



Carcinogen: Any substance that promotes the formation of cancer.
Mutagen: A physical or chemical agent that changes genetic material of an organism, increasing the frequency of mutations. Many mutations cause cancer, and therefore are also carcinogens.

International Agency Research on Cancer



World Health
Organization

IARC Classifications Of Carcinogens

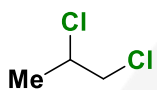
Group 1 Human Carcinogen: Sufficient evidence in humans: solar radiation, smoking, alcohol, processed meats, crystalline silica, welding fumes, asbestos

Group 2a/b Probable/Possible Human Carcinogen: Limited evidence in humans, some evidence in animals: red meat, steroids, gasoline fumes, engine exhaust

Group 3 Not Classifiable: Insufficient evidence in animals and humans: static magnetic fields, fluorescent lighting, polyethylene

Group 1 Carcinogens

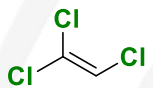
Chlorinated Compounds



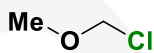
1,2-dichloropropane
liver, breast,
bile duct cancers



vinyl chloride
mutates white
blood cells
liver cancer,
angiosarcoma



trichloroethylene
kidney or liver
cancer, lymphoma

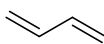


**MOMCI
chloromethyl ethers**
alkylating agents
respiratory cancers

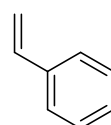
Other



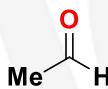
benzene
alters bone
marrow
leukemia



1,3-butadiene
leukemia,
stomach
& blood cancers



**styrene &
styrene oxide**
leukemia,
lymphoma



acetaldehyde
damages DNA
upper GI & liver
cancer

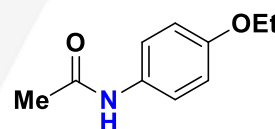


**formaldehyde
(formalin)**
nasopharyngeal
& brain cancer,
leukemia

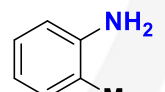


ethylene oxide
alkylating agent
lymphoma &
leukemia

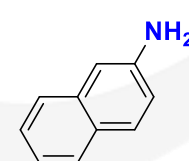
Anilines



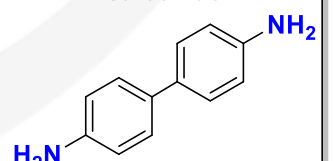
phenacetin
bladder cancer



o-toluidine
mutagen
sarcomas



2-naphthylamine
bladder cancer



benzidine
pancreatic cancer

4

Be

Beryllium

- ex: TOXIC BeCl₂, BeO, Be⁰
- bioaccumulates and displaces Mg
- lung cancer

28

Ni

Nickel

- ex: NiS, NiCl₂, TOXIC Ni(CO)₄
- binds histone and damages chromosomes
- lung & nasal cancer

24

Cr

Chromium

- ex Cr(VI): PCC/PDC, CrO₃, Na₂CrO₄
- mutagenic; permeates cells
- respiratory & skin cancers

33

As

Arsenic

- ex: As₂O₃, AsCl₅, As⁰, TOXIC As₂O₅, AsCl₃
- alters gene transcription
- skin, bladder & lung cancers

48

Cd

Cadmium

- ex: CdS, CdO, Cd(OAc)₂, CdCl₂
- endocrine disruptor
- lung, prostate & breast cancers

82

Pb

Lead

- ex: Organo Pb, Pb oxides, PbCl₂, PdSO₄
- inhibits DNA repair
- lung & stomach cancers

Group 2 Carcinogens: chloroform, dichloromethane, furan, HMPA, methyl methanesulfonate, nitrobenzene, nitromethane, carbon tetrachloride

Carcinogen Standard Operating Procedures:

Handling: Use fume hoods and full PPE including appropriate gloves, lab coat and goggles. Remove any contaminated PPE and wash hands with soap and water after use.

Storage: Designate a work area for carcinogens such as a specific hood. After use, wipe down the work area and equipment. Store in ventilated and/or fire-proof cabinets.

Waste Disposal: P-listed materials such as acute toxins and carcinogens must be disposed of separately.