

## LIST OF CARCINOGENS

In the following lists, the agents, mixtures or exposures are classified as to their carcinogenic risk to humans in accordance with the procedures adopted as standard IARC practice:

- List of all agents, mixtures and exposures evaluated to date
- Evaluations classified by group

**Group 1:** The agent (mixture) is carcinogenic to humans. The exposure circumstance entails exposures that are carcinogenic to humans.

Group 2 (two classifications):

**Group 2A:** The agent (mixture) is probably carcinogenic to humans. The exposure circumstance entails exposures that are probably carcinogenic to humans.

**Group 2B:** The agent (mixture) is possibly carcinogenic to humans. The exposure circumstance entails exposures that are possibly carcinogenic to humans.

**Group 3:** The agent (mixture, or exposure circumstance) is not classifiable as to carcinogenicity in humans.

**Group 4:** The agent (mixture, exposure circumstance) is probably not carcinogenic to humans.

### Group 1: Carcinogenic to humans

#### Agents and groups of agents

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

4-Aminobiphenyl [92-67-1] (Vol. 1, Suppl. 7; 1987)

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; 1987)

Beryllium [7440-41-7] and beryllium compounds (Vol. 58; 1993)  
(NB: Evaluated as a group)  
*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)  
1,4-Butanediol dimethanesulfonate (Busulphan; Myleran) [55-98-1] (Vol. 4, Suppl. 7; 1987)  
Cadmium [7440-43-9] and cadmium compounds (Vol. 58; 1993)  
(NB: Evaluated as a group)  
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] compounds (Vol. 49; 1990)  
(NB: Evaluated as a group)  
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)  
Epstein-Barr virus (Vol. 70; 1997)  
Erionite [66733-21-9] (Vol. 42, Suppl. 7; 1987)  
Ethylene oxide [75-21-8] (Vol. 60; 1994)  
(NB: Overall evaluation upgraded from 2A to 1 with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Etoposide [33419-42-0] in combination with cisplatin and bleomycin (Vol. 76; 2000)  
Formaldehyde [50-00-0] (Vol. 88; in preparation)  
[Gamma Radiation: see X- and Gamma ( )-Radiation]  
Gallium arsenide [1303-00-0] (Vol. 86; in preparation)  
*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)  
Herbal remedies containing plant species of the genus *Aristolochia* (Vol. 82; 2002)  
Human immunodeficiency virus type 1 (infection with) (Vol. 67; 1996)  
Human papillomavirus type 16 (Vol. 64; 1995)  
Human papillomavirus type 18 (Vol. 64; 1995)  
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)

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; 1987)  
 Neutrons (Vol. 75; 2000)  
 (NB: Overall evaluation upgraded from 2B to 1 with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
 Nickel compounds (Vol. 49; 1990)  
 (NB: Evaluated as a group)  
 Oestrogen therapy, postmenopausal (Vol. 72; 1999)  
 Oestrogens, 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)  
 Oestrogens, 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)  
*Opisthorchis viverrini* (infection with) (Vol. 61; 1994)  
 Oral contraceptives, combined (Vol. 72; 1999)  
 (NB: There is also conclusive evidence that these agents have a protective effect against cancers of the ovary and endometrium)  
 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,  $\alpha$ -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,  $\beta$ -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. 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 this agent (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 data relevant to the evaluation of carcinogenicity and its  
mechanisms)  
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)  
Tresulfan [299-75-2] (Vol. 26, Suppl. 7; 1987)  
Vinyl chloride [75-01-4] (Vol. 19, Suppl. 7; 1987)  
X- and Gamma ( )-Radiation (Vol. 75; 2000)

### **Mixtures**

Alcoholic beverages (Vol. 44; 1988)  
Analgesic mixtures containing phenacetin (Suppl. 7; 1987)  
Areca nut (Vol. 85; in preparation)  
Betel quid with tobacco (Vol. 85; in preparation)  
Betel quid without tobacco (Vol. 85; in preparation)  
Coal-tar pitches [65996-93-2] (Vol. 35, Suppl. 7; 1987)  
Coal-tars [8007-45-2] (Vol. 35, Suppl. 7; 1987)  
Mineral oils, untreated and mildly treated (Vol. 33, 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 products, smokeless (Vol. 37, Suppl. 7; 1987)  
Wood dust (Vol. 62; 1995)

### **Exposure circumstances**

Aluminium production (Vol. 34, Suppl. 7; 1987)  
Arsenic in drinking-water (Vol. 84; in preparation)  
Auramine, manufacture of (Suppl. 7; 1987)  
Boot and shoe manufacture and repair (Vol. 25, Suppl. 7; 1987)  
Coal gasification (Vol. 34, Suppl. 7; 1987)  
Coke production (Vol. 34, Suppl. 7; 1987)  
Furniture and cabinet making (Vol. 25, Suppl. 7; 1987)  
Haematite mining (underground) with exposure to radon (Vol. 1, Suppl.  
7; 1987)  
Involuntary smoking (Vol. 83; 2004)  
Iron and steel founding (Vol. 34, Suppl. 7; 1987)  
Isopropanol manufacture (strong-acid process) (Suppl. 7; 1987)  
Magenta, manufacture of (Vol. 57; 1993)

Painter (occupational exposure as a) (Vol. 47; 1989)  
Rubber industry (Vol. 28, Suppl. 7; 1987)  
Strong-inorganic-acid mists containing sulfuric acid (occupational exposure to)  
Tobacco smoking (Vol. 38, Suppl. 7, Vol. 83; 2004)

## **Group 2A: Probably carcinogenic to humans**

### **Agents and groups of agents**

Acrylamide [79-06-1] (Vol. 60; 1994)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Adriamycin [23214-92-8] (Vol. 10, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Androgenic (anabolic) steroids (Suppl. 7; 1987)  
Aristolochic acids (naturally occurring mixtures of) (Vol. 82; 2002)  
Azacitidine [320-67-2] (Vol. 50; 1990)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Benz[*a*]anthracene [56-55-3] (Vol. 32, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Benzidine-based dyes (Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Benzo[*a*]pyrene [50-32-8] (Vol. 32, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Bischloroethyl nitrosourea (BCNU) [154-93-8] (Vol. 26, Suppl.7; 1987)  
1,3-Butadiene [106-99-0] (Vol. 71; 1999)  
Captafol [2425-06-1] (Vol. 53; 1991)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)

Chloramphenicol [56-75-7] (Vol. 50; 1990)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
-Chlorinated toluenes (benzal chloride [98-87-3], benzotrichloride [98-07-7], benzyl chloride [100-44-7]) and benzoyl chloride [98-88-4] (combined exposures) (Vol. 29, Suppl. 7, Vol. 71; 1999)  
1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (CCNU) [13010-47-4](Vol. 26, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
4-Chloro-*ortho*-toluidine [95-69-2] (Vol. 77; 2000)  
Chlorozotocin [54749-90-5] (Vol. 50; 1990)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Cisplatin [15663-27-1] (Vol. 26, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
*Clonorchis sinensis* (infection with) (Vol. 61; 1994)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Dibenz[*a,h*]anthracene [53-70-3] (Vol. 32, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Diethyl sulfate [64-67-5] (Vol. 54, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Dimethylcarbamoyl chloride [79-44-7] (Vol. 12, Suppl. 7, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
1,2-Dimethylhydrazine [540-73-8] (Vol. 4, Suppl. 7, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Dimethyl sulfate [77-78-1] (Vol. 4, Suppl. 7, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting

evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Epichlorohydrin [106-89-8] (Vol. 11, Suppl. 7, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Ethylene dibromide [106-93-4] (Vol. 15, Suppl. 7, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
*N*-Ethyl-*N*-nitrosourea [759-73-9] (Vol. 17, Suppl.7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Etoposide [33419-42-0] (Vol. 76; 2000)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Glycidol [556-52-5] (Vol. 77; 2000)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Human papillomavirus type 31 (Vol. 64; 1995)  
Human papillomavirus type 33 (Vol. 64; 1995)  
Indium phosphide [22398-80-7] (Vol. 86; in preparation)  
IQ (2-Amino-3-methylimidazo[4,5-*f*]quinoline) [76180-96-6] (Vol. 56; 1993)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Lead compounds, inorganic (Vol. 87; in preparation)  
Kaposi's sarcoma herpesvirus/human herpesvirus 8 (Vol. 70; 1997)  
5-Methoxypsoralen [484-20-8] (Vol. 40, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
4,4'-Methylene bis(2-chloroaniline) (MOCA) [101-14-4] (Vol.57; 1993)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Methyl methanesulfonate [66-27-3] (Vol. 7, Suppl. 7, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting

evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
*N*-Methyl-*N'*-nitro-*N*-nitrosoguanidine(MNNG) [70-25-7] (Vol. 4, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
*N*-Methyl-*N*-nitrosoourea [684-93-5] (Vol. 17, Suppl.7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Nitrogen mustard [51-75-2] (Vol. 9, Suppl. 7; 1987)  
*N*-Nitrosodiethylamine [55-18-5] (Vol. 17, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
*N*-Nitrosodimethylamine [62-75-9] (Vol. 17, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Phenacetin [62-44-2] (Vol. 24, Suppl. 7; 1987)  
Procarbazine hydrochloride [366-70-1] (Vol. 26, Suppl. 7; 1987)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Styrene-7,8-oxide [96-09-3] (Vol. 60; 1994)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Teniposide [29767-20-2] (Vol. 76; 2000)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Tetrachloroethylene [127-18-4] (Vol. 63; 1995)  
*ortho*-Toluidine [95-53-4] (Vol. 77; 2000)  
Trichloroethylene [79-01-6] (Vol. 63; 1995)  
1,2,3-Trichloropropane [96-18-4] (Vol. 63; 1995)  
Tris(2,3-dibromopropyl) phosphate [126-72-7] (Vol. 20, Suppl. 7, Vol. 71;1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)

Ultraviolet radiation A (Vol. 55; 1992)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Ultraviolet radiation B (Vol. 55; 1992)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Ultraviolet radiation C (Vol. 55; 1992)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Vinyl bromide [593-60-2] (Vol. 39, Suppl. 7, Vol. 71; 1999)  
(NB: Overall evaluation upgraded from 2B to 2A with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
Vinyl fluoride [75-02-5] (Vol. 63; 1995)

### **Mixtures**

Creosotes (from coal-tars) [8001-58-9] (Vol. 35, Suppl. 7; 1987)  
Diesel engine exhaust (Vol. 46; 1989)  
Hot mate (Vol. 51; 1991)  
Non-arsenical insecticides (occupational exposures in spraying and application of) (Vol. 53; 1991)  
Polychlorinated biphenyls [1336-36-3] (Vol. 18, Suppl. 7; 1987)

### **Exposure circumstances**

Art glass, glass containers and pressed ware (manufacture of) (Vol. 58; 1993)  
Cobalt metal with tungsten carbide (Vol. 86; in preparation)  
Hairdresser or barber (occupational exposure as a) (Vol. 57; 1993)  
Petroleum refining (occupational exposures in) (Vol. 45; 1989)  
Sunlamps and sunbeds (use of) (Vol. 55; 1992)

### **Group 2B: Possibly carcinogenic to humans (241)**

#### **Agents and groups of agents**

A- -C (2-Amino-9*H*-pyrido[2,3-*b*]indole) [26148-68-5] (Vol. 40, Suppl. 7; 1987)  
Acetaldehyde [75-07-0] (Vol. 36, Suppl. 7, Vol. 71; 1999)  
Acetamide [60-35-5] (Vol. 7, Suppl. 7, Vol. 71; 1999)  
Acrylonitrile [107-13-1] (Vol. 71; 1999)

AF-2 [2-(2-Furyl)-3-(5-nitro-2-furyl)acrylamide] [3688-53-7] (Vol.31, Suppl. 7; 1987)  
 Aflatoxin M1 [6795-23-9] (Vol. 56; 1993)  
*para*-Aminoazobenzene [60-09-3] (Vol. 8, Suppl. 7; 1987)  
*ortho*-Aminoazotoluene [97-56-3] (Vol. 8, Suppl. 7; 1987)  
 2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole [712-68-5] (Vol.7, Suppl. 7; 1987)  
 Amsacrine [51264-14-3] (Vol. 76; 2000)  
*ortho*-Anisidine [90-04-0] (Vol. 73; 1999)  
 Antimony trioxide [1309-64-4] (Vol. 47; 1989)  
 Aramite® [140-57-8] (Vol. 5, Suppl. 7; 1987)  
 Auramine [492-80-8] (technical-grade) (Vol. 1, Suppl. 7; 1987)  
 Azaserine [115-02-6] (Vol. 10, Suppl. 7; 1987)  
 Aziridine [151-56-4] (Vol. 9, Suppl. 7, Vol. 71; 1999)  
 (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
 Benzo[*b*]fluoranthene [205-99-2] (Vol. 32, Suppl. 7; 1987)  
 Benzo[*j*]fluoranthene [205-82-3] (Vol. 32, Suppl. 7; 1987)  
 Benzo[*k*]fluoranthene [207-08-9] (Vol. 32, Suppl. 7; 1987)  
 Benzofuran [271-89-6] (Vol. 63; 1995)  
 Benzyl violet 4B [1694-09-3] (Vol. 16, Suppl. 7; 1987)  
 2,2-Bis(bromomethyl)propane-1,3-diol [3296-90-0] (Vol. 77; 2000)  
 Bleomycins [11056-06-7] (Vol. 26, Suppl. 7; 1987)  
 (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
 Bracken fern (Vol. 40, Suppl. 7; 1987)  
 Bromodichloromethane [75-27-4] (Vol. 52, Vol. 71; 1999)  
 Butylated hydroxyanisole (BHA) [25013-16-5] (Vol. 40, Suppl. 7; 1987)  
   -Butyrolactone [3068-88-0] (Vol. 11, Suppl. 7, Vol. 71; 1999)  
 Caffeic acid [331-39-5] (Vol. 56; 1993)  
 Carbon black [1333-86-4] (Vol. 65; 1996)  
 Carbon tetrachloride [56-23-5] (Vol. 20, Suppl. 7, Vol. 71; 1999)  
 Catechol [120-80-9] (Vol. 15, Suppl. 7, Vol. 71; 1999)  
 Chlordane [57-74-9] (Vol. 79; 2001)  
 Chlordecone (Kepone) [143-50-0] (Vol. 20, Suppl. 7; 1987)  
 Chlorendic acid [115-28-6] (Vol. 48; 1990)  
*para*-Chloroaniline [106-47-8] (Vol. 57; 1993)  
 3-Chloro-4-(dichloromethyl)-5-hydroxy-2(5*H*)-furanone [77439-76-0] (Vol. 84; in preparation)  
 Chloroform [67-66-3] (Vol. 73; 1999)  
 1-Chloro-2-methylpropene [513-37-1] (Vol. 63; 1995)

Chlorophenoxy herbicides (Vol. 41, Suppl. 7; 1987)  
 4-Chloro-*ortho*-phenylenediamine [95-83-0] (Vol. 27, Suppl.7; 1987)  
 Chloroprene [126-99-8] (Vol. 71; 1999)  
 Chlorothalonil [1897-45-6] (Vol. 73; 1999)  
 CI Acid Red 114 [6459-94-5] (Vol. 57; 1993)  
 CI Basic Red 9 [569-61-9] (Vol. 57; 1993)  
 CI Direct Blue 15 [2429-74-5] (Vol. 57; 1993)  
 Citrus Red No. 2 [6358-53-8] (Vol. 8, Suppl. 7; 1987)  
 Cobalt [7440-48-4] and cobalt compounds (Vol. 52; 1991)  
 (NB: Evaluated as a group)  
 Cobalt sulfate [10026-24-1] and other soluble cobalt(II) salts (Vol. 86; in preparation)  
*para*-Cresidine [120-71-8] (Vol. 27, Suppl. 7; 1987)  
 Cycasin [14901-08-7] (Vol. 10, Suppl. 7; 1987)  
 Dacarbazine [4342-03-4] (Vol. 26, Suppl. 7; 1987)  
 Dantron (Chrysazin; 1,8-Dihydroxyanthraquinone) [117-10-2] (Vol.50; 1990)  
 Daunomycin [20830-81-3] (Vol. 10, Suppl. 7; 1987)  
 DDT [*p,p'*-DDT, 50-29-3] (Vol. 53; 1991)  
*N,N'*-Diacetylbenzidine [613-35-4] (Vol. 16, Suppl.7; 1987)  
 2,4-Diaminoanisole [615-05-4] (Vol. 79; 2001)  
 4,4'-Diaminodiphenyl ether [101-80-4] (Vol. 29, Suppl. 7; 1987)  
 2,4-Diaminotoluene [95-80-7] (Vol. 16, Suppl. 7; 1987)  
 Dibenz[*a,h*]acridine [226-36-8] (Vol. 32, Suppl. 7; 1987)  
 Dibenz[*a,j*]acridine [224-42-0] (Vol. 32, Suppl. 7; 1987)  
 7*H*-Dibenzo[*c,g*]carbazole [194-59-2] (Vol. 32, Suppl.7; 1987)  
 Dibenzo[*a,e*]pyrene [192-65-4] (Vol. 32, Suppl. 7; 1987)  
 Dibenzo[*a,h*]pyrene [189-64-0] (Vol. 32, Suppl. 7; 1987)  
 Dibenzo[*a,i*]pyrene [189-55-9] (Vol. 32, Suppl. 7; 1987)  
 Dibenzo[*a,l*]pyrene [191-30-0] (Vol. 32, Suppl. 7; 1987)  
 1,2-Dibromo-3-chloropropane [96-12-8] (Vol. 20, Suppl. 7, Vol. 71; 1999)  
 2,3-Dibromopropan-1-ol [96-13-9] (Vol. 77; 2000)  
 Dichloroacetic acid [79-43-6] (Vol. 84; in preparation)  
*para*-Dichlorobenzene [106-46-7] (Vol. 73; 1999)  
 3,3'-Dichlorobenzidine [91-94-1] (Vol. 29, Suppl. 7; 1987)  
 3,3'-Dichloro-4,4'-diaminodiphenyl ether [28434-86-8] (Vol. 16,Suppl. 7; 1987)  
 1,2-Dichloroethane [107-06-2] (Vol. 20, Suppl. 7, Vol. 71; 1999)  
 Dichloromethane (methylene chloride) [75-09-2] (Vol. 71; 1999)  
 1,3-Dichloropropene [542-75-6] (technical-grade) (Vol. 41, Suppl.7, Vol. 71; 1999)  
 Dichlorvos [62-73-7] (Vol. 53; 1991)

1,2-Diethylhydrazine [1615-80-1] (Vol. 4, Suppl. 7, Vol. 71; 1999)  
 Diglycidyl resorcinol ether [101-90-6] (Vol. 36, Suppl. 7, Vol. 71; 1999)  
 Dihydrosafrole [94-58-6] (Vol. 10, Suppl. 7; 1987)  
 Diisopropyl sulfate [2973-10-6] (Vol. 54, Vol. 71; 1999)  
 3,3'-Dimethoxybenzidine (*ortho*-Dianisidine) [119-90-4](Vol. 4, Suppl. 7; 1987)  
*para*-Dimethylaminoazobenzene [60-11-7] (Vol. 8, Suppl.7; 1987)  
*trans*-2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)-vinyl]-1,3,4-oxadiazole [25962-77-0] (Vol. 7, Suppl. 7; 1987)  
 2,6-Dimethylaniline (2,6-Xylidine) [87-62-7] (Vol. 57; 1993)  
 3,3'-Dimethylbenzidine (*ortho*-Tolidine) [119-93-7] (Vol.1, Suppl. 7; 1987)  
 1,1-Dimethylhydrazine [57-14-7] (Vol. 4, Suppl. 7, Vol. 71; 1999)  
 3,7-Dinitrofluoranthene [105735-71-5] (Vol. 65; 1996)  
 3,9-Dinitrofluoranthene [22506-53-2] (Vol. 65; 1996)  
 1,6-Dinitropyrene [42397-64-8] (Vol. 46; 1989)  
 1,8-Dinitropyrene [42397-65-9] (Vol. 46; 1989)  
 2,4-Dinitrotoluene [121-14-2] (Vol. 65; 1996)  
 2,6-Dinitrotoluene [606-20-2] (Vol. 65; 1996)  
 1,4-Dioxane [123-91-1] (Vol. 11, Suppl. 7, Vol. 71; 1999)  
 Disperse Blue 1 [2475-45-8] (Vol. 48; 1990)  
 1,2-Epoxybutane [106-88-7] (Vol. 47, Vol. 71; 1999)  
 (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)  
 Ethyl acrylate [140-88-5] (Vol. 39, Suppl. 7, Vol. 71; 1999)  
 Ethylbenzene [100-41-4] (Vol. 77; 2000)  
 Ethyl methanesulfonate [62-50-0] (Vol. 7, Suppl. 7; 1987)  
 Foreign bodies, implanted in tissues (Vol. 74; 1999)  
     Polymeric, prepared as thin smooth films (with the exception of poly(glycolic acid))  
     Metallic, prepared as thin smooth films  
     Metallic cobalt, metallic nickel and an alloy powder containing 66-67% nickel, 13-16% chromium and 7% iron  
 2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole [3570-75-0](Vol. 7, Suppl. 7; 1987)  
 Fumonisin B<sub>1</sub> [116355-83-0] (Vol. 82; 2002)  
 Furan [110-00-9] (Vol. 63; 1995)  
 Glu-P-1 (2-Amino-6-methylidipyrido[1,2-*a*:3',2'-*d*]imidazole) [67730-11-4] (Vol. 40, Suppl. 7; 1987)  
 Glu-P-2 (2-Aminodipyrido[1,2-*a*:3',2'-*d*]imidazole)[67730-10-3] (Vol. 40, Suppl. 7; 1987)

Glycidaldehyde [765-34-4] (Vol. 11, Suppl. 7, Vol. 71; 1999)  
 Griseofulvin [126-07-8] (Vol. 79; 2001)  
 HC Blue No. 1 [2784-94-3] (Vol. 57; 1993)  
 Heptachlor [76-44-8] (Vol. 79; 2001)  
 Hexachlorobenzene [118-74-1] (Vol. 79; 2001)  
 Hexachloroethane [67-72-1] (Vol. 73; 1999)  
 Hexachlorocyclohexanes (Vol. 20, Suppl. 7; 1987)  
 Hexamethylphosphoramide [680-31-9] (Vol. 15, Suppl. 7, Vol. 71; 1999)  
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 1-Hydroxyanthraquinone [129-43-1] (Vol. 82; 2002)  
 Indeno[1,2,3-*cd*]pyrene [193-39-5] (Vol. 32, Suppl. 7; 1987)  
 Iron-dextran complex [9004-66-4] (Vol. 2, Suppl. 7; 1987)  
 Isoprene [78-79-5] (Vol. 60, Vol. 71; 1999)  
 Lasiocarpine [303-34-4] (Vol. 10, Suppl. 7; 1987)  
 Lead [7439-92-1] (Vol. 23, Suppl. 7; 1987)  
 Magenta [632-99-5] (containing CI Basic Red 9) (Vol. 57; 1993)  
**Magnetic fields (extremely low-frequency) (Vol. 80; 2002)**  
 MeA- -C (2-Amino-3-methyl-9*H*-pyrido[2,3-*b*]indole) [68006-83-7] (Vol. 40, Suppl. 7; 1987)  
 Medroxyprogesterone acetate [71-58-9] (Vol. 21, Suppl. 7; 1987)  
 MeIQ (2-Amino-3,4-dimethylimidazo[4,5-*f*]quinoline) [77094-11-2] (Vol. 56; 1993)  
 MeIQx (2-Amino-3,8-dimethylimidazo[4,5-*f*]quinoxaline) [77500-04-0] (Vol. 56; 1993)  
 Merphalan [531-76-0] (Vol. 9, Suppl. 7; 1987)  
 2-Methylaziridine (Propyleneimine) [75-55-8] (Vol. 9, Suppl. 7, Vol. 71; 1999)  
 Methylazoxymethanol acetate [592-62-1] (Vol. 10, Suppl. 7; 1987)  
 5-Methylchrysene [3697-24-3] (Vol. 32, Suppl. 7; 1987)  
 4,4'-Methylene bis(2-methylaniline) [838-88-0] (Vol. 4, Suppl. 7; 1987)  
 4,4'-Methylenedianiline [101-77-9] (Vol. 39, Suppl. 7; 1987)  
 Methylmercury compounds (Vol. 58; 1993)  
 (NB: Evaluated as a group)  
 2-Methyl-1-nitroanthraquinone [129-15-7] (uncertain purity) (Vol. 27, Suppl. 7; 1987)  
*N*-Methyl-*N*-nitrosourethane [615-53-2] (Vol. 4, Suppl. 7; 1987)  
 Methylthiouracil [56-04-2] (Vol. 79; 2001)  
 Metronidazole [443-48-1] (Vol. 13, Suppl. 7; 1987)  
 Mirex [2385-85-5] (Vol. 20, Suppl. 7; 1987)  
 Mitomycin C [50-07-7] (Vol. 10, Suppl. 7; 1987)

Mitoxantrone [65271-80-9] (Vol. 76; 2000)  
 Monocrotaline [315-22-0] (Vol. 10, Suppl. 7; 1987)  
 5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene)amino]-2-oxazolidinone  
 [3795-88-8] (Vol. 7, Suppl. 7; 1987)  
 Nafenopin [3771-19-5] (Vol. 24, Suppl. 7; 1987)  
 Naphthalene [91-20-3] (Vol. 82; 2002)  
 Nickel, metallic [7440-02-0] and alloys (Vol. 49; 1990)  
 Niridazole [61-57-4] (Vol. 13, Suppl. 7; 1987)  
 Nitrilotriacetic acid [139-13-9] and its salts (Vol. 73; 1999)  
 (NB: Evaluated as a group)  
 5-Nitroacenaphthene [602-87-9] (Vol. 16, Suppl. 7; 1987)  
 2-Nitroanisole [91-23-6] (Vol. 65; 1996)  
 Nitrobenzene [98-95-3] (Vol. 65; 1996)  
 6-Nitrochrysene [7496-02-8] (Vol. 46; 1989)  
 Nitrofen [1836-75-5] (technical-grade) (Vol. 30, Suppl. 7; 1987)  
 2-Nitrofluorene [607-57-8] (Vol. 46; 1989)  
 1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone [555-84-0] (Vol. 7,  
 Suppl. 7; 1987)  
*N*-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide [531-82-8] (Vol. 7, Suppl.  
 7; 1987)  
 Nitrogen mustard *N*-oxide [126-85-2] (Vol. 9, Suppl. 7; 1987)  
 Nitromethane [75-52-5] (Vol. 77; 2000)  
 2-Nitropropane [79-46-9] (Vol. 29, Suppl. 7, Vol. 71; 1999)  
 1-Nitropyrene [5522-43-0] (Vol. 46; 1989)  
 4-Nitropyrene [57835-92-4] (Vol. 46; 1989)  
*N*-Nitrosodi-*n*-butylamine [924-16-3] (Vol. 17, Suppl. 7; 1987)  
*N*-Nitrosodiethanolamine [1116-54-7] (Vol. 17, Suppl. 7, Vol. 77; 2000)  
*N*-Nitrosodi-*n*-propylamine [621-64-7] (Vol. 17, Suppl. 7; 1987)  
 3-(*N*-Nitrosomethylamino)propionitrile [60153-49-3] (Vol. 85; in  
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 4-(*N*-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK)[64091-91-4]  
 (Vol. 37, Suppl. 7; 1987)  
*N*-Nitrosomethylethylamine [10595-95-6] (Vol. 17, Suppl. 7; 1987)  
*N*-Nitrosomethylvinylamine [4549-40-0] (Vol. 17, Suppl. 7; 1987)  
*N*-Nitrosomorpholine [59-89-2] (Vol. 17, Suppl. 7; 1987)  
*N'*-Nitrosornicotine (NNN) [16543-55-8] (Vol. 37, Suppl. 7; 1987)  
*N*-Nitrosopiperidine [100-75-4] (Vol. 17, Suppl. 7; 1987)  
*N*-Nitrosopyrrolidine [930-55-2] (Vol. 17, Suppl. 7; 1987)  
*N*-Nitrososarcosine [13256-22-9] (Vol. 17, Suppl. 7; 1987)  
 Ochratoxin A [303-47-9] (Vol. 56; 1993)  
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 (Vol. 68; 1997)  
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 Phenazopyridine hydrochloride [136-40-3] (Vol. 24, Suppl. 7; 1987)  
 Phenobarbital [50-06-6] (Vol. 79; 2001)  
 Phenolphthalein [77-09-8] (Vol. 76; 2000)  
 Phenoxybenzamine hydrochloride [63-92-3] (Vol. 24, Suppl. 7; 1987)  
 Phenyl glycidyl ether [122-60-1] (Vol. 47, Vol. 71; 1999)  
 Phenytoin [57-41-0] (Vol. 66; 1996)  
 PhIP (2-Amino-1-methyl-6-phenylimidazo[4,5-*b*]pyridine) [105650-23-5]  
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 1,3-Propane sultone [1120-71-4] (Vol. 4, Suppl. 7, Vol. 71; 1999)  
   -Propiolactone [57-57-8] (Vol. 4, Suppl. 7, Vol. 71; 1999)  
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 Riddelliine [23246-96-0] (Vol. 10, Suppl. 7, Vol. 82; 2002)  
 Safrole [94-59-7] (Vol. 10, Suppl. 7; 1987)  
*Schistosoma japonicum* (infection with) (Vol. 61; 1994)  
 Sodium *ortho*-phenylphenate [132-27-4] (Vol. 73; 1999)  
 Special-purpose fibres such as E-glass and '475' glass fibres (Vol. 81;  
 2002)  
 Sterigmatocystin [10048-13-2] (Vol. 10, Suppl. 7; 1987)  
 Streptozotocin [18883-66-4] (Vol. 17, Suppl. 7; 1987)  
 Styrene [100-42-5] (Vol. 60, 82; 2002)  
 (NB: Overall evaluation upgraded from 3 to 2B with supporting evidence  
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 Sulfallate [95-06-7] (Vol. 30, Suppl. 7; 1987)  
 Tetrafluoroethylene [116-14-3] (Vol. 19, Suppl. 7, Vol. 71; 1999)  
 Tetranitromethane [509-14-8] (Vol. 65; 1996)  
 Thioacetamide [62-55-5] (Vol. 7, Suppl. 7; 1987)  
 4,4'-Thiodianiline [139-65-1] (Vol. 27, Suppl. 7; 1987)  
 Thiouracil [141-90-2] (Vol. 79; 2001)  
 Toluene diisocyanates [26471-62-5] (Vol. 39, Suppl. 7, Vol. 71; 1999)

Trichlormethine (Trimustine hydrochloride) [817-09-4] (Vol. 50; 1990)  
Trp-P-1 (3-Amino-1,4-dimethyl-5*H*-pyrido[4,3-*b*]indole)[62450-06-0]  
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Trp-P-2 (3-Amino-1-methyl-5*H*-pyrido[4,3-*b*]indole)[62450-07-1] (Vol.  
31, Suppl. 7; 1987)  
Trypan blue [72-57-1] (Vol. 8, Suppl. 7; 1987)  
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Vanadium pentoxide [1314-62-1] (Vol. 86; in preparation)  
Vinyl acetate [108-05-4] (Vol. 63; 1995)  
4-Vinylcyclohexene [100-40-3] (Vol. 60; 1994)  
4-Vinylcyclohexene diepoxide [106-87-6] (Vol. 60; 1994)  
Zalcitabine [7481-89-2] (Vol. 76; 2000)  
Zidovudine (AZT) [30516-87-1] (Vol. 76; 2000)

### **Mixtures**

Bitumens [8052-42-4], extracts of steam-refined and air-refined (Vol. 35,  
Suppl. 7; 1987)  
Carrageenan [9000-07-1], degraded (Vol. 31, Suppl. 7; 1987)  
Chlorinated paraffins of average carbon chain length C12 and average  
degree of chlorination approximately 60% (Vol. 48; 1990)  
Coffee (urinary bladder) (Vol. 51; 1991)  
(NB: There is some evidence of an inverse relationship between coffee  
drinking and cancer of the large bowel; coffee drinking could not be  
classified as to its carcinogenicity to other organs)  
Diesel fuel, marine (Vol. 45; 1989)  
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from other data relevant to the evaluation of carcinogenicity and its  
mechanisms)  
Pickled vegetables (traditional in Asia) (Vol. 56; 1993)  
Polybrominated biphenyls [Firemaster BP-6, 59536-65-1] (Vol. 41,  
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Toxaphene (Polychlorinated camphenes) [8001-35-2] (Vol. 79; 2001)  
Toxins derived from *Fusarium moniliforme* (Vol. 56; 1993)  
Welding fumes (Vol. 49; 1990)

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Cobalt metal without tungsten carbide (Vol. 86; in preparation)

Dry cleaning (occupational exposures in) (Vol. 63; 1995)

Printing processes (occupational exposures in) (Vol. 65; 1996)

Textile manufacturing industry (work in) (Vol. 48; 1990)

**Group 3: Not classifiable as to carcinogenicity to humans (497**

Caprolactam [105-60-2] (Vol. 39, Suppl. 7, Vol. 71; 1998)

**Group 4: Probably not carcinogenic to humans (1)**

**References;**

Monographs on the evaluation of carcinogenic risks to humans, IARC