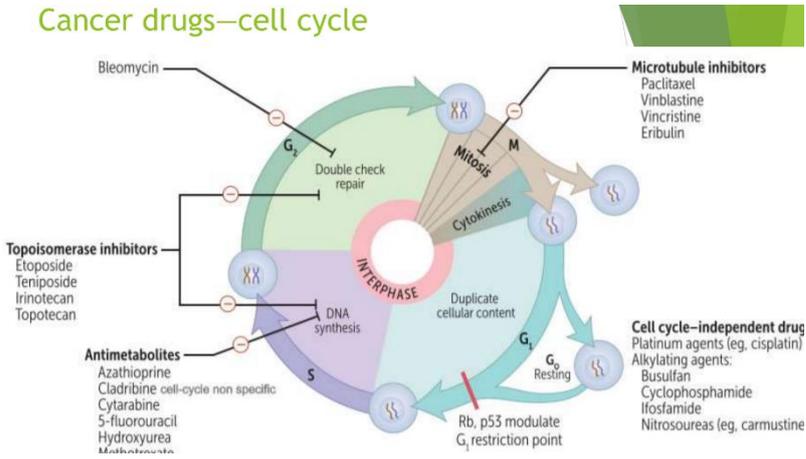
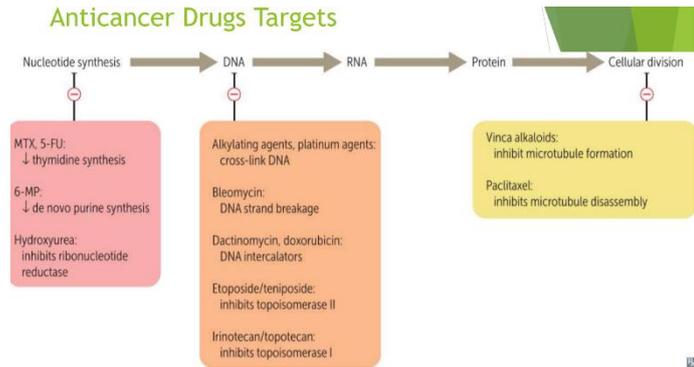


Drug Treatment of Hematopoietic Malignancy

Cancer drugs—cell cycle



Anticancer Drugs Targets



Drug	Action	Uses	Side Effects	Note
Antitumor Antibiotics				
Bleomycin	Induces free radical formation=> breaks in DNA strands.	Testicular cancer, Hodgkin lymphoma	Pulmonary fibrosis, Flagellate erythema, Minimal myelosuppression.	
Doxorubicin, Daunorubicin	Intercalates into DNA, preventing RNA synthesis.	Solid tumors, leukemias, lymphomas.	Cardiotoxicity (dilated cardiomyopathy), myelosuppression, alopecia.	Dexrazoxane (iron chelating agent) is used to prevent cardiotoxicity, but it decreases the effect
Antimetabolites				
Cladribine	Purine analog => multiple mechanisms (eg, inhibition of DNA polymerase, DNA strand breaks).	Hairy cell leukemia.	Myelosuppression, nephrotoxicity, and neurotoxicity.	
Cytarabine (arabinofuranosyl Cytidine)	Pyrimidine analog =>DNA chain termination. At higher concentrations, inhibits DNA Polymerase.	Leukemias (AML), lymphomas.	Myelosuppression with megaloblastic anemia.	CYTarabine causes panCYTopenia.
Methotrexate	Folic acid analog that competitively inhibits dihydrofolate reductase => decreases dTMP => decreases DNA synthesis.	*Cancers: leukemias (ALL), lymphomas, choriocarcinoma, sarcomas. *Non-neoplastic: ectopic pregnancy, medical abortion (with misoprostol), rheumatoid arthritis, psoriasis, IBD, vasculitis.	* Myelosuppression, which is reversible with leucovorin "rescue." * Hepatotoxicity. Mucositis (eg, mouth ulcers). *Pulmonary fibrosis. *Folate deficiency, which may be teratogenic (neural tube defects) without supplementation. *Nephrotoxicity	

Alkylating Agents

Busulfan	Cross-links DNA.	Used to ablate patient's bone marrow before bone marrow transplantation.	Severe myelosuppression (in almost all cases), pulmonary fibrosis, hyperpigmentation.	
Procarbazine	Cell cycle phase–nonspecific alkylating agent, mechanism not yet defined.	Hodgkin lymphoma, brain tumors.	*Bone marrow suppression, *pulmonary toxicity, *leukemia, *disulfiram-like reaction.	
Cyclophosphamide	Cross-link DNA at guanine. Require bioactivation by liver. A nitrogen mustard.	Solid tumors, leukemia, lymphomas, rheumatic disease (eg, SLE, granulomatosis with polyangiitis).	*Myelosuppression *SIADH; *Fanconi syndrome (ifosfamide); *Hemorrhagic cystitis and bladder cancer, prevented with mesna (sulfhydryl group of mesna binds toxic metabolites) and adequate hydration.	

Microtubule inhibitors

Vincristine	Vinca alkaloids bind β -tubulin and inhibit its polymerization into microtubules => prevent mitotic spindle formation(M-phase arrest).	Solid tumors, leukemias, Hodgkin and non-Hodgkin lymphomas.	Neurotoxicity (areflexia, peripheral neuritis), constipation (including paralytic ileus). Crisps the nerves.	
Vinblastine			Bone marrow suppression. Blasts the bone marrow.	

Miscellaneous

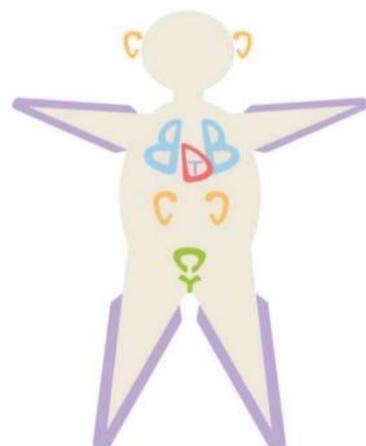
Hydroxyurea	Inhibits ribonucleotide reductase => DNA Synthesis (Sphase specific).	Myeloproliferative disorders (eg, CML, polycythemia vera), sickle cell (increases HbF).	Severe myelosuppression.	
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Tyrosine Kinase Inhibitors

Imatinib Masitinib	Tyrosine kinase inhibitor of bcr-abl (encoded by Philadelphia chromosome fusion gene in CML) and c-kit (common in GI stromal tumors).	CML, GI stromal tumors (GIST).	Safe drugs, can cause fluid retention.	
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Monoclonal antibody

Rituximab	Monoclonal antibody against CD20, which is found on most B-cell neoplasms.	Non-Hodgkin lymphoma, CLL, ITP, rheumatoid arthritis.	Carry the risk of progressive multifocal leukoencephalopathy (reactivation of JC virus) and other Opportunistic infections, Hepatitis B reactivation	Must screen for Hepatitis B and C before giving Rituximab
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Cisplatin/Carboplatin → ototoxicity
 Vincristine → peripheral neuropathy
 Bleomycin, Busulfan → pulmonary fibrosis
 Doxorubicin → cardiotoxicity
 Trastuzumab → cardiotoxicity
 Cisplatin/Carboplatin → nephrotoxicity
 Cyclophosphamide → hemorrhagic cystitis

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