)

Coal-tars [8007-45-2] (Vol. 35, Suppl. 7; 1987)

Herbal remedies containing plant species of the genus *Aristolochia* (Vol. 82; 2002)

Household combustion of coal, indoor emissions from (Vol. 95; in preparation)

Mineral oils, untreated and mildly treated (Vol. 33, Suppl. 7; 1987)

Phenacetin, analgesic mixtures containing (Suppl. 7; 1987)

Salted fish (Chinese-style) (Vol. 56; 1993)

Shale-oils [68308-34-9] (Vol. 35, Suppl. 7; 1987)

Soots (Vol. 35, Suppl. 7; 1987)

Tobacco, smokeless (Vol. 37, Suppl. 7, Vol. 89; 2007)

Wood dust (Vol. 62; 1995)

Exposure circumstances

Aluminium production (Vol. 34, Suppl. 7; 1987)

Arsenic in drinking-water (Vol. 84; 2004)

Auramine production (Suppl. 7, Vol. 99; in preparation)

Boot and shoe manufacture and repair (Vol. 25, Suppl. 7; 1987)

Chimney sweeping (Vol. 92; in preparation)

Coal gasification (Vol. 34, Suppl. 7, Vol. 92; in preparation)

Coal-tar distillation (Vol. 92; in preparation)

Coke production (Vol. 34, Suppl. 7, Vol. 92; in preparation)

Furniture and cabinet making (Vol. 25, Suppl. 7; 1987)

Haematite mining (underground) with exposure to radon (Vol. 1, Suppl. 7; 1987)

Involuntary smoking (exposure to secondhand or 'environmental' tobacco smoke) (Vol. 83; 2004)

Iron and steel founding (Vol. 34, Suppl. 7; 1987)

Isopropyl alcohol manufacture (strong-acid process) (Suppl. 7; 1987)

Magenta production (Vol. 57, Vol. 99; in preparation)

Painter (occupational exposure as a) (Vol. 47, Vol. 98; in preparation)

Paving and roofing with coal-tar pitch (Vol. 92; in preparation)

Rubber industry (Vol. 28, Suppl. 7; 1987)

Strong-inorganic-acid mists containing sulfuric acid (occupational exposure to) (Vol. 54; 1992)

Tobacco smoking and tobacco smoke (Vol. 83; 2004)

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