

Chapter-13 | P. Chemistry

Anti-Neoplastic Agents

Study of the following category of medicinal compounds with respect to classification, chemical name (IUPAC Name), chemical structure (compounds marked with*) uses, stability and storage conditions, different types of formulations and their popular brand names:

Anti-Neoplastic Agents

Anti-Neoplastic Agents: Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate

Anti-Neoplastic Agents:

- Antineoplastic agents, also known as anticancer drugs or chemotherapy, are medications used to treat cancer. They work by targeting and killing rapidly dividing cancerous cells.
- Anti-neoplastic agents can be used as the primary treatment for cancer, or they may be combined with other therapies such as surgery or radiation therapy.

Classification of Anti-Neoplastic Agents:

- Alkylating agents: cyclophosphamide, chlorambucil, melphalan
- Antimetabolites: methotrexate, cytarabine, fluorouracil
- Natural products: vincristine, vinblastine, paclitaxel
- Hormonal agents: tamoxifen, raloxifene, goserelin
- Immunomodulatory agents: rituximab, ipilimumab, pembrolizumab



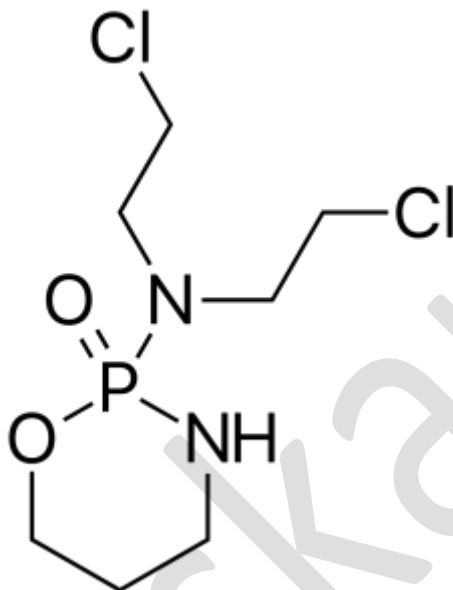
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Cyclophosphamide*

Chemical Name: (RS)-N,N-bis(2-chloroethyl)-1,3,2-oxazaphosphinan-2-amine 2-oxide

Chemical Structure:



Uses:

- Cyclophosphamide is a chemotherapy drug used to treat a variety of cancers, including lymphoma, multiple myeloma, leukemia, ovarian cancer, breast cancer, small cell lung cancer, neuroblastoma, and sarcoma.
- It is also used to suppress the immune system in conditions such as nephrotic syndrome, granulomatosis with polyangiitis, and following organ transplant.

Stability and storage Condition:

It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets

Brand name:

- Cytosan
- Endoxan
- Neosar



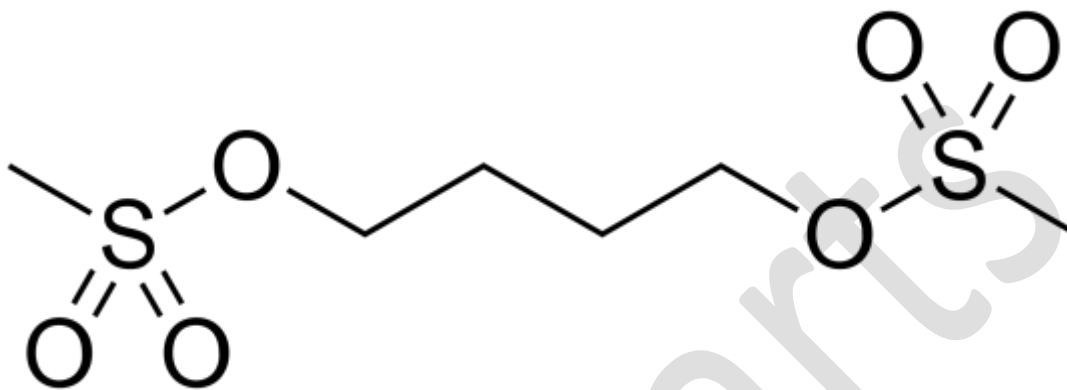
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Busulfan

Chemical Name: 1,4-Butanediol dimethanesulfonate

Chemical Structure:



Uses:

- Busulfan is a chemotherapy drug used to treat chronic myelogenous leukemia (CML).
- It is also used as part of a conditioning regimen before bone marrow transplantation.

Stability and storage Condition:

- It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets

Brand name:

- Myleran
- Busulfex



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Mercaptopurine

Chemical Name: 3,7-dihydropurine-6-thione.

Chemical Structure:



Uses:

- Mercaptopurine is used to treat acute lymphocytic leukemia (ALL), acute promyelocytic leukemia (APL), Crohn's disease, and ulcerative colitis.
- It is also sometimes used to treat other types of cancer, such as chronic lymphocytic leukemia (CLL) and lymphoma.

Stability and storage Condition:

It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets

Brand name:

- Purinethol



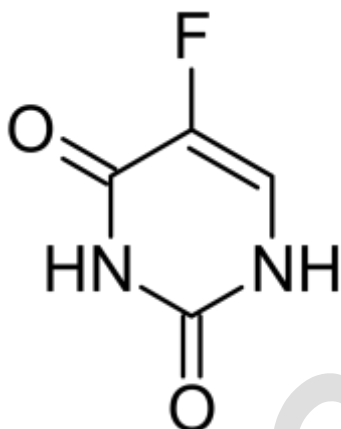
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Fluorouracil*

Chemical Name: 5-Fluoro-1H,3H-pyrimidine-2,4-dione

Chemical Structure:



Uses:

Fluorouracil is a chemotherapy drug that is used to treat a variety of cancers, including:

- Breast cancer
- Colorectal cancer
- Head and neck cancer
- Lung cancer

Stability and storage Condition:

- It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets
- Capsules
- Injections

Brand name:

- Adrucil
- Carac
- Efudex



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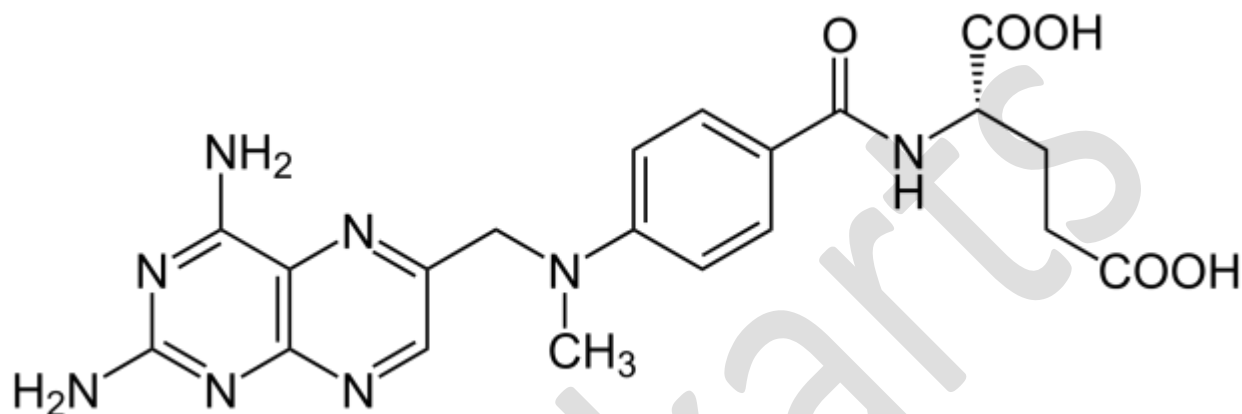
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Methotrexate

Chemical Name:

(2S)-2-[(4-[[[2,4-Diaminopteridin-6-yl)methyl](methyl)amino]benzoyl)amino]pentanedioic acid

Chemical Structure:



Uses:

- Methotrexate is used to treat cancer, autoimmune diseases, and ectopic pregnancies.
- It is used to treat cancer by slowing the growth of cancer cells.
- It is used to treat autoimmune diseases by decreasing the activity of the immune system.
- It is used to treat ectopic pregnancies by stopping the growth of the fertilized egg outside the uterus.

Stability and storage Condition:

It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets

Brand name:

- Rheumatrex
- Trexall



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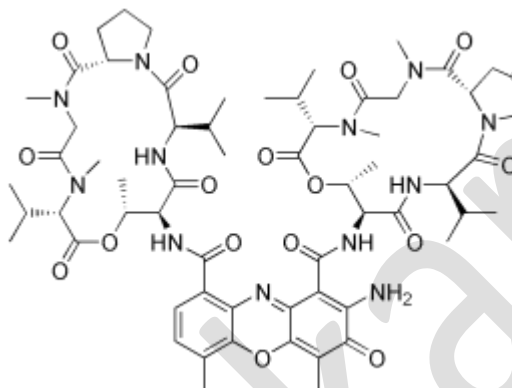
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Dactinomycin

Chemical Name:

2-Amino-N,N'- bis[(6S,9R,10S,13R,18aS)-6,13-diisopropyl-2,5,9-trimethyl-1,4,7,11,14-pentaoxohexadecahydro-1H-pyrrolo[2,1-i][1,4,7,10,13]oxatetraazacyclohexadecin-10-yl]-4,6-dimethyl-3-oxo-3H-phenoxazine-1,9-dicarboxamid

Chemical Structure:



Uses:

- Dactinomycin is used to treat a variety of cancers, including Wilms tumor, rhabdomyosarcoma, Ewing's sarcoma, trophoblastic neoplasm, testicular cancer, and certain types of ovarian cancer.
- It is also used to treat acute lymphoblastic leukemia (ALL).

Stability and storage Condition:

It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets

Brand name:

- Cosmegen



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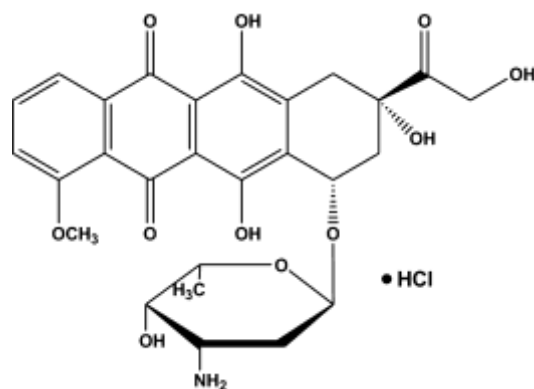
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Doxorubicin Hydrochloride

Chemical Name:

(7S,9S)-7-[(2R,4S,5S,6S)-4-amino-5-hydroxy-6-methyloxan-2-yl]oxy-6,9,11-trihydroxy-9-(2-hydroxyacetyl)-4-methoxy-8,10-dihydro-7H-tetracene-5,12-dione;hydrochloride

Chemical Structure:



Uses:

- Doxorubicin hydrochloride is a chemotherapy drug used to treat cancer.
- It is most commonly used to treat breast cancer, bladder cancer, Kaposi's sarcoma, lymphoma, and acute lymphocytic leukemia.
- It is often used together with other chemotherapy agents.

Stability and storage Condition:

- It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

Injectable solutions, oral capsules, and topical creams.

Brand name:

- Adriamycin
- Rubex
- Doxil



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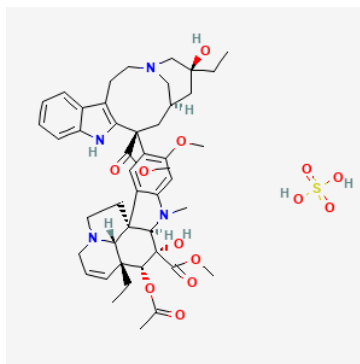
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Vinblastine Sulphate

Chemical Name:

methyl (1R,9R,10S,11R,12R,19R)-11-acetyloxy-12-ethyl-4-[(13S,15R,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]-10-hydroxy-5-methoxy-8-methyl-8,16-diazapentacyclo[10.6.1.0¹,9.0²,7.0¹⁶,19]nonadeca-2,4,6,13-tetraene-10-carboxylate;sulfuric acid

Chemical Structure:



Uses:

Vinblastine sulfate is a chemotherapy medication used to treat a number of types of cancer, including:

- Hodgkin's lymphoma
- Non-Hodgkin's lymphoma
- Breast cancer
- Testicular cancer

Stability and storage Condition:

- It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Intravenous injection

Brand name:

- Alkaban-AQ
- Velban



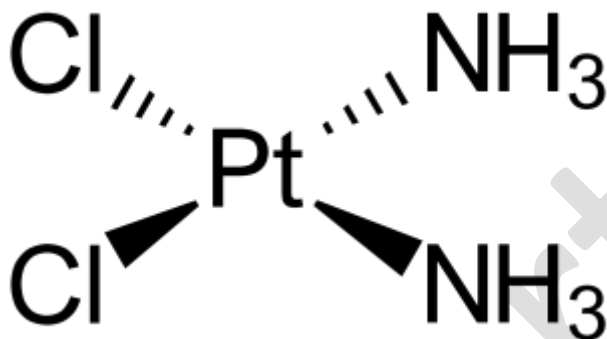
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Cisplatin*

Chemical Name: cis-diamminedichloroplatinum(II)

Chemical Structure:



Uses:

Cisplatin is used to treat a variety of cancers, including:

- Bladder cancer
- Head and neck cancer
- Lung cancer
- Ovarian cancer
- Testicular cancer
- Germ cell tumors

Stability and storage Condition:

- It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets

Brand name:

- Platinol
- Platinol-AQ



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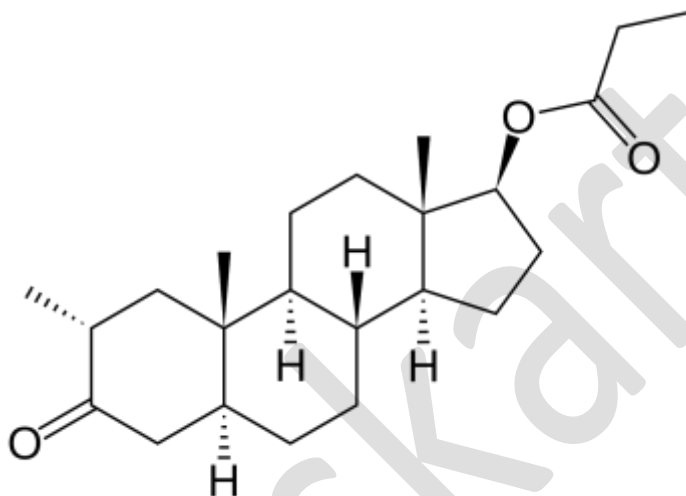
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Dromostanolone Propionate

Chemical Name:

(2R,5S,8R,9S,10S,13S,14S,17S)-17-hydroxy-2,10,13-trimethyl-1,2,4,5,6,7,8,9,11,12,14,15,16,17-tetradecahydrocyclopenta[a]phenanthren-3-one

Chemical Structure:



Uses:

- Dromostanolone propionate is an androgen and anabolic steroid (AAS) medication which was used to treat breast cancer in women but is now no longer marketed.

Stability and storage Condition:

It is a stable drug that can be stored at room temperature. However, it should be protected from light and moisture.

Type of Formulation:

- Tablets

Brand name:

- Drolban
- Masteril

