

Anticancer agent

Dr. Gopal Krishna Padhy
Assoc. Professor
Centurion University of Technology and
Management

Introduction

- ❖ Cancer is a disease characterized by uncontrollable, irreversible, independent, and abnormal over growth of tissues.
- ❖ Cancer spreads by invasion to the surrounding tissues and by metastasis to distant sites.

Types of Cancer	Affected Area
Breast Cancer	Breast
Bladder Cancer	Urinary Bladder
Bone marrow Cancer	Shafts of long bones
Colon Cancer	Colon
Cervical Cancer	Cervix
Gynecological Cancer	Female Reproductive organs
Lung Cancer	Lung
Osteo sarcoma	metaphyseal region of tubular long bones
Wilms tumour	Kidney
Leukemia	Blood
Larynx Cancer	Larynx

Causes

Environment

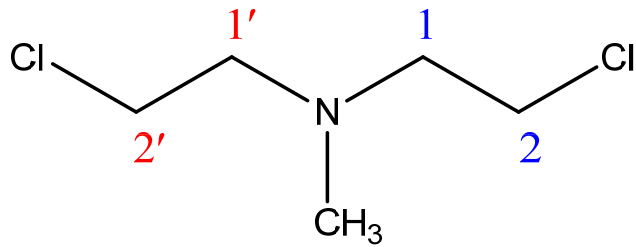
- ❖ cigarette smoke
- ❖ Chemicals
- ❖ UV light
- ❖ Viruses

Metabolic processes

- ❖ free radicals
- ❖ DNA copying and repair defects

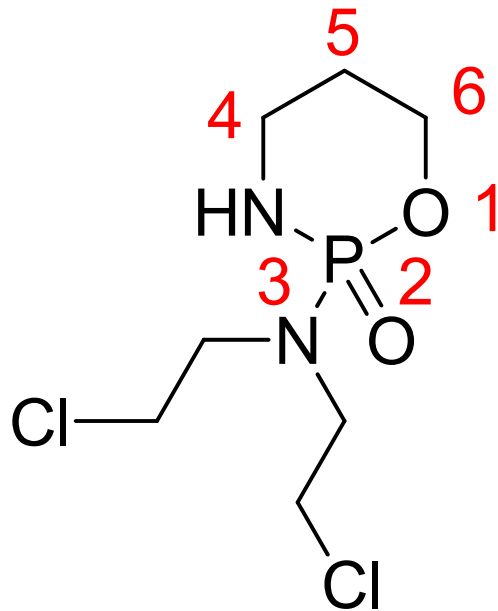
Inherited genetic mutations

Alkylating agents



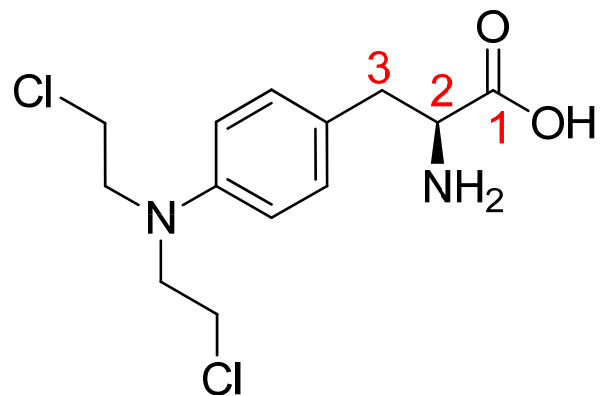
Meclorothamine

IUPAC: 2,2'-dichloro-N-methyldiethylamine



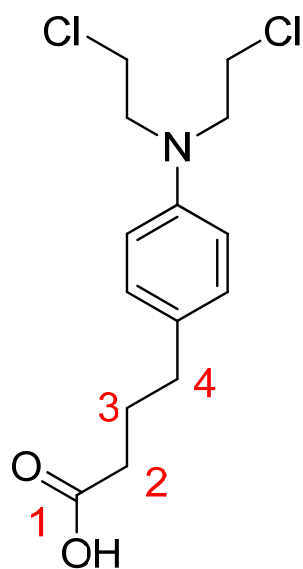
Cyclophosphamide

IUPAC: 2-[Bis(2-chloroethylamino)]-tetrahydro-2H-1,3,2-oxazaphosphorine-2-oxide



IUPAC: 3-(p-(Bis(2-chloroethyl) amino)phenyl)-L-alanine

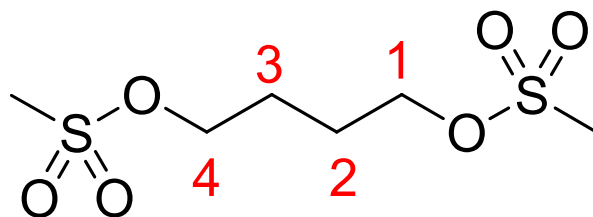
Melphalan



IUPAC: 4-(p-bis(beta-chloroethyl) aminophenyl)butyric acid

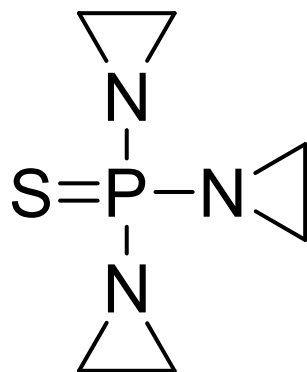
Chlorambucil

Busulfan



IUPAC: 1,4-Bis(methanesulfonyl)butane

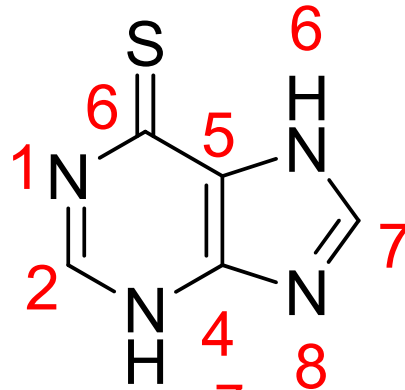
Thiotepa



IUPAC: *N,N',N''*-triethylenethiophosphoramide

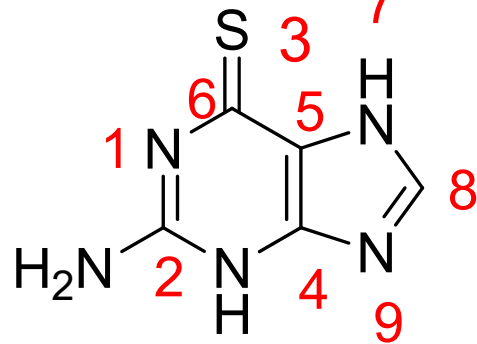
Antimetabolites

Mercaptopurine



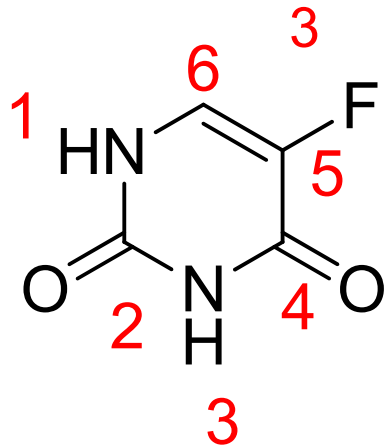
IUPAC: 6-Thioxopurine

Thioguanine



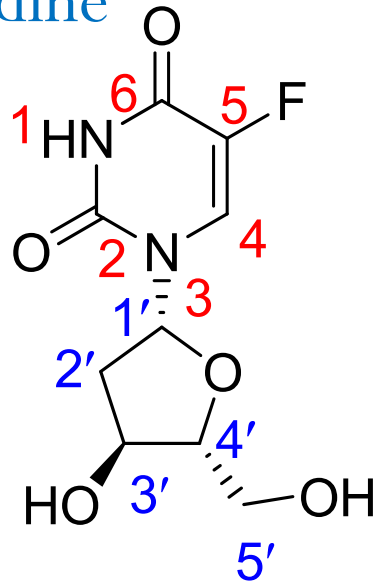
IUPAC: 2-Amino-1,7-dihydro-6H-purine-6-thione

Fluorouracil



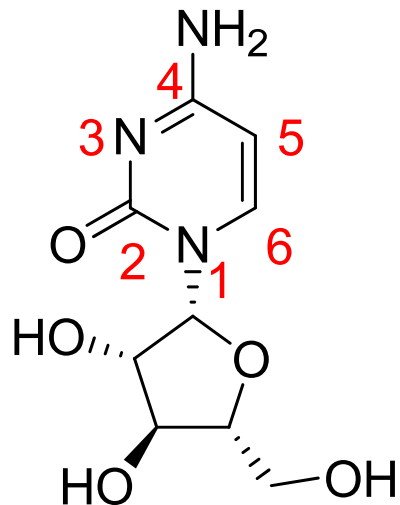
IUPAC: 5-Fluoropyrimidine-2,4-dione

Floxuridine



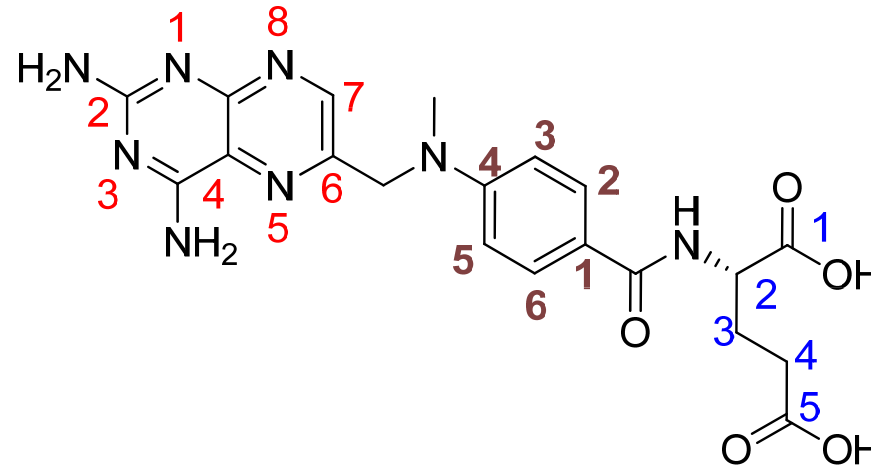
IUPAC: 1beta-D-2'-Deoxyribofuranosyl-5-fluorouracil

Cytarabine



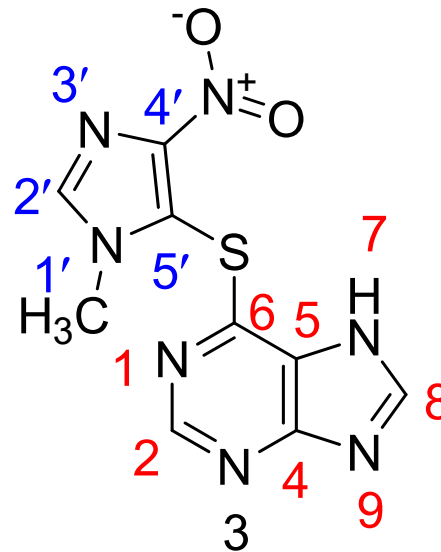
IUPAC: 4-Amino-1-beta-D-arabinofuranosyl-2(1H)-pyrimidinone

Methotrexate



IUPAC: (2S)-2-[(4- {[(2,4-diaminopteridin-6-yl)methyl] (methyl) amino} phenyl)formamido]pentanedioic acid

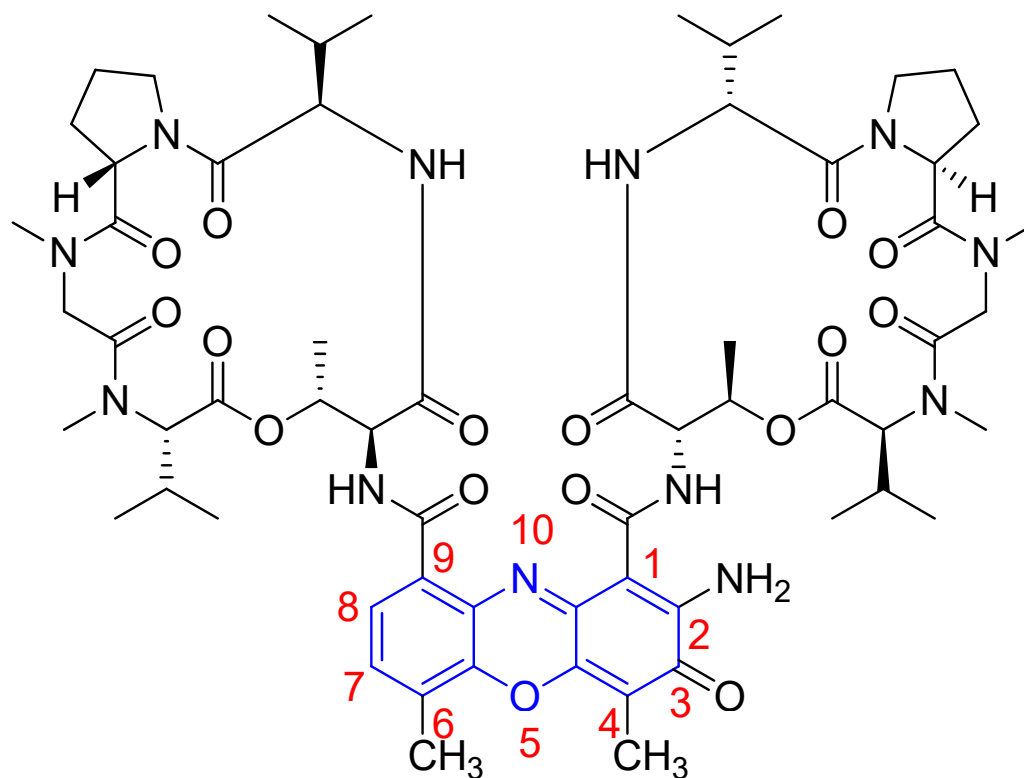
Azathioprine



6-((1'-Methyl-4'-nitro-1H-imidazol-5'-yl)thio)-1H-purine

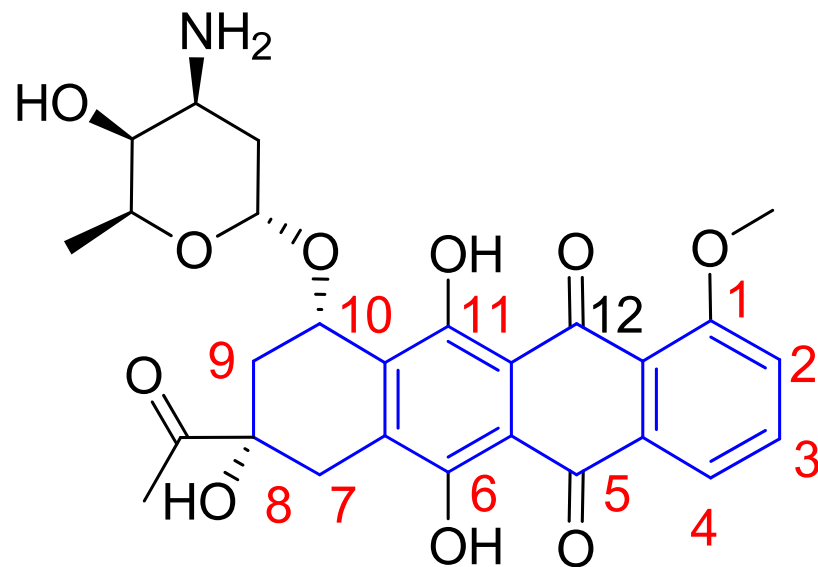
Antibiotics

Dactinomycin



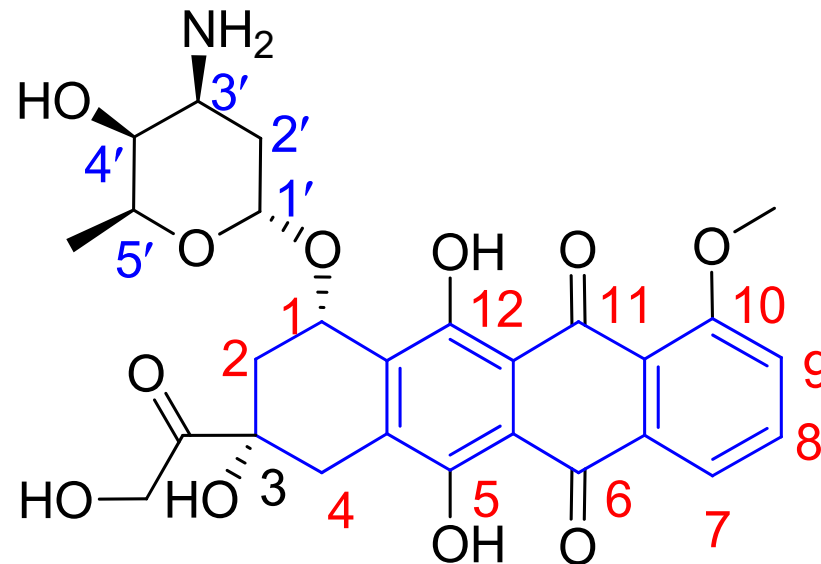
IUPAC: 2-amino-N,N'-bis(hexadecahydro-2,5,9-trimethyl-6,13-bis(1-methylethyl)-1,4,7,11,14-pentaoxo-1H-pyrrolo(2,1-i)(1,4,7,10,13)oxatetra-azacyclohexadecin-10-yl)-4,6-dimethyl-3-oxo-3H-phenoxazine-1,9-dicarboxamide

Daunorubicin



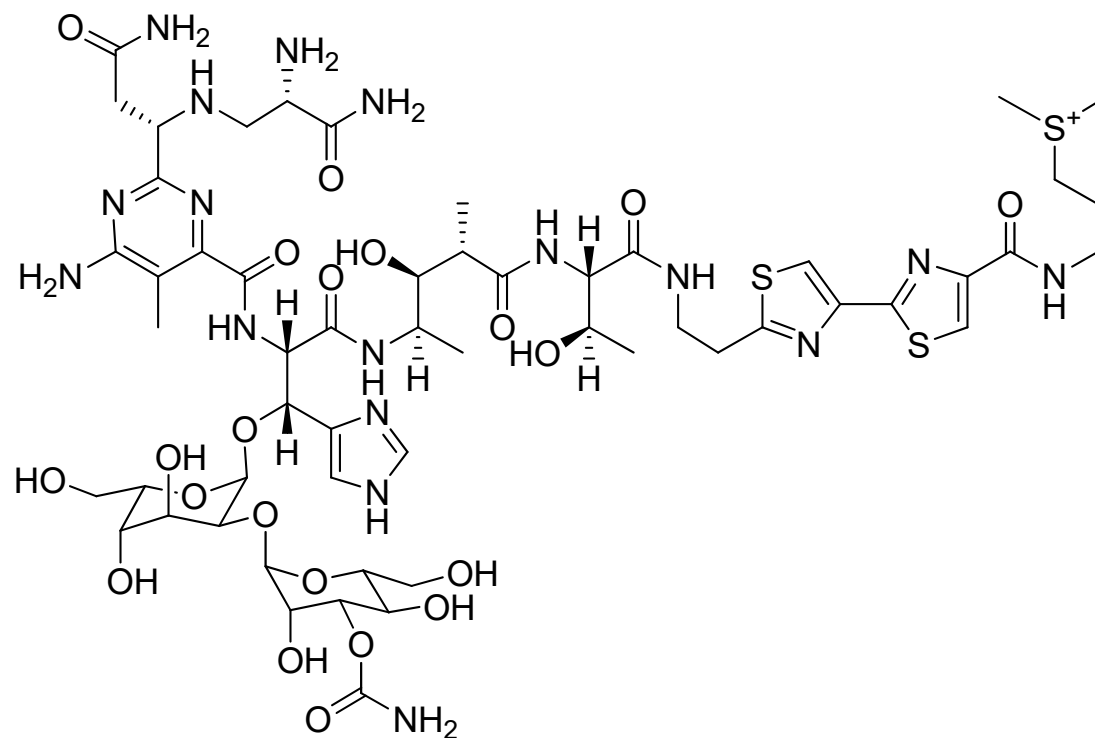
IUPAC: (8*S*-*cis*)-8-acetyl-10-((3-amino-2,3,6-trideoxy- α -L-lyxo-hexopyrannosyl)oxy)-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-5,12-naphthacenedione

Doxorubicin



IUPAC: (1S,3S)-3-glycoloyl-3,5,12-trihydroxy-10-methoxy-6,11-dioxo-1,2,3,4,6,11-hexahydrotetracen-1-yl 3'-amino-2',3',6'-trideoxy- α -L-lyxohexopyranoside

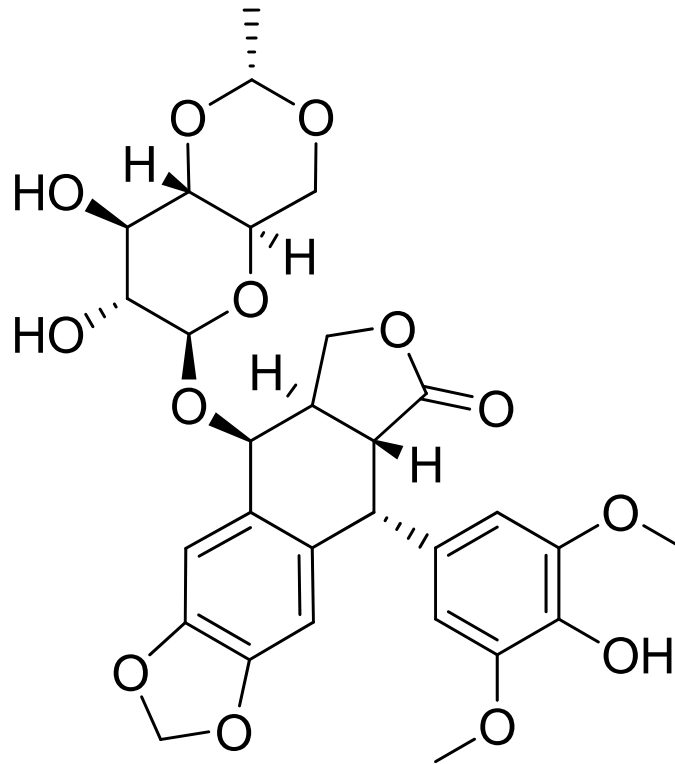
Bleomycin



IUPAC: (3- {[2-(2- {2-[(2S,3R)-2-[(2S,3S,4R)-4-[(2S,3R)-2-({6-amino-2- [(1S)-1- {[(2S)-2-amino-2-carbamoylethyl]amino} -2-carbamoylethyl]-5-methylpyrimidin-4-yl} formamido)-3-[(3- {[4-(carbamoyloxy)-3,5-dihydroxy-6-(hydroxymethyl)oxan-2-yl]oxy} -4,5-dihydroxy-6-(hydroxymethyl)oxan-2-yl]oxy]-3-(1H-imidazol-4-yl)propanamido]-3-hydroxy-2-methylpentanamido]-3-hydroxybutanamido]ethyl} -1,3-thiazol-4-yl)-1,3-thiazol-4-yl]formamido} propyl)dimethylsulfanium

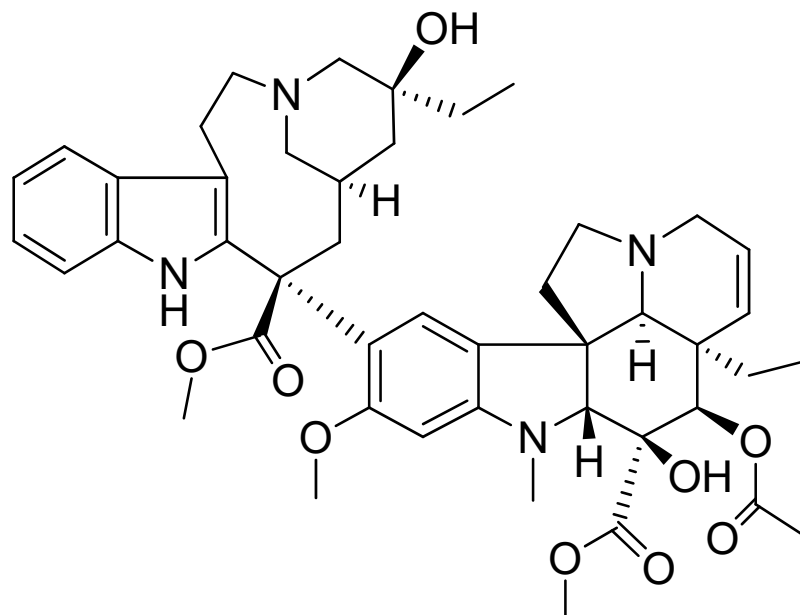
Plant products

Etoposide



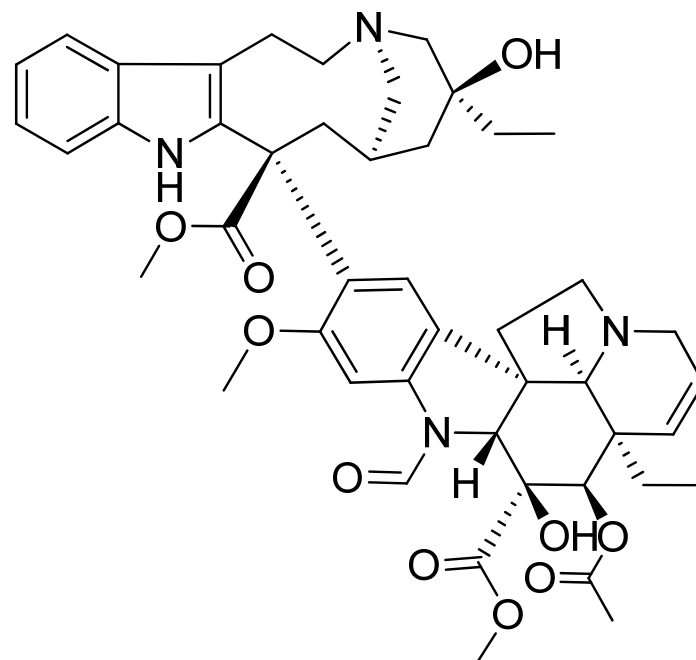
IUPAC: 9-((4,6-O-Ethylidene-beta-D-glucopyranosyl)oxy)-5,8,8a,9-tetrahydro-5-(4-hydroxy-3,4-dimethoxyphenyl)furo(3',4'':6,7)naphtho-(2,3-d)-1,3-dioxol-6(5aH)-one

Vinblastin sulphate



IUPAC: methyl (1*R*,9*R*,10*S*,11*R*,12*R*,19*R*)-11-acetyloxy-12-ethyl-4-[(13*S*,15*R*,17*S*)-17-ethyl-17-hydroxy-13-methoxycarbonyl-1,11-diazatetracyclo[13.3.1.0^{4,12}.0^{5,10}]nonadeca-4(12),5,7,9-tetraen-13-yl]-10-hydroxy-5-methoxy-8-methyl-8,16-diazapentacyclo[10.6.1.0^{1,9}.0^{2,7}.0^{16,19}]nonadeca-2,4,6,13-tetraene-10-carboxylate

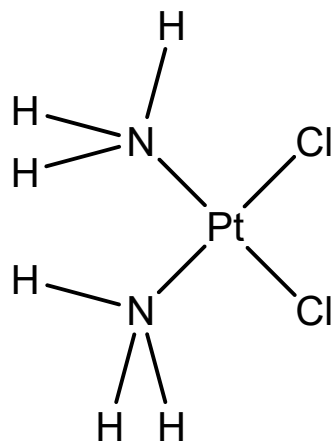
Vincristin



IUPAC: 2-(2,4-difluorophenyl)-1,3-bis(1,2,4-triazol-1-yl)propan-2-ol;methyl (1R,9R,10S,11R,12R,19R)-11-acetyloxy-12-ethyl-4-[(13S,15S,17S)-17-ethyl-17-hydroxy-13-methoxycarbonyl-1,11-diazatetracyclo[13.3.1.04,12.05,10]nonadeca-4(12),5,7,9-tetraen-13-yl]-8-formyl-10-hydroxy-5-methoxy-8,16-diazapentacyclo[10.6.1.01,9.02,7.016,19]nonadeca-2,4,6,13-tetraene-10-carboxylate

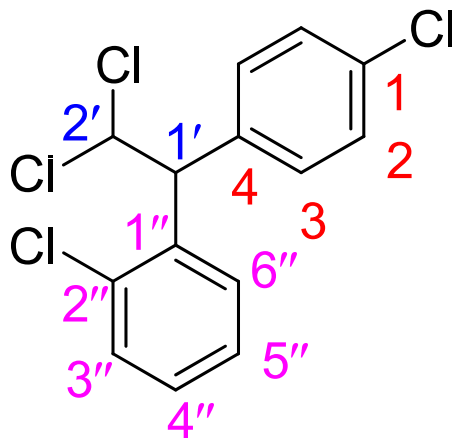
Miscellaneous

Cisplatin



IUPAC: Cis-diamminedichloroplatinum(II)

Mitotane



IUPAC: 1-chloro-4-[2,2-dichloro-1'-(2''-chlorophenyl)ethyl]benzene