

List of IARC Group 1 carcinogens

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This article is **outdated**. Please update this article to reflect recent events or newly available information. (*June 2012*)

Substances, mixtures and exposure circumstances in this list have been classified by the [IARC](#) as **Group 1**: *The agent (mixture) is [carcinogenic](#) to humans. The exposure circumstance entails exposures that are carcinogenic to humans.* This category is used when there is *sufficient evidence* of carcinogenicity in humans. Exceptionally, an agent (mixture) may be placed in this category when evidence of carcinogenicity in humans is less than sufficient but there is *sufficient evidence* of carcinogenicity in experimental animals and strong evidence in exposed humans that the agent (mixture) acts through a relevant mechanism of carcinogenicity.

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Agents and groups of agents[\[edit\]](#)

- [Acetaldehyde](#)^[1]
- [4-Aminobiphenyl](#)
- [Aristolochic acids](#), and plants containing them
- [Arsenic](#) and [arsenic compounds](#)¹
- [Asbestos](#)
- [Azathioprine](#)
- [Benzene](#)
- [Benzidine](#)
- [Benzo\[*a*\]pyrene](#)
- [Beryllium](#) and [beryllium compounds](#)²
- [Chlornapazine](#) (*N,N*-Bis(2-chloroethyl)-2-naphthylamine)
- [Bis\(chloromethyl\)ether](#)
- [Chloromethyl methyl ether](#)
- [1,3-Butadiene](#)
- [1,4-Butanediol dimethanesulfonate](#) (Busulphan, Myleran)

- [Cadmium](#) and [cadmium compounds](#)²
- [Chlorambucil](#)
- [Methyl-CCNU](#) (1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea; Semustine)
- [Chromium\(VI\)](#) compounds²
- [Ciclosporin](#)
- [Contraceptives, hormonal](#), combined forms (those containing both estrogen and a progestogen)³
- [Contraceptives, oral](#), sequential forms of hormonal contraception (a period of estrogen-only followed by a period of both estrogen and a progestogen)
- [Cyclophosphamide](#)
- [Diethylstilboestrol](#)
- [Dyes](#) metabolized to [benzidine](#)
- [Epstein-Barr virus](#)
- [Estrogens, nonsteroidal](#) [1](#)
- [Estrogens, steroidal](#) [1](#)
- [Estrogen therapy](#), postmenopausal
- [Ethanol](#) in alcoholic beverages [4](#),⁴¹
- [Erionite](#)
- [Ethylene oxide](#)
- [Etoposide](#) alone and in combination with [cisplatin](#) and [bleomycin](#)
- [Formaldehyde](#)
- [Gallium arsenide](#)
- [Helicobacter pylori](#) (infection with)
- [Hepatitis B virus](#) (chronic infection with)
- [Hepatitis C virus](#) (chronic infection with)
- Herbal remedies containing plant species of the genus [Aristolochia](#)
- [Human immunodeficiency virus](#) type 1 (infection with)
- [Human papillomavirus](#) type 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 66
- [Human T-cell lymphotropic virus type I](#)
- [Melphalan](#)
- [Methoxsalen](#) (8-Methoxypsoralen) plus ultraviolet A radiation
- [4,4'-methylene-bis\(2-chloroaniline\)](#) (MOCA)
- [MOPP](#) and other combined chemotherapy including alkylating agents
- [Mustard gas](#) (Sulfur mustard)
- [2-Naphthylamine](#)
- [Neutron radiation](#)
- [Nickel compounds](#)²
- [4-\(N-Nitrosomethylamino\)-1-\(3-pyridyl\)-1-butanone](#) (NNK)
- [N-Nitrosornicotine](#) (NNN)
- [Opisthorchis viverrini](#) (infection with)
- [Outdoor air pollution](#)
- [Particulate matter](#) in outdoor air pollution
- [Phosphorus-32](#), as phosphate
- [Plutonium-239](#) and its decay products (may contain plutonium-240 and other isotopes), as aerosols

- Radioiodines, short-lived isotopes, including iodine-131, from atomic reactor accidents and nuclear weapons detonation (exposure during childhood)
- Radionuclides, α -particle-emitting, internally deposited⁵
- Radionuclides, β -particle-emitting, internally deposited⁵
- [Radium-224](#) and its decay products
- [Radium-226](#) and its decay products
- [Radium-228](#) and its decay products
- [Radon-222](#) and its decay products
- [Schistosoma haematobium](#) (infection with)
- [Silica](#), crystalline (inhaled in the form of [quartz](#) or [cristobalite](#) from occupational sources)
- [Solar radiation](#)
- [Talc](#) containing [asbestiform](#) fibres
- [Tamoxifen](#)⁶
- [2,3,7,8-Tetrachlorodibenzo-para-dioxin](#)
- [Thiotepa](#) (1,1',1''-Phosphinothioylidynetrisaziridine)
- [Thorium-232](#) and its decay products, administered intravenously as [a colloidal dispersion of thorium-232 dioxide](#)
- [Treasulfan](#)
- [ortho-Toluidine](#)
- [Vinyl chloride](#)
- [Ultraviolet Radiation](#)
- [X-Radiation](#) and [Gamma radiation](#)