PHARMACOLOGY AIIMS PYQ

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Which of the following is a protease inhibitor?

a. Abacavir
b. Nevirapine
c. Saquinavir
d. Enfuvirtide

DRUG	MECHANISM	ADVERSE EFFECTS
NRTIs		
Abacavir (ABC) Emtricitabine (FTC) Lamivudine (3TC) Tenofovir (TDF) Zidovudine (ZDV, formerly AZT)	Competitively inhibit nucleotide binding to reverse transcriptase and terminate the DNA chain (lack a 3′ OH group). Tenofovir is a nucleoTide; the others are nucleosides. All need to be phosphorylated to be active. ZDV can be used for general prophylaxis and during pregnancy to ↓ risk of fetal transmission. Have you dined (vudine) with my nuclear (nucleosides) family?	Myelosuppression (can be reversed with granulocyte colony-stimulating factor [G-CSF] and erythropoietin), nephrotoxicity. Abacavir contraindicated if patient has HLA-B*5701 mutation due to ↑ risk of hypersensitivity.
NNRTIs		
Doravirine Efavirenz Rilpivirine	Bind to reverse transcriptase at site different from NRTIs. Do not require phosphorylation to be active or compete with nucleotides.	Rash and hepatotoxicity are common to all NNRTIs. Vivid dreams and CNS symptoms are common with efavirenz.
Integrase strand transfer inhibitors		
Bictegravir Dolutegravir	Also called integrase inhibitors. Inhibit HIV genome integration into host cell chromosome by reversibly inhibiting HIV integrase.	↑ creatine kinase, weight gain.

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Protease inhibitors		
Atazanavir Darunavir Lopinavir Ritonavir	Prevents maturation of new virions. Maturation depends on HIV-1 protease (*pol* gene), which cleaves the polypeptide products of HIV mRNA into their functional parts. Thus, protease inhibitors prevent maturation of new viruses. All protease inhibitors require boosting with either ritonavir or cobicistat. Navir (never) tease a protease.	Hyperglycemia, GI intolerance (nausea, diarrhea). Rifampin (potent CYP/UGT inducer) ↓ protease inhibitor concentrations; use rifabutin instead. Ritonavir (cytochrome P-450 inhibitor) is only used as a boosting agent.
Entry inhibitors		
Enfuvirtide	Binds gp41, inhibiting viral entry. Enfuvirtide inhibits fusion.	Skin reaction at injection sites.
Maraviroc	Binds CCR-5 on surface of T cells/monocytes, inhibiting interaction with gp120. Maraviroc inhibits docking.	

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Which of the following does not act by increasing insulin secretion?

a) Rosiglitazone
b) Repaglinide
c) Exenatide
d) Sitagliptin

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DRUG	MECHANISM	ADVERSE EFFECTS
Increase insulin sensitivity		
Metformin	Inhibits mitochondrial glycerol-3-phosphate dehydrogenase (mGPD) → inhibition of hepatic gluconeogenesis and the action of glucagon. ↑ glycolysis, peripheral glucose uptake (↑ insulin sensitivity).	GI upset, lactic acidosis (use with caution in renal insufficiency), vitamin B_{12} deficiency. Weight loss (often desired).
Pioglitazone	Activate PPAR-γ (a nuclear receptor) → ↑ insulin sensitivity and levels of adiponectin → regulation of glucose metabolism and fatty acid storage.	Weight gain, edema, HF, ↑ risk of fractures. Delayed onset of action (several weeks).
Increase insulin secretion		
Sulfonylureas (1st gen) Chlorpropamide, tolbutamide **Sulfonylureas (2nd gen)** Glipizide, glyburide **Meglitinides** Nateglinide, repaglinide	Close K^+ channels in pancreatic B cell membrane → cell depolarizes → insulin release via ↑ Ca^{2+} influx.	Disulfiram-like reaction with first-generation sulfonylureas only (rarely used). Hypoglycemia (↑ risk in renal insufficiency), weight gain.
Increase glucose-induced insulin secretion		
GLP-1 analogs Exenatide, liraglutide, semaglutide	↓ glucagon release, ↓ gastric emptying, ↑ glucose-dependent insulin release.	Nausea, vomiting, pancreatitis. Weight loss (often desired). ↑ satiety (often desired).
DPP-4 inhibitors Linagliptin, saxagliptin, sitagliptin	Inhibit DPP-4 enzyme that deactivates GLP-1 → ↓ glucagon release, ↓ gastric emptying. ↑ glucose-dependent insulin release.	Respiratory and urinary infections, weight neutral. ↑ satiety (often desired).

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Best antihypertensive drug used in pulmonary hypertension is:

a. Digoxin
b. Amlodipine
c. Furosemide
d. Bosentan

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Pulmonary hypertension drugs

DRUG	MECHANISM	CLINICAL NOTES
Endothelin receptor antagonists	Competitively antagonizes endothelin-1 receptors → ↓ pulmonary vascular resistance.	Hepatotoxic (monitor LFTs). Example: bosentan.
PDE-5 inhibitors	Inhibits PDE-5 → ↑ cGMP → prolonged vasodilatory effect of NO.	Also used to treat erectile dysfunction. Contraindicated when taking nitroglyce or other nitrates (due to risk of severe hypotension). Example: sildenafil.
Prostacyclin analogs	PGI_2 (prostacyclin) with direct vasodilatory effects on pulmonary and systemic arterial vascular beds. Inhibits platelet aggregation.	Adverse effects: flushing, jaw pain. Examples: epoprostenol, iloprost.

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Drugs prescribed by registered medical practitioners mostly fall under which class of drugs?

a. Schedule X
b. Schedule S
c. Schedule H
d. Schedule P

Phase 1 clinical trial is done for:

a. Drug safety
b. Pharmacodynamics
c. Efficacy
d. Dosing

Which of the following drugs does not affect DNA synthesis?

a. Rifampicin
b. Linezolid
c. Nitrofurantoin
d. Metronidazole

What does low volume of distribution of a drug mean?

a. Low bioavailability
b. Does not accumulates in tissues
c. Low absorption
d. Not metabolized in the body

Which of the following drugs is not used in treatment of bird flu?

a. Oseltamivir
b. Ribavirin
c. Zanamivir
d. Peramivir

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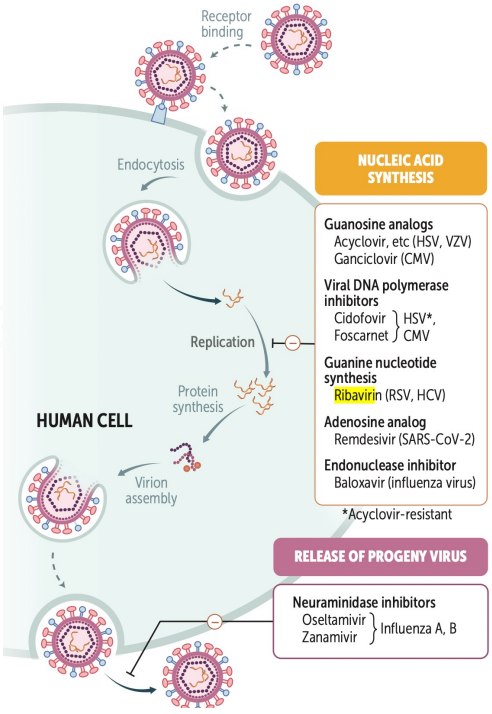

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Hepatitis C therapy — Chronic HCV infection treated with multidrug therapy that targets specific steps within HCV replication cycle (HCV-encoded proteins). Examples of drugs are provided.

DRUG	MECHANISM	TOXICITY
NS5A inhibitors		
Elbasvir Ledipasvir Pibrentasvir Velpatasvir	Inhibits NS5A, a viral phosphoprotein that plays a key role in RNA replication Exact mechanism unknown	Headache, diarrhea
NS5B inhibitors		
Sofosbuvir	Inhibits NS5B, an RNA-dependent RNA polymerase acting as a chain terminator Prevents viral RNA replication	Fatigue, headache
NS3/4A inhibitors		
Glecaprevir Grazoprevir	Inhibits NS3/4A, a viral protease, preventing viral replication	Headache, fatigue
Alternative drugs		
Ribavirin	Inhibits synthesis of guanine nucleotides by competitively inhibiting IMP dehydrogenase	Hemolytic anemia, severe teratogen

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Absorption of which of the following drugs is increased after a fatty meal?

a. Amphotericin
b. Griseofulvin
c. Ampicillin
d. Aspirin

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Which of these anticonvulsants causes contraction of visual field?

a. Levetiracetam
b. Phenytoin
c. Vigabatrin
d. Ethosuximide

Which one of the following is a gender specific side-effect of valproate?

a. Polycystic ovarian syndrome
b. Alopecia
c. Weight loss
d. Tremor

Broad spectrum (focal and generalized seizures)			
Valproate	Blocks Na^+ channel Blocks Ca^{2+} channel Blocks GABA transaminase	Sedation, dizziness, vomiting, weight gain, hair loss, easy bruising, drug interactions (CYP450 inhibition)	Hepatotoxicity, pancreatitis, teratogenicity
Lamotrigine	Blocks Na^+ channel	Sedation, dizziness, rash	SJS, DRESS
Levetiracetam	Blocks Synaptic Vesicle protein 2A (SV2A)	Sedation, dizziness, fatigue	Neuropsychiatric (eg, psychosis)
Topiramate	Blocks Na^+ channel Potentiates $GABA_A$ receptor	Sedation, dizziness, mood disturbance (eg, depression), weight loss, paresthesia	Kidney stones, angle-closure glaucoma

Etanercept is a disease-modifying drug used in management of rheumatoid arthritis. What is its mechanism of action?

a. Inhibition of TNF alpha
b. COX-2 inhibition
c. IL-6 inhibition
d. Stabilization of mast cells

AGENT	TARGET	CLINICAL USE	NOTES
Autoimmune disease therapy			
Adalimumab, certolizumab, golimumab, infliximab	Soluble TNF-α	IBD, rheumatoid arthritis, ankylosing spondylitis, psoriasis	Pretreatment screening (TB, HBV, HCV, VZV, EBV, CMV) due to risk of reactivation Etanercept is a decoy TNF-α receptor and not a monoclonal antibody

Which of the following drugs is not used in detoxification of chronic alcoholics?

a. Flumazenil
b. Acamprosate
c. Disulfiram
d. Naltrexone

Alcohol use disorder

Diagnosed using criteria for substance use disorder.
Complications: vitamin B_1 (thiamine) deficiency, alcoholic cirrhosis, hepatitis, pancreatitis, peripheral neuropathy, testicular atrophy.
Treatment: naltrexone (reduces cravings; avoid in liver failure), acamprosate (contraindicated in renal failure), disulfiram (to condition the patient to abstain from alcohol use). Support groups such as Alcoholics Anonymous are helpful in sustaining abstinence and supporting patient and family.