

ยา	กลุ่ม	กลไก	การทำลายยา	Toxic	Toxic อื่น	Counteract
<b>1. Alkylating</b>		inhibit S phase: Miscoding DNA by alkylate at N7 position of guanine of DNA				
1.1 Cyclophosphamide	Nitrogen mustard		ขึ้นทางปัสสาวะ	Hemorrhagic cystitis (Acrolein toxic@bladder epithelium), renal tubular toxicity distal RTA	ผมร่วง,SIADH,lung fibrosis,N/V	Mesna(coated bladder epithelium), ให้อดน้ำ
1.2 Ifosfamide				Hemorrhagic cystitis, Fanconi syndrome; proximal tubule damage	Neurotoxic, interstitial pneumonitis	
1.3 Busulfan	Alkyl Sulfonate		ผ่าน BBB	GI,Mucositis,seizure	ผื่นคัน,lung fibrosis	Dilantin prophylaxis
1.4 Carmustine	Nitrosoureas		Lipid-soluble ผ่าน BBB	Progressive renal atrophy, lung		
1.5 Thiotepa	Ethylenimines					
<b>2. Alkylating related agents</b>						
2.1 Procarbazine						
2.2 Cisplatin, Carboplatin	Platinum		ขึ้นทางปัสสาวะ	Nephrotoxic irreversible, decrease GFR, tubular dysfunction, ototoxic, peripheral neuropathy,N/V, encephalopathy, BM suppression	Carboplatin : hypersensitive reaction	Manitol, chloride diuresis,add Mg, hydration
<b>3. Antimetabolite</b>		inhibit: S phase DNA synthesis				
3.1 MTX	Folate analog	Competitive Inh of DHF reductase ( $\uparrow$ THF, $\uparrow$ DHF)	ขึ้นทางปัสสาวะ	กด BM,mucositis ตลอด GI tract,ตับ,ไต,dermatitis, neurotoxic, pneumonitis		Leucovorin( derivative THF) ไม่ช่วย hepatotoxicity, hydration+alkalinization
3.2 MP & TG	Purine analogs		ขึ้นทางปัสสาวะ	6-MP:กดBM,hepatic dysfn	TG กด BM	ห้ามให้กิน allopurinol
3.3 Fludarabine						ให้เลือดต้อง irradiated
3.4 Ara-C, Gemcitabine	Pyrimidine analogs	$\uparrow$ AraCDP, AraCTP	ขึ้นทางปัสสาวะ	กดBM,N/V,GI mucosal damage,mucositis,syndrome fever, malaise, jt.and bone pain,chest pain,rash, conjunctivitis, BM suppression	Neuro ,acute cerebellar syndrome,nystagmus	Corticosteroid ลดอาการ, Dex-oph ED
3.5 Fluorouracil (5-FU)		inh.thymidylate syntase, thymidylate		กดBM,stomatitis,diarrhea, มีข้อจำกัดในเด็ก	neuro,ocular,dermatitis	
<b>4. Antibiotics</b>						
4.1 Doxorubicin&Daunorubicin &Idarubicin&Actinomycin-D	Anthracyclin	ทำลาย DNA & RNA,Free radical formation, inh.topoisomerase II	ขึ้นทางbile	mucositis, total alopecia, BM suppress, deep tis damage,cardiotoxic,ห้าม leak,N/V,diarrhea; Idarubicin: Headache	Accumulative dose>450mg/m2(>320ในเด็กครึ่งวัน) Actinomycin D : Hepatotoxic, not combined with RT	Cardioprotective : Dexrazoxane 20 mg : Doxorubicin 1 mg
4.2 Bleomycin		inh G2 phase	ขึ้นทางตับและ bile	anaphyctoid, blister,pul fibrosis		
		Oxidation of DNA-Bleomycin-Fe <sup>2+</sup> , chromosomal aberration				
<b>5. Plant alkaloids</b>						
5.1 Vincristin,Vinblastin	Vinca alkaloids	Inhibit M phase จับกับ tubulinใน microtubule	metabolizeที่liver ขึ้นทางbile	VCR:peripheral neuropathy,constipation,jaw pain,neuro:loss DTR,SIADH VBT:กด BM,mucositis,ห้ามleak, N/V,alopecia	alopecia,ซีด,local tissue damage	
5.2 Etoposide(VP-16)	Podophyllotoxin	inh S-G2 phase Inh topoisomerase II DNAstrandแตก	ขึ้นทางปัสสาวะ	กด BM,mucositis,pulmonary edema,CHF,MI,hypotension anaphylaxis,muscle cramp,transient metabolic acidosis	alopecia,N/V,phlebitis, mild peripheral neuropathy,liver dysfunction	
5.3 Topotecan/Irinotecan	Camptothecins	inh. Topoisomerase I DNA damage		Topotecan: BM suppression	Irinotecan: severe diarrhea, BM suppress	Irinotecan : Loperamide
5.4 Paclitaxel (taxol)	Texanes	inh M phase จับกับ tubulinใน microtubule		Neutopenia, Pltต่ำ, peripheral neuropathy		
<b>6. Miscellaneous</b>						
6.1 Corticosteroid		Lympholysis	ขึ้นทางตับ	Increase appetite,centripedal obesity,pancreatitis,leukocytosis, hyperglycemia		
6.2 Hydroxyurea	Urea analog	Inh.ribonucleotide reductase Inh S phase		BM suppress, rash, hyperpigmentation,N/V, renal dysfunction		
6.3 Mitoxantrone	คล้าย antracyclin	Inh.DNA&RNA synthesis		Cardio toxic, BM suppress		
6.4 Imatinib		Tyrosine kinase inhibitor		N/V, lower limb edema, LFTขึ้น	treat Ph+CML	
6.5 Asparaginase(L-as)		Bacterial Enz.E coli reduce glutamine level(Asparagine level) and inh.protein synthesis Inh G2		Hypersen,anaphylaxis,Hypercoagulable state(ลด antithrombin,prot C,S),hemorrhagic pancreatitis	rare: กด BM,GI toxic	

Nonmyelosuppressive agents : VCR, L-as, Pred

MCM leucoencephalopathy : MTX, L-as, Tracolumis reverse in 8-12 wk

Cell cycle specific agents	Cell cycle non-specific	
Antimetabolite esp.Ara-C-S	Alkylating	G0 : resting phase
Bleomycin-G2	Antibiotic	G1 : Cell growth
Podophyllin alkaloid-VP-16-S-G2	Cisplatin	S : replication DNA
Vinca alkaloid- VCR-M	Nitrosoureas	G2 : RNA and protein
		M : Mitosis

Side effect chemotherapy

BY : CHALINEE MONSREENUSORN, M.D.