COMPREHENSIVE MOCK EXAM 7

Supplemental to: Pharmacology Board Review for the PANCE 2026-2027

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PANCE (NCCPA) — 300 questions, single-best-answer, domain-weighted per NCCPA Jan-2025 organ-system blueprint (Professional Practice domain replaced with General Principles & Toxicology pharmacology domain)

Board-Review Questions

1. A patient with hypertension and diabetic nephropathy has a dry cough on lisinopril. Which ARB is switched to for renal protection without the ACE-inhibitor-related cough?

A. Candesartan

B. Ramipril

C. Diltiazem

D. Furosemide

E. Amlodipine

2. A patient with hypertension and heart failure with reduced ejection fraction requires an ARB specifically studied as an alternative to ACE inhibitors in ACE-inhibitor-intolerant HFrEF patients. Which drug is this?

A. Irbesartan

B. Valsartan

C. Losartan

D. Candesartan

E. Telmisartan

3. A patient with hypertension desires an ARB with the longest half-life in its class, allowing more forgiving once-daily dosing if a dose is occasionally delayed. Which drug is this?

A. Losartan

B. Valsartan

C. Telmisartan

D. Candesartan

E. Irbesartan

4. A patient with hypertension and heart failure with reduced ejection fraction is started on an ACE inhibitor with strong post-MI mortality-reduction trial data, distinct from lisinopril and enalapril. Which drug is this?

A. Captopril

B. Losartan

C. Valsartan

D. Ramipril

E. Candesartan

5. A patient in a hypertensive emergency requires the original short-acting ACE inhibitor, historically used sublingually for rapid-onset blood pressure reduction though now largely reserved for other testing purposes given hypotension risk. Which drug is this?

A. Lisinopril

B. Losartan

C. Ramipril

D. Captopril

E. Enalapril

6. A patient with hypertension and CKD desires an ACE inhibitor with dual renal and hepatic elimination, allowing use without dose adjustment across a wider range of renal function than most other ACE inhibitors. Which drug is this?

A. Lisinopril

B. Ramipril

C. Enalapril

D. Captopril

E. Fosinopril

7. A patient with hypertension and peripheral edema on amlodipine desires an alternative dihydropyridine calcium channel blocker with a shorter half-life, allowing more rapid dose titration. Which drug is this?

A. Felodipine

B. Diltiazem

C. Verapamil

D. Nicardipine

E. Clevidipine

8. A patient with hypertension desires a dihydropyridine calcium channel blocker with the shortest half-life among oral dihydropyridines, historically associated with reflex tachycardia when used in immediate-release form. Which drug is this?

A. Isradipine

B. Amlodipine

C. Felodipine

D. Nicardipine (oral)

E. Nifedipine

9. A patient with statin-associated muscle symptoms on atorvastatin desires an alternative statin with the least CYP3A4-mediated drug interaction potential, metabolized primarily via a different pathway. Which drug is this?

A. Simvastatin

B. Pravastatin

C. Lovastatin

D. Atorvastatin

E. Fluvastatin

10. A patient with ASCVD and statin intolerance on multiple prior statins desires a newer high-potency statin with the smallest effective dose among available options, requiring only a low milligram dose for substantial LDL reduction. Which drug is this?

A. Pitavastatin

B. Rosuvastatin

C. Atorvastatin

D. Simvastatin

E. Lovastatin

11. A patient with elevated LDL and statin intolerance is started on an oral bile acid sequestrant that also improves glycemic control in type 2 diabetes, requiring separation from other oral medications given binding interactions. Which drug is this?

A. Ezetimibe

B. Niacin

C. Gemfibrozil

D. Colesevelam

E. Fenofibrate

12. A patient with hypertriglyceridemia and elevated cardiovascular risk is started on an oral fibrate that primarily activates PPAR-alpha to lower triglycerides, with caution needed regarding myopathy risk when combined with a statin. Which drug is this?

A. Ezetimibe

B. Colesevelam

C. Niacin

D. Fenofibrate

E. Bempedoic acid

13. A patient with heterozygous familial hypercholesterolemia desires a novel small interfering RNA (siRNA) therapeutic that reduces PCSK9 hepatic synthesis, requiring dosing only twice yearly after initial loading. Which drug is this?

A. Inclisiran

B. Evolocumab

C. Alirocumab

D. Bempedoic acid

E. Ezetimibe

14. A patient with acute VTE requires outpatient treatment with a subcutaneously injected low-molecular-weight heparin, dosed based on body weight without routine anti-Xa monitoring in most patients. Which drug is this?

A. Unfractionated heparin

B. Warfarin

C. Enoxaparin

D. Argatroban

E. Fondaparinux

15. A patient with acute VTE and a history of heparin-induced thrombocytopenia requires an alternative low-molecular-weight heparin with a distinct manufacturing process from enoxaparin, though caution regarding cross-reactivity risk still applies. Which drug is this?

A. Fondaparinux

B. Argatroban

C. Unfractionated heparin

D. Enoxaparin

E. Dalteparin

16. A patient with acute coronary syndrome undergoing PCI requires a parenteral direct thrombin inhibitor with a very short half-life, allowing rapid offset of anticoagulant effect after the procedure. Which drug is this?

A. Bivalirudin

B. Argatroban

C. Fondaparinux

D. Enoxaparin

E. Warfarin

17. A patient with acute coronary syndrome desires an oral antiplatelet agent that antagonizes the protease-activated receptor-1 (PAR-1), blocking thrombin-mediated platelet activation, used as an adjunct to standard dual antiplatelet therapy. Which drug is this?

A. Clopidogrel

B. Vorapaxar

C. Aspirin

D. Prasugrel

E. Ticagrelor

18. A patient with intermittent claudication desires an oral phosphodiesterase-3 inhibitor that increases walking distance through vasodilation and antiplatelet effects, contraindicated in heart failure. Which drug is this?

A. Pentoxifylline

B. Dipyridamole

C. Cilostazol

D. Clopidogrel

E. Aspirin

19. A patient with intermittent claudication and a contraindication to cilostazol (heart failure) desires an alternative oral agent that improves blood viscosity and microcirculatory flow through a hemorheologic rather than antiplatelet mechanism. Which drug is this?

A. Pentoxifylline

B. Dipyridamole

C. Clopidogrel

D. Aspirin

E. Cilostazol

20. A patient with a mechanical heart valve on warfarin requires an additional oral antiplatelet with vasodilatory properties, historically combined with aspirin for stroke prevention, working by inhibiting phosphodiesterase and adenosine reuptake. Which drug is this?

A. Clopidogrel

B. Cilostazol

C. Pentoxifylline

D. Prasugrel

E. Dipyridamole

21. A patient with neurogenic orthostatic hypotension refractory to nonpharmacologic measures is started on an oral alpha-1 agonist that increases peripheral vascular resistance, requiring the patient to remain upright for a period after dosing to avoid supine hypertension. Which drug is this?

A. Phenylephrine (oral)

B. Droxidopa

C. Isoproterenol

D. Angiotensin II

E. Midodrine

22. A patient with neurogenic orthostatic hypotension due to autonomic failure (e.g., Parkinson disease, multiple system atrophy) is started on an oral norepinephrine precursor that is converted to active norepinephrine, providing an alternative mechanism to midodrine. Which drug is this?

A. Isoproterenol

B. Phenylephrine

C. Angiotensin II

D. Droxidopa

E. Midodrine

23. A patient with complete heart block awaiting pacemaker placement requires a temporary IV pure beta-adrenergic agonist to increase heart rate, without the vasoconstrictive alpha effects of epinephrine. Which drug is this?

A. Phenylephrine

B. Isoproterenol

C. Vasopressin

D. Dopamine

E. Norepinephrine

24. A patient in septic shock refractory to high-dose norepinephrine and vasopressin requires an additional vasopressor that directly activates angiotensin II type 1 receptors, a novel option beyond traditional catecholamine and vasopressin-pathway agents. Which drug is this?

A. Phenylephrine

B. Angiotensin II

C. Epinephrine

D. Dopamine

E. Midodrine

25. A patient with recurrent ventricular tachycardia is treated with an older Class Ia antiarrhythmic notable for anticholinergic and negative inotropic effects, requiring caution in heart failure, distinct from quinidine and procainamide. Which drug is this?

A. Lidocaine

B. Mexiletine

C. Disopyramide

D. Flecainide

E. Sotalol

26. A patient with ventricular arrhythmia refractory to lidocaine requires an oral Class Ib antiarrhythmic alternative, structurally related to lidocaine but suitable for chronic oral dosing. Which drug is this?

A. Disopyramide

B. Procainamide

C. Mexiletine

D. Quinidine

E. Flecainide

27. A patient with sustained ventricular tachycardia requires an IV Class Ia antiarrhythmic historically used for acute arrhythmia termination, associated with a lupus-like syndrome with prolonged use, requiring ANA monitoring. Which drug is this?

A. Disopyramide

B. Procainamide

C. Mexiletine

D. Lidocaine

E. Sotalol

28. A patient with type 2 diabetes and established ASCVD is started on an SGLT2 inhibitor with specific cardiovascular outcome trial data, an alternative to empagliflozin/dapagliflozin/canagliflozin. Which drug is this?

A. Sitagliptin

B. Linagliptin

C. Ertugliflozin

D. Glipizide

E. Metformin

29. A patient with HFrEF and asthma requires a beta blocker with combined beta-1 selectivity and nitric-oxide-mediated vasodilatory properties, offering a theoretically more favorable pulmonary side-effect profile than nonselective agents. Which drug is this?

A. Carvedilol

B. Nebivolol

C. Metoprolol succinate

D. Bisoprolol

E. Propranolol

30. A patient with HFrEF is started on one of the three evidence-based beta blockers proven to reduce mortality, a highly beta-1-selective agent distinct from carvedilol and metoprolol succinate. Which drug is this?

A. Nebivolol

B. Atenolol

C. Bisoprolol

D. Propranolol

E. Labetalol

31. A patient with hypertension and hyperthyroidism-related tachycardia desires a beta blocker with intrinsic sympathomimetic activity (partial agonism), theoretically causing less resting bradycardia. Which drug is this?

A. Metoprolol

B. Bisoprolol

C. Nebivolol

D. Carvedilol

E. Acebutolol

32. A patient post-MI without heart failure is started on an older beta-1-selective beta blocker for secondary prevention, historically among the most widely studied beta blockers though now often supplanted by newer agents with additional outcome data in HFrEF. Which drug is this?

A. Nebivolol

B. Bisoprolol

C. Atenolol

D. Carvedilol

E. Metoprolol succinate

33. A patient with hypertension and symptomatic BPH desires a nonselective alpha-1 blocker for combined blood pressure and urinary symptom benefit, requiring bedtime dosing with gradual titration to reduce first-dose syncope risk, distinct from doxazosin/terazosin. Which drug is this?

A. Tamsulosin

B. Silodosin

C. Alfuzosin

D. Doxazosin

E. Prazosin

34. A patient with COPD is started on a once-daily LABA available only as a component of fixed-dose combination inhalers (never as monotherapy), paired with either an ICS or a LAMA. Which drug is this?

A. Formoterol

B. Indacaterol

C. Salmeterol

D. Vilanterol

E. Olodaterol

35. A patient with COPD is started on a once-daily LABA specifically paired with tiotropium in a fixed-dose combination inhaler, distinct from the LABA paired with umeclidinium. Which drug is this?

A. Vilanterol

B. Formoterol

C. Salmeterol

D. Olodaterol

E. Indacaterol

36. A patient with COPD desires a nebulized, twice-daily LABA formulation for patients unable to use a metered-dose or dry-powder inhaler effectively. Which drug is this?

A. Arformoterol

B. Vilanterol

C. Salmeterol

D. Indacaterol

E. Olodaterol

37. A patient with persistent asthma desires an inhaled corticosteroid activated locally in lung tissue by esterases, theoretically reducing oropharyngeal deposition and local side effects like thrush and dysphonia. Which drug is this?

A. Ciclesonide

B. Fluticasone

C. Beclomethasone

D. Budesonide (inhaled)

E. Mometasone (inhaled)

38. A patient with persistent asthma desires an inhaled corticosteroid available as a nasal spray for concurrent allergic rhinitis, an older ICS option with a shorter duration of action requiring more frequent daily dosing than newer agents. Which drug is this?

A. Ciclesonide

B. Flunisolide

C. Fluticasone

D. Budesonide (inhaled)

E. Mometasone (inhaled)

39. A patient with severe eosinophilic asthma inadequately controlled on standard biologics is started on an alternative IL-5-targeting monoclonal antibody, binding the ligand directly like mepolizumab but from a different manufacturer with distinct trial data. Which drug is this?

A. Benralizumab

B. Omalizumab

C. Dupilumab

D. Tezepelumab

E. Reslizumab

40. A patient with COPD desires a once-daily nebulized long-acting muscarinic antagonist, providing an inhaler-free option distinct from tiotropium, umeclidinium, aclidinium, and glycopyrrolate. Which drug is this?

A. Ipratropium

B. Formoterol

C. Revefenacin

D. Vilanterol

E. Indacaterol

41. A patient with severe pulmonary arterial hypertension requires an inhaled prostacyclin analog dosed 6-9 times daily via nebulizer, an alternative to inhaled treprostinil with a shorter duration requiring more frequent administration. Which drug is this?

A. Epoprostenol

B. Selexipag

C. Riociguat

D. Iloprost

E. Bosentan

42. A patient motivated to quit smoking prefers a fast-dissolving nicotine replacement product for acute breakthrough craving relief, an alternative to gum for patients with dental work or jaw discomfort. Which product is this?

A. Nicotine patch

B. Varenicline

C. Bupropion

D. Nicotine inhaler

E. Nicotine lozenge

43. A premature neonate with respiratory distress syndrome requires a natural porcine-derived surfactant alternative to the bovine-derived product beractant, containing similar surfactant proteins B and C. Which product is this?

A. Poractant alfa

B. Calfactant

C. Beractant

D. Synthetic surfactant (colfosceril)

E. Palivizumab

44. A premature neonate with respiratory distress syndrome requires an alternative bovine-derived natural surfactant to beractant, extracted via a different purification process from calf lung lavage. Which product is this?

A. Calfactant

B. Poractant alfa

C. Beractant

D. Palivizumab

E. Racemic epinephrine

45. A patient with an upper respiratory infection and thick, tenacious mucus desires an OTC expectorant that increases respiratory tract fluid to reduce sputum viscosity, distinct from mucolytic or antitussive agents. Which drug is this?

A. Dextromethorphan

B. Benzonatate

C. Guaifenesin

D. Codeine

E. Pseudoephedrine

46. A patient with a nonproductive cough desires an OTC antitussive that acts centrally on the cough center, structurally related to opioids but without significant analgesic or abuse potential at standard doses. Which drug is this?

A. Dextromethorphan

B. Guaifenesin

C. Benzonatate

D. Pseudoephedrine

E. Codeine

47. A patient with a persistent nonproductive cough desires a prescription antitussive that numbs stretch receptors in the respiratory tract (a peripherally-acting, non-opioid mechanism), structurally related to local anesthetics. Which drug is this?

A. Dextromethorphan

B. Guaifenesin

C. Benzonatate

D. Codeine

E. Pseudoephedrine

48. An infant in their first RSV season is given a novel long-acting monoclonal antibody for RSV prophylaxis, distinct from palivizumab, requiring only a single dose per season rather than monthly injections. Which drug is this?

A. Palivizumab

B. Ribavirin

C. Racemic epinephrine

D. Nirsevimab

E. Ivermectin

49. A patient with mild persistent asthma desires an inhaled mast cell stabilizer alternative to cromolyn sodium, with a similar mechanism preventing mast cell degranulation but a somewhat longer duration of action. Which drug is this?

A. Zafirlukast

B. Zileuton

C. Omalizumab

D. Nedocromil

E. Montelukast

50. A patient with nasal congestion from an upper respiratory infection desires an oral alpha-adrenergic agonist decongestant, distinct from topical oxymetazoline, without the rebound congestion (rhinitis medicamentosa) risk of topical nasal sprays. Which drug is this?

A. Cetirizine

B. Fluticasone (nasal)

C. Ipratropium (nasal)

D. Azelastine (nasal)

E. Pseudoephedrine

51. A patient starting first-line four-drug therapy for active pulmonary tuberculosis requires an agent specifically included to prevent resistance emergence, with optic neuritis (red-green color discrimination loss) as its most notable dose-limiting toxicity requiring baseline and periodic visual monitoring. Which drug is this?

A. Isoniazid

B. Ethambutol

C. Rifampin

D. Pyrazinamide

E. Streptomycin

52. A patient starting first-line four-drug TB therapy requires the agent most associated with hyperuricemia and arthralgias, typically discontinued after the initial 2-month intensive phase while the other core drugs continue. Which drug is this?

A. Isoniazid

B. Pyrazinamide

C. Ethambutol

D. Rifampin

E. Streptomycin

53. A patient with multidrug-resistant tuberculosis requires a novel oral diarylquinoline that inhibits mycobacterial ATP synthase, carrying a boxed warning for QT prolongation and requiring baseline and periodic ECG monitoring. Which drug is this?

A. Rifabutin

B. Rifapentine

C. Bedaquiline

D. Clofazimine

E. Streptomycin

54. A patient starting treatment for active TB requires an injectable aminoglycoside, one of the original first-line TB drugs before oral regimens became standard, now reserved for drug-resistant disease given ototoxicity/nephrotoxicity risk. Which drug is this?

A. Rifabutin

B. Bedaquiline

C. Streptomycin

D. Clofazimine

E. Rifapentine

55. A patient with TB and HIV on a protease inhibitor-based antiretroviral regimen requires a rifamycin alternative to rifampin with less potent CYP3A4 induction, reducing interaction with antiretroviral therapy. Which drug is this?

A. Bedaquiline

B. Clofazimine

C. Streptomycin

D. Pyrazinamide

E. Rifabutin

56. A patient with latent TB infection desires a shorter treatment regimen using a long-acting rifamycin given once weekly in combination with isoniazid for 12 weeks, an alternative to daily isoniazid monotherapy for 9 months. Which drug is this?

A. Rifapentine

B. Rifabutin

C. Bedaquiline

D. Clofazimine

E. Streptomycin

57. A patient with multidrug-resistant tuberculosis is started on a riminophenazine antimycobacterial also used for leprosy, notable for causing reversible red-brown skin discoloration with prolonged use. Which drug is this?

A. Rifabutin

B. Clofazimine

C. Bedaquiline

D. Streptomycin

E. Rifapentine

58. A patient with HIV and a low CD4 count requires prophylaxis against Pneumocystis pneumonia but has a severe sulfa allergy precluding TMP-SMX use. Which aerosolized or IV alternative, also used for active PCP treatment in sulfa-allergic patients, is this?

A. Dapsone

B. Atovaquone

C. Clindamycin-primaquine

D. Pentamidine

E. Trimethoprim

59. A patient with a productive cough and moderate discomfort desires a prescription antitussive combining a mild opioid with expectorant or antihistamine components, an older option with genuine (if modest) abuse potential compared to dextromethorphan. Which drug is this?

A. Dextromethorphan

B. Guaifenesin

C. Codeine (opioid)

D. Benzonatate

E. Pseudoephedrine

60. A patient with COPD inadequately controlled on a LABA/LAMA combination is started on a novel oral dual phosphodiesterase-3/4 inhibitor, combining bronchodilator and anti-inflammatory effects in a single mechanism distinct from roflumilast. Which drug is this?

A. Roflumilast

B. Theophylline

C. Zileuton

D. Ensifentrine

E. Aminophylline

61. A patient with erosive esophagitis desires a PPI available as a delayed-release orally disintegrating tablet, useful for patients with dysphagia who cannot swallow standard capsules. Which drug is this?

A. Omeprazole

B. Esomeprazole

C. Lansoprazole

D. Pantoprazole

E. Rabeprazole

62. A hospitalized patient with a GI bleed requires a PPI available as an IV formulation for patients who cannot take oral medications, with minimal drug interaction potential via CYP2C19 compared to omeprazole. Which drug is this?

A. Lansoprazole

B. Esomeprazole

C. Rabeprazole

D. Pantoprazole

E. Dexlansoprazole

63. A patient with GERD desires a PPI with a novel dual delayed-release formulation providing two separate absorption peaks, extending acid suppression duration without requiring twice-daily dosing. Which drug is this?

A. Omeprazole

B. Pantoprazole

C. Dexlansoprazole

D. Rabeprazole

E. Lansoprazole

64. A patient with GERD and Zollinger-Ellison syndrome requires a PPI with the most rapid onset of acid suppression among the class, activated across a broader pH range than omeprazole. Which drug is this?

A. Lansoprazole

B. Pantoprazole

C. Rabeprazole

D. Dexlansoprazole

E. Esomeprazole

65. A patient with mild GERD prefers an older, less potent H2 receptor antagonist with more significant CYP450 drug interaction potential than famotidine, historically associated with gynecomastia with prolonged use. Which drug is this?

A. Famotidine

B. Nizatidine

C. Ranitidine

D. Omeprazole

E. Cimetidine

66. A patient with mild GERD desires an H2 receptor antagonist alternative to famotidine with minimal hepatic metabolism, eliminated primarily unchanged by the kidneys, useful in patients with hepatic impairment. Which drug is this?

A. Cimetidine

B. Nizatidine

C. Ranitidine

D. Omeprazole

E. Esomeprazole

67. A patient receiving highly emetogenic chemotherapy requires antiemetic prophylaxis with an IV 5-HT3 receptor antagonist carrying a specific boxed warning for dose-dependent QT prolongation, more pronounced than with ondansetron. Which drug is this?

A. Granisetron

B. Dolasetron

C. Palonosetron

D. Metoclopramide

E. Aprepitant

68. A patient receiving highly emetogenic chemotherapy requires a second-generation 5-HT3 receptor antagonist with a notably longer half-life (approximately 40 hours) than ondansetron or granisetron, providing extended coverage into the delayed phase. Which drug is this?

A. Dolasetron

B. Metoclopramide

C. Palonosetron

D. Ondansetron

E. Aprepitant

69. A patient receiving highly emetogenic chemotherapy requires an oral NK1 receptor antagonist added to a 5-HT3 antagonist and dexamethasone for triple antiemetic prophylaxis, with notable CYP3A4 interaction potential. Which drug is this?

A. Aprepitant

B. Dolasetron

C. Palonosetron

D. Metoclopramide

E. Ondansetron

70. A patient unable to tolerate oral antiemetic prophylaxis before chemotherapy requires an IV prodrug that is converted to the active NK1 receptor antagonist after administration. Which drug is this?

A. Aprepitant (oral)

B. Fosaprepitant

C. Dolasetron

D. Palonosetron

E. Ondansetron

71. A patient with recurrent Clostridioides difficile infection despite standard antibiotic therapy is started on an adjunctive IV monoclonal antibody that binds C. difficile toxin B, reducing recurrence risk when added to antibiotic treatment. Which drug is this?

A. Fidaxomicin

B. Vancomycin (oral)

C. Bezlotoxumab

D. Rifaximin

E. Metronidazole

72. A patient with moderate-to-severe Crohn disease refractory to anti-TNF therapy is started on a monoclonal antibody targeting alpha-4 integrin, blocking leukocyte adhesion and migration into gut tissue, distinct from the gut-selective vedolizumab. Which drug is this?

A. Ustekinumab

B. Golimumab

C. Certolizumab pegol

D. Risankizumab

E. Natalizumab

73. A patient with moderate-to-severe Crohn disease refractory to anti-TNF and anti-integrin therapy is started on a monoclonal antibody selectively targeting the p19 subunit of IL-23, distinct from ustekinumab's shared p40 targeting. Which drug is this?

A. Natalizumab

B. Golimumab

C. Risankizumab

D. Certolizumab pegol

E. Infliximab

74. A patient with moderate-to-severe ulcerative colitis refractory to anti-TNF therapy is started on a monoclonal antibody selectively targeting IL-23, an alternative to risankizumab with its own distinct UC-specific trial data. Which drug is this?

A. Natalizumab

B. Ustekinumab

C. Golimumab

D. Vedolizumab

E. Mirikizumab

75. A patient with mild-to-moderate ulcerative colitis desires an oral 5-aminosalicylate alternative to mesalamine, a prodrug linked via an azo bond to a carrier molecule, cleaved by colonic bacteria to release the active moiety. Which drug is this?

A. Sulfasalazine

B. Infliximab

C. Budesonide (oral)

D. Vedolizumab

E. Balsalazide

76. A patient with mild-to-moderate ulcerative colitis and sulfapyridine-related intolerance to sulfasalazine desires an alternative aminosalicylate consisting of two mesalamine molecules joined by an azo bond, cleaved in the colon to release two active moieties. Which drug is this?

A. Balsalazide

B. Olsalazine

C. Mesalamine

D. Sulfasalazine

E. Budesonide (oral)

77. A patient with chronic idiopathic constipation refractory to osmotic laxatives is started on an oral chloride channel activator that increases intestinal fluid secretion, distinct from linaclotide's guanylate cyclase mechanism. Which drug is this?

A. Plecanatide

B. Lubiprostone

C. Prucalopride

D. Senna

E. Bisacodyl

78. A patient with IBS-C desires a novel oral agent that inhibits intestinal sodium/hydrogen exchanger 3 (NHE3), reducing sodium absorption to increase intestinal fluid and accelerate transit, also studied for hyperphosphatemia in dialysis patients. Which drug is this?

A. Tenapanor

B. Lubiprostone

C. Linaclotide

D. Plecanatide

E. Prucalopride

79. A postoperative patient undergoing bowel resection requires a peripherally-acting mu-opioid receptor antagonist specifically approved for accelerating GI recovery and reducing postoperative ileus duration, restricted to short-term inpatient use. Which drug is this?

A. Methylnaltrexone

B. Alvimopan

C. Naloxegol

D. Naloxone

E. Naltrexone

80. A patient with IBS-C desires an oral 5-HT4 receptor partial agonist historically used but withdrawn and later reintroduced with restricted access given cardiovascular safety concerns identified in the general population. Which drug is this?

A. Prucalopride

B. Tegaserod

C. Linaclotide

D. Plecanatide

E. Lubiprostone

81. A patient with severe nausea and vomiting from a non-chemotherapy cause (e.g., gastroenteritis, migraine) requires an IV dopamine antagonist antiemetic/antipsychotic with sedating properties, useful also for acute migraine, distinct from metoclopramide. Which drug is this?

A. Prochlorperazine

B. Ondansetron

C. Aprepitant

D. Palonosetron

E. Ranitidine

82. A pregnant patient with severe hyperemesis gravidarum refractory to doxylamine-pyridoxine requires an additional sedating antihistamine/antiemetic with dopamine-antagonist properties, historically used but with notable extrapyramidal and sedation side effects. Which drug is this?

A. Ondansetron

B. Metoclopramide

C. Diphenhydramine

D. Trimethobenzamide

E. Promethazine

83. A patient with mild nausea desires an older antiemetic with a less well-characterized mechanism than dopamine or serotonin antagonism, generally considered less effective than newer agents but with a comparatively mild side-effect profile. Which drug is this?

A. Ondansetron

B. Prochlorperazine

C. Trimethobenzamide

D. Promethazine

E. Metoclopramide

84. A patient with chemotherapy-induced nausea and vomiting refractory to standard antiemetics, or a patient with cancer-related cachexia and appetite loss, is started on an oral cannabinoid that also stimulates appetite. Which drug is this?

A. Aprepitant

B. Ondansetron

C. Prochlorperazine

D. Metoclopramide

E. Dronabinol

85. A patient with osteoarthritis desires an NSAID with a long half-life allowing once-daily dosing, structurally distinct from the propionic acid class. Which drug is this?

A. Ibuprofen

B. Naproxen

C. Ketorolac

D. Etodolac

E. Celecoxib

86. A patient with osteoarthritis desires a once-daily NSAID with a notably long half-life (approximately 24 hours) among nonselective agents, an alternative to etodolac with a distinct chemical structure. Which drug is this?

A. Diclofenac

B. Ketorolac

C. Meloxicam

D. Nabumetone

E. Sulindac

87. A patient with rheumatoid arthritis desires an NSAID with an unusually long half-life (over 40 hours) permitting once-daily dosing, a propionic acid derivative distinct from ibuprofen and naproxen. Which drug is this?

A. Ketoprofen

B. Fenoprofen

C. Oxaprozin

D. Etodolac

E. Nabumetone

88. A patient with osteoarthritis desires a propionic acid NSAID alternative to ibuprofen with a shorter half-life requiring three to four times daily dosing, historically among the first propionic acid NSAIDs marketed. Which drug is this?

A. Naproxen

B. Oxaprozin

C. Fenoprofen

D. Ketorolac

E. Etodolac

89. A patient with mild-to-moderate menstrual pain desires an NSAID from the fenamate class, with a unique dual mechanism inhibiting both prostaglandin synthesis and prostaglandin receptor binding. Which drug is this?

A. Ibuprofen

B. Naproxen

C. Ketorolac

D. Diclofenac

E. Mefenamic acid

90. A patient with acute gouty arthritis desires an older acetic acid derivative NSAID, structurally related to indomethacin, less commonly used today given a less favorable side-effect profile relative to newer options. Which drug is this?

A. Ketorolac

B. Etodolac

C. Nabumetone

D. Sulindac

E. Tolmetin

91. A patient with osteoarthritis and a documented aspirin allergy manifesting as urticaria requires an alternative analgesic that, unlike most NSAIDs, does not inhibit platelet function, though it retains some cross-reactivity risk in true aspirin-sensitive asthma. Which drug is this?

A. Ibuprofen

B. Naproxen

C. Celecoxib

D. Diflunisal

E. Ketorolac

92. A patient with rheumatoid arthritis desires a propionic acid NSAID with relatively potent anti-inflammatory activity per milligram, requiring lower doses than ibuprofen for comparable effect, though with a shorter duration of action. Which drug is this?

A. Ketoprofen

B. Naproxen

C. Oxaprozin

D. Fenoprofen

E. Etodolac

93. A patient with moderate-to-severe plaque psoriasis and psoriatic arthritis refractory to IL-17A-selective and IL-23-selective biologics is started on a novel monoclonal antibody targeting both IL-17A and IL-17F. Which drug is this?

A. Secukinumab

B. Bimekizumab

C. Ixekizumab

D. Ustekinumab

E. Guselkumab

94. A patient with moderate-to-severe plaque psoriasis and psoriatic arthritis is started on a novel oral selective TYK2 (tyrosine kinase 2) inhibitor, distinguishing its mechanism from JAK1/JAK2-targeting oral agents like baricitinib. Which drug is this?

A. Deucravacitinib

B. Upadacitinib

C. Baricitinib

D. Tofacitinib

E. Apremilast

95. A patient with severe, refractory rheumatoid arthritis is started on an oral calcineurin inhibitor, more commonly associated with transplant immunosuppression, used off-label or as an add-on for refractory disease given its T-cell-suppressive effect. Which drug is this?

A. Methotrexate

B. Leflunomide

C. Tacrolimus

D. Cyclosporine

E. Azathioprine

96. A patient with severe RA refractory to methotrexate is started on an oral purine analog DMARD that inhibits purine synthesis, requiring TPMT or NUDT15 genotyping/phenotyping before initiation given risk of severe myelosuppression in deficient patients. Which drug is this?

A. Leflunomide

B. Cyclosporine

C. Methotrexate

D. Hydroxychloroquine

E. Azathioprine

97. A patient with severe RA refractory to modern biologic DMARDs is started on a historic parenteral gold-salt compound, largely abandoned given a narrow therapeutic window and significant toxicity (nephrotic syndrome, mucocutaneous reactions) relative to newer options. Which drug is this?

A. Penicillamine

B. Gold sodium thiomalate

C. Hydroxychloroquine

D. Sulfasalazine

E. Leflunomide

98. A patient with Wilson disease-associated joint symptoms or historically for severe RA is described taking a copper-chelating DMARD with a mechanism thought to involve disruption of disulfide bonds and reduced rheumatoid factor production, now rarely used given toxicity concerns. Which drug is this?

A. Gold sodium thiomalate

B. Hydroxychloroquine

C. Sulfasalazine

D. Leflunomide

E. Penicillamine

99. A patient undergoing rapid sequence intubation requires a nondepolarizing neuromuscular blocker with an intermediate onset and duration, commonly used for maintenance of paralysis after intubation given its steroid-based structure and relative cardiovascular stability. Which drug is this?

A. Succinylcholine

B. Rocuronium

C. Vecuronium

D. Cisatracurium

E. Mivacurium

100. A patient undergoing rapid sequence intubation requires a depolarizing neuromuscular blocker with the fastest onset of paralysis among available agents, contraindicated in hyperkalemia and malignant hyperthermia susceptibility. Which drug is this?

A. Vecuronium

B. Succinylcholine

C. Rocuronium

D. Cisatracurium

E. Mivacurium

101. A patient with acute low back muscle spasm desires a centrally-acting skeletal muscle relaxant with analgesic properties beyond simple muscle relaxation, derived from a topical capsaicinoid mechanism when applied locally for adjunct pain relief. Which topical agent depletes substance P from sensory nerve terminals with repeated application?

A. Methocarbamol

B. Capsaicin

C. Baclofen

D. Cyclobenzaprine

E. Tizanidine

102. A patient with localized musculoskeletal pain desires a topical patch delivering a local anesthetic directly to the painful area, blocking sodium channels in peripheral nerve endings with minimal systemic absorption. Which drug is this?

A. Capsaicin (topical)

B. Methocarbamol

C. Baclofen

D. Lidocaine patch

E. Tizanidine

103. A patient with acute musculoskeletal spasm desires a centrally-acting muscle relaxant chemically related to chlorzoxazone's mechanism class but structurally distinct, with hepatotoxicity as a recognized but uncommon risk requiring patient counseling. Which drug is this?

A. Baclofen

B. Tizanidine

C. Cyclobenzaprine

D. Metaxalone

E. Methocarbamol

104. A patient with acute musculoskeletal spasm desires a centrally-acting muscle relaxant with a chlorinated benzoxazole structure, generally considered to have milder sedation than cyclobenzaprine, dosed multiple times daily. Which drug is this?

A. Baclofen

B. Chlorzoxazone

C. Tizanidine

D. Metaxalone

E. Methocarbamol

105. A patient with severe systemic lupus erythematosus refractory to standard immunosuppression is started on a monoclonal antibody targeting B-lymphocyte stimulator (BLyS), reducing autoreactive B-cell survival, given as an adjunct to standard therapy. Which drug is this?

A. Rituximab

B. Tocilizumab

C. Abatacept

D. Belimumab

E. Anifrolumab

106. A patient with moderate-to-severe systemic lupus erythematosus refractory to standard therapy is started on a monoclonal antibody blocking the type I interferon receptor, targeting a pathway implicated in lupus pathogenesis distinct from the B-cell-focused belimumab. Which drug is this?

A. Rituximab

B. Anifrolumab

C. Tocilizumab

D. Abatacept

E. Belimumab

107. A patient with lymphangioleiomyomatosis (LAM), a rare cystic lung disease with musculoskeletal/systemic overlap in tuberous sclerosis complex, is started on an oral mTOR inhibitor that stabilizes lung function, also used in transplant immunosuppression. Which drug is this?

A. Tacrolimus

B. Cyclosporine

C. Azathioprine

D. Mycophenolate mofetil

E. Sirolimus

108. A patient with tuberous sclerosis complex-associated subependymal giant cell astrocytoma or renal angiomyolipoma is started on an alternative oral mTOR inhibitor to sirolimus, with its own distinct pharmacokinetic profile and specific tuberous sclerosis complex-related FDA approvals. Which drug is this?

A. Tacrolimus

B. Everolimus

C. Cyclosporine

D. Azathioprine

E. Mycophenolate mofetil

109. A patient with a severe polymicrobial pelvic infection requires empiric IV therapy with a beta-lactam/beta-lactamase inhibitor combination narrower in spectrum than piperacillin-tazobactam, providing anaerobic and beta-lactamase-producing organism coverage. Which drug is this?

A. Cefepime (IV)

B. Meropenem (IV)

C. Ceftriaxone (IV)

D. Ampicillin-sulbactam

E. Aztreonam (IV)

110. A child with acute otitis media refractory to first-line amoxicillin requires an oral third-generation cephalosporin alternative with activity against beta-lactamase-producing H. influenzae and M. catarrhalis. Which drug is this?

A. Cefdinir

B. Cefazolin

C. Cefepime

D. Ceftriaxone (oral)

E. Aztreonam

111. A patient with MRSA pneumonia requires a fifth-generation cephalosporin with activity against MRSA in addition to typical cephalosporin gram-negative coverage, distinct from ceftaroline's siblings. Which drug is this?

A. Cefepime

B. Ceftriaxone

C. Ceftaroline

D. Cefazolin

E. Aztreonam

112. A patient with a complicated intra-abdominal infection requires a carbapenem with once-daily dosing, an alternative to meropenem lacking reliable Pseudomonas or Acinetobacter coverage, useful when broad-spectrum coverage beyond typical community pathogens is not needed. Which drug is this?

A. Ertapenem

B. Imipenem-cilastatin

C. Meropenem

D. Doripenem

E. Aztreonam

113. A patient with a severe multidrug-resistant gram-negative infection requires a carbapenem combined with a renal dehydropeptidase-I inhibitor to prevent renal metabolism and inactivation of the antibiotic. Which drug is this?

A. Ertapenem (IV)

B. Meropenem (IV)

C. Imipenem-cilastatin

D. Doripenem (IV)

E. Aztreonam (IV)

114. A patient with MRSA bacteremia inadequately responsive to vancomycin requires a novel long-acting lipoglycopeptide requiring only a single or two-dose IV regimen for the entire treatment course. Which drug is this?

A. Daptomycin

B. Linezolid

C. Ceftaroline

D. Tedizolid

E. Dalbavancin

115. A patient with acute bacterial skin and skin structure infection requires an oxazolidinone alternative to linezolid with a shorter treatment duration (6 days) and once-daily dosing, with less reported myelosuppression risk. Which drug is this?

A. Daptomycin

B. Ceftaroline

C. Tedizolid

D. Dalbavancin

E. Vancomycin

116. A patient with a complicated intra-abdominal infection due to a multidrug-resistant organism requires a glycylcycline antibiotic, structurally related to tetracyclines but active against many tetracycline-resistant strains, with a boxed warning for increased mortality risk relative to comparator antibiotics. Which drug is this?

A. Tigecycline

B. Doxycycline

C. Minocycline

D. Ceftaroline

E. Dalbavancin

117. A patient with a multidrug-resistant gram-negative infection (e.g., carbapenem-resistant Enterobacterales) requires a polymyxin-class antibiotic for systemic IV use, distinct from the inhaled/topical colistimethate, reserved given significant nephrotoxicity risk. Which drug is this?

A. Aztreonam

B. Tigecycline

C. Ceftaroline

D. Polymyxin B

E. Meropenem

118. A pregnant woman with acute toxoplasmosis infection acquired during pregnancy requires a folate antagonist antiparasitic, typically combined with sulfadiazine and folinic acid (leucovorin) to reduce hematologic toxicity. Which drug is this?

A. Atovaquone (alone)

B. Metronidazole

C. Trimethoprim (alone)

D. Azithromycin

E. Pyrimethamine

119. A patient with acute Chagas disease (Trypanosoma cruzi infection) requires a nitrofuran-class antiparasitic, one of two first-line options for this indication in the acute phase. Which drug is this?

A. Miltefosine

B. Eflornithine

C. Sodium stibogluconate

D. Nifurtimox

E. Praziquantel

120. A patient with visceral leishmaniasis requires an oral alkylphosphocholine antiparasitic, the first oral treatment option for this disease, originally developed as an antineoplastic agent. Which drug is this?

A. Nifurtimox

B. Eflornithine

C. Sodium stibogluconate

D. Miltefosine

E. Praziquantel

121. A patient with late-stage West African trypanosomiasis (sleeping sickness) with CNS involvement requires an IV ornithine decarboxylase inhibitor, sometimes combined with nifurtimox for combination therapy. Which drug is this?

A. Miltefosine

B. Sodium stibogluconate

C. Eflornithine

D. Nifurtimox (alone)

E. Praziquantel

122. A patient with intestinal tapeworm infection (e.g., Taenia saginata) and intolerance to praziquantel requires an alternative oral antihelminthic that inhibits mitochondrial ATP production in the parasite. Which drug is this?

A. Mebendazole

B. Albendazole

C. Ivermectin

D. Diethylcarbamazine

E. Niclosamide

123. A patient with severe P. falciparum malaria requires the WHO-preferred first-line IV antimalarial, an artemisinin derivative superior to quinine in reducing mortality in severe disease. Which drug is this?

A. Artesunate (IV)

B. Chloroquine

C. Mefloquine

D. Atovaquone-proguanil

E. Primaquine

124. A traveler to a chloroquine-resistant malaria-endemic region with a contraindication to atovaquone-proguanil and doxycycline (e.g., young child, pregnancy in later trimesters) requires an alternative weekly oral chemoprophylaxis agent, though with a notable neuropsychiatric side-effect profile. Which drug is this?

A. Chloroquine

B. Mefloquine

C. Primaquine

D. Quinine sulfate

E. Artesunate

125. A patient with recurrent genital herpes desires an oral antiviral alternative to valacyclovir with a distinct prodrug structure, converted to penciclovir after absorption, dosed for suppressive or episodic therapy. Which drug is this?

A. Acyclovir

B. Ganciclovir

C. Foscarnet

D. Cidofovir

E. Famciclovir

126. A solid organ transplant recipient at high risk for CMV disease requires a novel oral antiviral for prophylaxis that inhibits the viral terminase complex, a mechanism distinct from ganciclovir/valganciclovir, avoiding myelosuppression as a limiting toxicity. Which drug is this?

A. Letermovir

B. Foscarnet

C. Cidofovir

D. Valganciclovir

E. Acyclovir

127. A patient with HIV desires a once-daily single-tablet regimen containing an integrase strand transfer inhibitor with a high barrier to resistance, combined with tenofovir alafenamide and emtricitabine. Which integrase inhibitor is this?

A. Bictegravir

B. Dolutegravir

C. Raltegravir

D. Elvitegravir

E. Cabotegravir

128. A patient with HIV desires a long-acting injectable integrase strand transfer inhibitor, administered intramuscularly every one to two months in combination with rilpivirine, eliminating the need for daily oral dosing. Which drug is this?

A. Bictegravir

B. Cabotegravir

C. Dolutegravir

D. Raltegravir

E. Elvitegravir

129. A patient with chronic hepatitis C genotype 1 requires an oral nucleotide analog NS5B polymerase inhibitor, the backbone component of several modern interferon-free direct-acting antiviral combination regimens. Which drug is this?

A. Ribavirin

B. Entecavir

C. Tenofovir disoproxil

D. Sofosbuvir

E. Lamivudine

130. A patient with refractory focal seizures desires an add-on AED that enhances slow inactivation of voltage-gated sodium channels (distinct from standard fast inactivation enhanced by most sodium-channel-blocking AEDs), available in both oral and IV formulations. Which drug is this?

A. Lacosamide

B. Brivaracetam

C. Cenobamate

D. Rufinamide

E. Cannabidiol

131. A patient with refractory focal seizures desires an add-on AED that binds synaptic vesicle protein 2A (SV2A) with higher affinity than levetiracetam, its structural analog, potentially offering improved efficacy in levetiracetam-refractory cases. Which drug is this?

A. Lacosamide

B. Cenobamate

C. Rufinamide

D. Brivaracetam

E. Cannabidiol

132. A patient with refractory focal seizures desires a newer add-on AED with a dual mechanism (sodium channel inactivation plus GABA-A receptor positive allosteric modulation), requiring a slow titration schedule to reduce risk of severe hypersensitivity reaction. Which drug is this?

A. Lacosamide

B. Brivaracetam

C. Rufinamide

D. Cannabidiol

E. Cenobamate

133. A child with Lennox-Gastaut syndrome and drop seizures desires an add-on triazole-derivative AED that shortens the QT interval, requiring caution and ECG monitoring in patients with Familial Short QT syndrome. Which drug is this?

A. Lacosamide

B. Brivaracetam

C. Cenobamate

D. Cannabidiol

E. Rufinamide

134. A child with Dravet syndrome or Lennox-Gastaut syndrome desires an add-on plant-derived AED requiring monitoring of hepatic transaminases, particularly with concurrent valproic acid use, given elevated hepatotoxicity risk in combination. Which drug is this?

A. Lacosamide

B. Brivaracetam

C. Cannabidiol

D. Rufinamide

E. Cenobamate

135. A patient with acute migraine and cardiovascular disease desires an acute abortive triptan alternative with rapid onset via subcutaneous or nasal spray formulation, distinct from oral-only triptans. Which drug is this?

A. Naratriptan

B. Frovatriptan

C. Almotriptan

D. Zolmitriptan

E. Eletriptan

136. A patient with acute migraine and cardiovascular contraindications to triptans desires a novel oral selective 5-HT1F receptor agonist without significant vasoconstrictive activity, distinct from the CGRP-antagonist gepants. Which drug is this?

A. Rimegepant

B. Lasmiditan

C. Atogepant

D. Ubrogepant

E. Zolmitriptan

137. A patient with episodic migraine desires an oral CGRP receptor antagonist ('gepant') approved for both acute treatment and preventive use, offering dual-purpose therapy with a single medication. Which drug is this?

A. Ubrogepant

B. Lasmiditan

C. Atogepant

D. Rimegepant

E. Zolmitriptan

138. A patient with chronic migraine desires an oral CGRP receptor antagonist specifically developed and approved for preventive use only, distinct from the acute-only ubrogepant and dual-purpose rimegepant. Which drug is this?

A. Lasmiditan

B. Zolmitriptan

C. Rimegepant

D. Atogepant

E. Ubrogepant

139. A patient with chronic migraine desires a subcutaneously injected CGRP ligand-targeting monoclonal antibody, an alternative to erenumab's receptor-targeting mechanism, dosed monthly or quarterly. Which drug is this?

A. Erenumab

B. Rimegepant

C. Fremanezumab

D. Ubrogepant

E. Lasmiditan

140. A patient with an acute severe migraine refractory to oral triptans requires an older IV/IM/intranasal ergot alkaloid with combined 5-HT1 agonism and alpha-adrenergic/dopaminergic activity, often given with an antiemetic given nausea risk. Which drug is this?

A. Zolmitriptan

B. Rimegepant

C. Lasmiditan

D. Dihydroergotamine

E. Sumatriptan

141. A patient with mild-to-moderate Alzheimer disease desires an older, first-generation acetylcholinesterase inhibitor, largely abandoned in current practice given significant hepatotoxicity requiring frequent liver function monitoring. Which drug is this?

A. Donepezil

B. Rivastigmine

C. Galantamine

D. Memantine

E. Tacrine

142. A patient with Parkinson disease and early motor symptoms desires an older MAO-B inhibitor alternative to rasagiline, requiring twice-daily dosing and metabolized to amphetamine-like metabolites, a distinguishing pharmacokinetic feature. Which drug is this?

A. Entacapone

B. Amantadine

C. Rotigotine

D. Selegiline

E. Levodopa-carbidopa

143. A patient with Parkinson disease and predominant tremor, with relatively preserved cognition, desires an oral anticholinergic agent useful specifically for tremor control, though generally avoided in older patients given cognitive side-effect risk. Which drug is this?

A. Amantadine

B. Trihexyphenidyl

C. Entacapone

D. Rotigotine

E. Selegiline

144. A patient with amyotrophic lateral sclerosis (ALS) and SOD1 gene mutation-associated disease desires a novel antisense oligonucleotide therapy administered intrathecally, reducing production of the mutant SOD1 protein. Which drug is this?

A. Riluzole

B. Tofersen

C. Nusinersen

D. Risdiplam

E. Edaravone

145. An infant with spinal muscular atrophy (SMA) requires an antisense oligonucleotide administered intrathecally, modifying SMN2 gene splicing to increase functional SMN protein production. Which drug is this?

A. Tofersen

B. Risdiplam

C. Onasemnogene abeparvovec

D. Nusinersen

E. Edaravone

146. An infant with spinal muscular atrophy desires an oral, at-home alternative to intrathecal nusinersen, also modifying SMN2 splicing to increase functional SMN protein, avoiding the need for repeated lumbar punctures. Which drug is this?

A. Tofersen

B. Risdiplam

C. Onasemnogene abeparvovec

D. Nusinersen

E. Edaravone

147. A patient with generalized myasthenia gravis and acetylcholine receptor antibodies, refractory to standard therapy, desires a novel IV neonatal Fc receptor (FcRn) antagonist that reduces circulating IgG autoantibody levels, distinct from complement-inhibitor mechanisms. Which drug is this?

A. Pyridostigmine

B. Rituximab

C. Eculizumab

D. Efgartigimod

E. IVIG

148. A patient with relapsing-remitting multiple sclerosis and secondary progressive disease with active relapses is started on an oral sphingosine-1-phosphate receptor modulator with greater receptor subtype selectivity than fingolimod, specifically approved for this MS subtype. Which drug is this?

A. Ocrelizumab

B. Natalizumab

C. Interferon beta-1a

D. Glatiramer acetate

E. Siponimod

149. A patient with relapsing-remitting multiple sclerosis desires an oral pyrimidine synthesis inhibitor DMARD, also used in rheumatoid arthritis (as leflunomide's active metabolite shares a related mechanism), dosed once daily for MS. Which drug is this?

A. Siponimod

B. Teriflunomide

C. Fingolimod

D. Ocrelizumab

E. Cladribine

150. A patient with highly active relapsing-remitting multiple sclerosis desires a short-course oral purine analog DMT, given as two annual treatment courses (each a short pulse of days), providing prolonged disease control without continuous dosing. Which drug is this?

A. Cladribine

B. Teriflunomide

C. Siponimod

D. Dimethyl fumarate

E. Fingolimod

151. A patient with MDD desires an SSRI with the longest half-life in its class (including an active metabolite with an even longer half-life), giving it the lowest discontinuation syndrome risk among SSRIs. Which drug is this?

A. Sertraline

B. Escitalopram

C. Paroxetine

D. Fluoxetine

E. Citalopram

152. A patient with MDD and QT prolongation risk factors requires careful SSRI selection given a specific FDA dose-dependent QT-prolongation warning limiting maximum daily dose, particularly in patients over 60 or with hepatic impairment. Which drug is this?

A. Sertraline

B. Fluoxetine

C. Paroxetine

D. Escitalopram

E. Citalopram

153. A patient with MDD desires a newer SNRI with a distinctly higher norepinephrine-to-serotonin reuptake inhibition ratio compared to other agents in its class, dosed once daily. Which drug is this?

A. Bupropion

B. Duloxetine

C. Sertraline

D. Levomilnacipran

E. Trazodone

154. A patient with insomnia and mild depressive symptoms desires a low-dose antidepressant primarily used off-label for sleep given potent histamine H1 and serotonin 5-HT2A receptor antagonism at low doses, with minimal effect on serotonin reuptake at this dose range. Which drug is this?

A. Mirtazapine

B. Sertraline

C. Bupropion

D. Venlafaxine

E. Trazodone

155. A patient with MDD and chronic pain desires a tricyclic antidepressant with the most potent serotonin and norepinephrine reuptake inhibition among TCAs, though with more significant

anticholinergic and cardiac conduction effects requiring baseline ECG in older patients. Which drug is this?

A. Nortriptyline

B. Desipramine

C. Amitriptyline

D. Trazodone

E. Doxepin

156. A patient with MDD and TCA candidacy desires an agent with comparatively less anticholinergic and sedating burden than amitriptyline, a secondary amine TCA metabolite often preferred in older adults when a TCA is specifically indicated. Which drug is this?

A. Doxepin

B. Amitriptyline

C. Imipramine

D. Nortriptyline

E. Trazodone

157. A patient with treatment-resistant MDD refractory to multiple SSRIs/SNRIs is started on an older, irreversible, nonselective MAO inhibitor requiring strict dietary tyramine restriction to avoid hypertensive crisis. Which drug is this?

A. Selegiline (transdermal)

B. Bupropion

C. Phenelzine

D. Mirtazapine

E. Trazodone

158. A patient with treatment-resistant MDD and atypical depression features (hypersomnia, hyperphagia) desires an alternative irreversible MAO inhibitor to phenelzine, structurally related to amphetamine with some inherent stimulant properties. Which drug is this?

A. Tranylcypromine

B. Phenelzine

C. Isocarboxazid

D. Selegiline (transdermal)

E. Bupropion

159. A patient with schizophrenia and metabolic syndrome desires an atypical antipsychotic with a comparatively favorable metabolic profile among newer agents, a benzisoxazole-derivative with partial dopamine D2/D3 agonism distinct from aripiprazole. Which drug is this?

A. Olanzapine

B. Clozapine

C. Quetiapine

D. Cariprazine

E. Risperidone

160. A patient with schizophrenia inadequately controlled on standard atypical antipsychotics desires a novel agent with a benzisothiazol structure and unique combined D2 partial agonism plus serotonin reuptake inhibition, distinct from cariprazine and aripiprazole. Which drug is this?

A. Iloperidone

B. Lumateperone

C. Asenapine

D. Ziprasidone

E. Olanzapine

161. A patient with schizophrenia desires a novel once-daily atypical antipsychotic with a unique mechanism including serotonin reuptake inhibition alongside dopamine and serotonin receptor modulation, notable for minimal metabolic side effects and no titration requirement. Which drug is this?

A. Iloperidone

B. Lumateperone

C. Cariprazine

D. Pimavanserin

E. Olanzapine

162. A patient with Parkinson disease psychosis desires an atypical antipsychotic that, unlike standard agents, has no direct dopamine receptor blocking activity, working instead through selective serotonin 5-HT2A inverse agonism, avoiding worsening of motor symptoms. Which drug is this?

A. Quetiapine

B. Clozapine

C. Pimavanserin

D. Olanzapine

E. Risperidone

163. A patient with schizophrenia and agitation requires an intermediate-potency typical antipsychotic, with a side-effect profile falling between the sedating low-potency agents (chlorpromazine) and the more EPS-prone high-potency agents (haloperidol, fluphenazine). Which drug is this?

A. Cariprazine

B. Perphenazine

C. Lumateperone

D. Pimavanserin

E. Asenapine

164. A patient with treatment-resistant psychotic depression or refractory schizoaffective disorder desires an older, low-potency typical antipsychotic notable for the highest QT prolongation risk among typical antipsychotics, limiting its use to refractory cases. Which drug is this?

A. Chlorpromazine

B. Thioridazine

C. Haloperidol

D. Fluphenazine

E. Perphenazine

165. A patient with Tourette syndrome and severe tics refractory to standard therapy desires a typical antipsychotic specifically FDA-approved for this indication, notable for QT prolongation risk requiring baseline ECG and electrolyte assessment. Which drug is this?

A. Haloperidol

B. Chlorpromazine

C. Fluphenazine

D. Pimozide

E. Thioridazine

166. A patient with narcolepsy and excessive daytime sleepiness desires a wakefulness-promoting agent with a novel mechanism (weak dopamine reuptake inhibition, distinct from traditional stimulants), with lower abuse potential than amphetamine-based options. Which drug is this?

A. Lisdexamfetamine

B. Methylphenidate

C. Modafinil (oral)

D. Sodium oxybate

E. Dexmethylphenidate

167. A patient with narcolepsy and cataplexy desires a novel oral histamine H3 receptor antagonist/inverse agonist, a non-scheduled option that increases histaminergic neurotransmission to promote wakefulness. Which drug is this?

A. Modafinil

B. Sodium oxybate

C. Armodafinil

D. Pitolisant

E. Solriamfetol

168. A patient with chronic insomnia desires an oral dual orexin receptor antagonist that blocks wake-promoting orexin signaling, distinct from GABA-A-potentiating Z-drugs, with somnolence rather than dependence as the primary concern. Which drug is this?

A. Suvorexant

B. Zolpidem

C. Eszopiclone

D. Ramelteon

E. Zaleplon

169. A patient with chronic insomnia and difficulty with sleep onset desires a non-scheduled melatonin receptor agonist without the dependence potential of Z-drugs or orexin antagonists, selective for MT1/MT2 receptors. Which drug is this?

A. Zolpidem

B. Suvorexant

C. Eszopiclone

D. Zaleplon

E. Ramelteon

170. A patient with non-24-hour sleep-wake disorder (common in total blindness without light perception) desires a melatonin receptor agonist specifically approved for this circadian rhythm disorder, distinct from ramelteon's insomnia indication. Which drug is this?

A. Tasimelteon

B. Ramelteon

C. Suvorexant

D. Zolpidem

E. Melatonin (OTC)

171. A child with ADHD inadequately controlled on methylphenidate-based stimulants is switched to an amphetamine-based mixed-salts stimulant, an alternative Schedule II option combining dextroamphetamine and levoamphetamine salts, distinct from the prodrug lisdexamfetamine. Which drug is this?

A. Dexmethylphenidate (oral)

B. Atomoxetine (oral)

C. Viloxazine (oral)

D. Guanfacine (oral)

E. Mixed amphetamine salts

172. A patient desires a combined oral contraceptive with a specific progestin component (norgestimate) noted for having minimal androgenic activity, often marketed for its favorable acne profile. Which combination is this?

A. Drospirenone-ethinyl estradiol

B. Norethindrone-ethinyl estradiol

C. Desogestrel-ethinyl estradiol

D. Dienogest-estradiol valerate

E. Norgestimate-ethinyl estradiol

173. A patient desires a combined oral contraceptive with a third-generation progestin (desogestrel) noted for a comparatively increased VTE risk relative to second-generation progestins like levonorgestrel, an important counseling point. Which combination is this?

A. Norgestimate-ethinyl estradiol

B. Desogestrel-ethinyl estradiol

C. Norelgestromin-ethinyl estradiol patch

D. Dienogest-estradiol valerate

E. Drospirenone-ethinyl estradiol

174. A patient desires a transdermal combined hormonal contraceptive patch, applied weekly for three weeks followed by a patch-free week, delivering a progestin metabolized in part to norgestrel. Which product is this?

A. Segesterone/EE vaginal ring

B. Etonogestrel implant

C. Norelgestromin-ethinyl estradiol patch

D. Depot medroxyprogesterone acetate

E. Combined oral contraceptive

175. A patient with endometriosis-associated pain desires an oral progestin specifically FDA-approved for this indication, with high progesterone-receptor selectivity and minimal estrogenic, androgenic, or glucocorticoid activity. Which drug is this?

A. Norethindrone acetate

B. Medroxyprogesterone

C. Drospirenone

D. Levonorgestrel

E. Dienogest (oral)

176. A postmenopausal patient with hormone receptor-positive metastatic breast cancer requires a selective estrogen receptor degrader (SERD) that both blocks and downregulates estrogen receptor expression, administered as a monthly IM injection, distinct from oral SERMs like tamoxifen. Which drug is this?

A. Anastrozole

B. Letrozole

C. Tamoxifen

D. Exemestane

E. Fulvestrant

177. A postmenopausal patient with hormone receptor-positive breast cancer requires an oral nonsteroidal aromatase inhibitor blocking peripheral estrogen synthesis, generally preferred over tamoxifen for postmenopausal adjuvant therapy given superior outcomes in this population. Which drug is this?

A. Fulvestrant

B. Tamoxifen

C. Raloxifene

D. Anastrozole

E. Ospemifene

178. A patient with metastatic hormone receptor-positive breast cancer desires an alternative SERM to tamoxifen with a similar overall mechanism but a distinct pharmacokinetic profile, FDA-approved specifically for metastatic disease in postmenopausal women. Which drug is this?

A. Toremifene

B. Exemestane

C. Fulvestrant

D. Tamoxifen

E. Anastrozole

179. A postmenopausal patient with hormone receptor-positive breast cancer refractory to nonsteroidal aromatase inhibitors requires a steroidal aromatase inactivator, irreversibly binding the enzyme, sometimes effective after nonsteroidal aromatase inhibitor failure given the distinct steroidal mechanism. Which drug is this?

A. Anastrozole

B. Letrozole

C. Fulvestrant

D. Tamoxifen

E. Exemestane

180. A patient with hormone receptor-positive, HER2-negative metastatic breast cancer is started on a CDK4/6 inhibitor combined with an aromatase inhibitor, blocking cell cycle progression from G1 to S phase in cancer cells. Which drug is this?

A. Trastuzumab

B. Tamoxifen

C. Abemaciclib

D. Fulvestrant

E. Anastrozole

181. A patient with prostate cancer requires a GnRH agonist alternative to leuprolide, formulated as a subcutaneous implant or injection with its own distinct dosing intervals (monthly, quarterly, or longer). Which drug is this?

A. Goserelin

B. Triptorelin

C. Nafarelin

D. Histrelin

E. Danazol

182. A patient with prostate cancer requires a GnRH agonist with the longest available dosing interval among depot formulations, an implant lasting up to 6 months per administration. Which drug is this?

A. Triptorelin

B. Goserelin

C. Nafarelin

D. Histrelin

E. Leuprolide

183. A child with central precocious puberty requires a GnRH agonist formulated as an intranasal spray, requiring multiple daily doses given rapid absorption and short duration, an older option less commonly used today given dosing burden. Which drug is this?

A. Histrelin

B. Nafarelin

C. Leuprolide

D. Goserelin

E. Triptorelin

184. A child with central precocious puberty requires a GnRH agonist formulated as a subdermal implant providing suppression for up to 12 months per placement, the longest duration among GnRH agonist delivery systems for this indication. Which drug is this?

A. Nafarelin

B. Leuprolide

C. Histrelin

D. Goserelin

E. Triptorelin

185. A patient with metastatic prostate cancer refractory to GnRH agonist therapy requires an oral nonsteroidal antiandrogen blocking androgen receptor binding, an older agent requiring more frequent dosing than newer antiandrogens like bicalutamide. Which drug is this?

A. Bicalutamide

B. Enzalutamide

C. Abiraterone

D. Flutamide

E. Apalutamide

186. A patient with metastatic prostate cancer requires an oral nonsteroidal antiandrogen with once-daily dosing, commonly combined with a GnRH agonist for combined androgen blockade. Which drug is this?

A. Bicalutamide

B. Flutamide

C. Enzalutamide

D. Apalutamide

E. Abiraterone

187. A premenopausal patient with hypoactive sexual desire disorder desires a daily oral serotonin-modulating agent (a repurposed antidepressant-class compound) specifically FDA-approved for this indication, requiring alcohol avoidance given hypotension and syncope risk. Which drug is this?

A. Bremelanotide

B. Testosterone

C. Flibanserin

D. Sildenafil

E. Bupropion

188. A premenopausal patient with hypoactive sexual desire disorder desires an as-needed subcutaneous injectable melanocortin receptor agonist, administered prior to anticipated sexual activity rather than daily. Which drug is this?

A. Flibanserin

B. Testosterone

C. Sildenafil

D. Bupropion

E. Bremelanotide

189. A postmenopausal patient with moderate-to-severe dyspareunia due to vulvovaginal atrophy, preferring a nonestrogen option, desires an intravaginal steroid that is locally converted to both estrogens and androgens within vaginal tissue. Which drug is this?

A. Vaginal estrogen cream

B. Ospemifene

C. Conjugated estrogens

D. Raloxifene

E. Prasterone

190. A pregnant patient with vulvovaginal candidiasis desires a topical azole antifungal considered first-line and safe in pregnancy, an alternative to oral fluconazole (which carries teratogenicity concerns at higher doses). Which drug is this?

A. Clotrimazole troche

B. Miconazole

C. Terconazole

D. Nystatin

E. Tinidazole

191. A nonpregnant patient with vulvovaginal candidiasis desires an intravaginal triazole antifungal cream or suppository, an alternative azole to miconazole and clotrimazole with a similar local mechanism. Which drug is this?

A. Terconazole

B. Nystatin

C. Tinidazole

D. Metronidazole

E. Clindamycin vaginal

192. A nonpregnant patient with recurrent bacterial vaginosis or vulvovaginal candidiasis refractory to standard azole therapy desires an intravaginal suppository with antiseptic and mild antifungal/antibacterial properties, an older, inexpensive adjunct option. Which drug is this?

A. Terconazole

B. Miconazole

C. Metronidazole gel

D. Clindamycin vaginal cream

E. Boric acid (vaginal)

193. A patient with type 1 diabetes on an insulin pump requires a rapid-acting insulin analog with the fastest onset among rapid-acting options, useful for pump therapy given its quick absorption profile after subcutaneous infusion. Which insulin is this?

A. Insulin degludec

B. Insulin glargine

C. Insulin lispro

D. NPH insulin

E. Insulin detemir

194. A patient with type 1 diabetes desires a rapid-acting insulin analog for pre-meal dosing that carries the specific labeling advantage of being administered immediately before or within 20 minutes after starting a meal, offering post-meal dosing flexibility for unpredictable eating (e.g., in children). Which insulin is this?

A. Insulin glulisine

B. Insulin degludec

C. Insulin glargine

D. NPH insulin

E. Insulin detemir

195. A patient with type 2 diabetes desires a once-daily ultra-long-acting basal insulin analog with the flattest, most stable time-action profile among basal insulins, providing more than 24 hours of duration and reduced nocturnal hypoglycemia risk compared to older long-acting analogs. Which insulin is this?

A. Insulin degludec

B. Insulin glulisine

C. NPH insulin

D. Insulin aspart

E. Insulin lispro

196. A patient with type 2 diabetes and a sulfonylurea allergy history desires a different sulfonylurea with the highest risk of hypoglycemia and weight gain among second-generation agents, generally used with caution in elderly patients. Which drug is this?

A. Metformin

B. Sitagliptin

C. Acarbose

D. Pioglitazone

E. Glimepiride

197. A patient with type 2 diabetes desires an older, inexpensive second-generation sulfonylurea, dosed once or twice daily, that remains widely used in resource-limited settings despite newer, costlier options. Which drug is this?

A. Repaglinide

B. Nateglinide

C. Sitagliptin

D. Glyburide

E. Canagliflozin

198. A patient with type 2 diabetes desires an older thiazolidinedione that was withdrawn from many markets or heavily restricted due to an associated increased risk of myocardial infarction identified in post-marketing meta-analyses, distinguishing it from pioglitazone (which lacks this specific signal). Which drug is this?

A. Empagliflozin

B. Metformin

C. Exenatide

D. Rosiglitazone

E. Glipizide

199. A patient with type 2 diabetes desires a first-generation GLP-1 receptor agonist requiring twice-daily subcutaneous injection, the original drug in this class, now less commonly prescribed given availability of once-weekly formulations. Which drug is this?

A. Semaglutide

B. Dulaglutide

C. Exenatide

D. Liraglutide

E. Tirzepatide

200. A patient with type 2 diabetes and coexisting type 1 diabetes management desires a novel dual SGLT1/SGLT2 inhibitor, approved as adjunctive therapy to insulin in type 1 diabetes given its additional SGLT1-mediated reduction in intestinal glucose absorption. Which drug is this?

A. Dapagliflozin

B. Empagliflozin

C. Sotagliflozin

D. Canagliflozin

E. Ertugliflozin

201. A patient with type 1 diabetes on intensive insulin therapy desires an adjunctive amylin analog, injected before meals alongside insulin, that slows gastric emptying and suppresses inappropriate postprandial glucagon secretion. Which drug is this?

A. Liraglutide

B. Pramlintide

C. Sitagliptin

D. Acarbose

E. Repaglinide

202. A neonate with congenital hyperinsulinism and refractory hypoglycemia requires an oral agent that opens pancreatic beta-cell ATP-sensitive potassium channels, suppressing insulin release, used as first-line medical therapy before considering pancreatectomy. Which drug is this?

A. Octreotide

B. Glucagon

C. Somatostatin

D. Diazoxide (oral)

E. Insulin glargine

203. A patient with hypothyroidism specifically requests an older, animal-derived thyroid hormone preparation containing a fixed ratio of T4 and T3 extracted from porcine thyroid glands, generally not preferred by endocrinologists given inconsistent hormone content between batches. Which preparation is this?

A. Liothyronine

B. Desiccated thyroid

C. Levothyroxine

D. Methimazole

E. Propylthiouracil

204. A patient in a region with endemic goiter from dietary iodine deficiency is found instead to have goitrogen-induced hypothyroidism from a competitive inhibitor of the sodium-iodide symporter, historically used therapeutically (now largely abandoned) to treat hyperthyroidism by blocking iodine uptake into the thyroid. Which agent is this?

A. Radioactive iodine

B. Potassium iodide (Lugol's solution)

C. Methimazole

D. Propylthiouracil

E. Potassium perchlorate

205. A patient with acromegaly inadequately controlled on a first-generation somatostatin receptor ligand desires a newer agent with broader somatostatin receptor subtype binding (including SSTR5), potentially more effective in select first-generation-resistant tumors. Which drug is this?

A. Octreotide

B. Cabergoline

C. Pasireotide

D. Pegvisomant

E. Bromocriptine

206. A patient with metastatic, inoperable adrenocortical carcinoma requires an adrenolytic agent that selectively destroys adrenal cortical cells, used both for tumor control and adjuvant therapy, requiring careful monitoring of drug levels given a narrow therapeutic window. Which drug is this?

A. Ketoconazole

B. Mitotane

C. Metyrapone

D. Osilodrostat

E. Etomidate

207. A child with growth hormone deficiency confirmed by stimulation testing requires recombinant replacement therapy, given as daily subcutaneous injections, to support normal linear growth. Which drug is this?

A. Mecasermin

B. Somatropin

C. Desmopressin

D. Pegvisomant

E. Octreotide

208. A child with severe primary IGF-1 deficiency and growth hormone receptor insensitivity (Laron syndrome) requires recombinant IGF-1 replacement directly, since growth hormone therapy itself would be ineffective given the receptor defect. Which drug is this?

A. Somatropin

B. Octreotide

C. Pegvisomant

D. Desmopressin

E. Mecasermin

209. A hospitalized patient with severe hyponatremia due to SIADH, refractory to fluid restriction, requires an IV vasopressin V2-receptor antagonist (vaptan), used cautiously with close sodium monitoring to avoid overly rapid correction. Which drug is this?

A. Conivaptan

B. Tolvaptan

C. Fludrocortisone

D. Hydrocortisone

E. Desmopressin

210. A patient started on an older first-generation sulfonylurea for type 2 diabetes develops hyponatremia, later attributed to the drug's off-target potentiation of antidiuretic hormone effect at the renal collecting duct, a recognized adverse effect more prominent with this older agent than with newer sulfonylureas. Which drug is this?

A. Chlorpropamide

B. Metformin

C. Sitagliptin

D. Pioglitazone

E. Acarbose

211. A patient with open-angle glaucoma and sulfa allergy concerns is prescribed a topical carbonic anhydrase inhibitor eye drop, distinct from dorzolamide, reducing aqueous humor production. Which drug is this?

A. Timolol

B. Brinzolamide

C. Latanoprost

D. Brimonidine

E. Pilocarpine

212. A patient with open-angle glaucoma desires a topical nonselective beta-blocker eye drop, an alternative to timolol and betaxolol, reducing aqueous humor production through the same general beta-blockade mechanism. Which drug is this?

A. Latanoprostene bunod

B. Carteolol

C. Netarsudil

D. Apraclonidine

E. Dorzolamide

213. A patient with open-angle glaucoma inadequately controlled on latanoprost desires a newer prostaglandin analog with an additional nitric oxide-donating moiety, providing dual reduction in aqueous humor production and increased outflow via a second mechanism. Which drug is this?

A. Travoprost (ophthalmic)

B. Bimatoprost (ophthalmic)

C. Unoprostone (ophthalmic)

D. Carbachol (ophthalmic)

E. Latanoprostene bunod

214. A patient with narrow-angle glaucoma requiring miosis desires a direct-acting cholinergic agonist eye drop with both muscarinic and nicotinic activity, providing a more potent and longer-acting miotic effect than pilocarpine. Which drug is this?

A. Brimonidine

B. Apraclonidine

C. Timolol

D. Carbachol

E. Latanoprost

215. A patient with bacterial conjunctivitis desires a topical fourth-generation fluoroquinolone eye drop with enhanced gram-positive coverage compared to earlier-generation fluoroquinolones, dosed less frequently given prolonged corneal tissue retention. Which drug is this?

A. Ciprofloxacin ophthalmic

B. Ofloxacin otic

C. Besifloxacin (ophthalmic)

D. Moxifloxacin ophthalmic

E. Gatifloxacin ophthalmic

216. A patient with bacterial conjunctivitis desires an older, inexpensive sulfonamide-class topical antibiotic eye drop, still occasionally used despite growing bacterial resistance limiting its reliability as first-line therapy. Which drug is this?

A. Tobramycin ophthalmic

B. Erythromycin ophthalmic

C. Bacitracin ophthalmic ointment

D. Sulfacetamide (ophthalmic)

E. Trifluridine

217. A patient with fungal keratitis, most commonly from Fusarium species after contact lens-related trauma, requires a topical antifungal eye drop, the only FDA-approved agent specifically for this indication. Which drug is this?

A. Fluconazole

B. Natamycin

C. Voriconazole

D. Amphotericin B

E. Itraconazole

218. A patient with herpes simplex keratitis requires a topical antiviral eye drop, one of the few FDA-approved topical ophthalmic antivirals, requiring frequent dosing (up to 9 times daily) during active infection. Which drug is this?

A. Valacyclovir

B. Famciclovir

C. Trifluridine

D. Acyclovir

E. Foscarnet

219. A patient with allergic conjunctivitis desires a topical antihistamine eye drop with additional mast cell-stabilizing properties, providing both immediate relief and longer-term prophylactic benefit, an alternative to olopatadine. Which drug is this?

A. Ketotifen ophthalmic

B. Azelastine nasal spray

C. Cetirizine

D. Levocetirizine

E. Emedastine (ophthalmic)

220. A patient with allergic conjunctivitis desires a topical antihistamine/mast cell stabilizer eye drop with a long duration of action allowing twice-daily dosing, an alternative to olopatadine with a similar dual mechanism. Which drug is this?

A. Ketotifen ophthalmic

B. Cyclosporine ophthalmic

C. Bepotastine (ophthalmic)

D. Lifitegrast

E. Lodoxamide

221. A patient with Sjogren syndrome and severe xerostomia (dry mouth) requires an oral muscarinic agonist to stimulate salivary gland secretion, distinct from pilocarpine, with a longer duration of action. Which drug is this?

A. Bethanechol

B. Cevimeline

C. Neostigmine

D. Pyridostigmine

E. Physostigmine

222. A patient with chronic otitis externa in a perforated tympanic membrane setting (where ototoxicity risk limits standard otic drop choices) requires a topical fluoroquinolone otic drop, one of the few considered safe for use with a non-intact tympanic membrane. Which drug is this?

A. Neomycin otic

B. Ofloxacin otic

C. Gentamicin otic

D. Tobramycin otic

E. Finafloxacin (otic)

223. A patient with chronic otitis externa desires a simple, inexpensive acidifying otic solution that restores the normal acidic pH of the ear canal, inhibiting bacterial and fungal growth without antibiotic content. Which agent is this?

A. Hydrogen peroxide

B. Mineral oil

C. Carbamide peroxide

D. Chlorhexidine

E. Acetic acid (otic)

224. A patient with chronic otitis externa and significant canal inflammation desires a topical corticosteroid otic drop, formulated in an oil-based vehicle allowing use with ear wicks, reducing inflammation and pruritus. Which drug is this?

A. Mometasone nasal spray

B. Fluocinolone (otic)

C. Betamethasone

D. Dexamethasone

E. Triamcinolone

225. A patient with allergic rhinitis desires an over-the-counter topical nasal decongestant, an alternative to oxymetazoline with a shorter duration of action, still carrying the same rebound congestion (rhinitis medicamentosa) risk with prolonged use beyond 3 days. Which drug is this?

A. Cetirizine

B. Levocetirizine

C. Xylometazoline (nasal)

D. Azelastine nasal spray

E. Mometasone nasal spray

226. A patient with open-angle glaucoma desires an older, less commonly used nonselective beta-blocker eye drop, similar to timolol, occasionally chosen for its intrinsic sympathomimetic activity profile though largely supplanted by newer options. Which drug is this?

A. Betaxolol

B. Carteolol ophthalmic

C. Brimonidine

D. Apraclonidine

E. Levobunolol

227. A patient with open-angle glaucoma desires an older prostaglandin-related eye drop with a distinct mechanism (reducing episcleral venous pressure rather than primarily increasing uveoscleral outflow), now rarely used given modest efficacy relative to newer prostaglandin analogs. Which drug is this?

A. Latanoprost

B. Bimatoprost

C. Travoprost

D. Latanoprostene bunod

E. Unoprostone

228. A patient with bacterial conjunctivitis desires a fourth-generation fluoroquinolone eye drop, an alternative to moxifloxacin and besifloxacin, also available in a systemic oral formulation unlike besifloxacin. Which drug is this?

A. Ciprofloxacin ophthalmic

B. Ofloxacin otic

C. Gatifloxacin ophthalmic

D. Tobramycin ophthalmic

E. Natamycin

229. A patient with chronic kidney disease-related iron deficiency anemia requires IV iron replacement with a formulation allowing large single-dose administration (up to 510 mg) with a low reported rate of hypersensitivity reactions, distinct from ferric carboxymaltose. Which agent is this?

A. Ferumoxytol

B. Iron sucrose

C. Ferrous sulfate

D. Sodium ferric gluconate

E. Iron dextran

230. A patient with chemotherapy-induced anemia requires a newer erythropoiesis-stimulating agent with an extended half-life allowing dosing as infrequently as once monthly, distinct from both epoetin alfa and darbepoetin alfa. Which drug is this?

A. Methoxy PEG-epoetin beta

B. Erythropoietin (IV/SC)

C. Darbepoetin alfa (SC)

D. Romiplostim (SC)

E. Eltrombopag (oral)

231. A patient with myelodysplastic syndrome-associated anemia refractory to erythropoiesis-stimulating agents requires a novel erythroid maturation agent that binds TGF-beta superfamily ligands to promote late-stage red blood cell maturation. Which drug is this?

A. Darbepoetin alfa

B. Eltrombopag

C. Romiplostim

D. Avatrombopag

E. Luspatercept

232. A patient with paroxysmal nocturnal hemoglobinuria requires a monoclonal antibody that inhibits terminal complement component C5, the original drug in this class requiring dosing every 2 weeks after initial loading, now often replaced by its longer-acting successor. Which drug is this?

A. Ravulizumab

B. Rituximab

C. Obinutuzumab

D. Eculizumab

E. Daratumumab

233. A patient with hereditary angioedema or significant fibrinolytic bleeding requires an oral or IV antifibrinolytic agent, an alternative to tranexamic acid with a similar lysine-analog mechanism but shorter half-life requiring more frequent dosing. Which drug is this?

A. Vitamin K

B. Protamine sulfate

C. Desmopressin

D. Factor VIII concentrate

E. Aminocaproic acid

234. A patient with hemophilia A or B and high-titer inhibitors requires an IV bypassing agent that activates the coagulation cascade downstream of factors VIII and IX, used for breakthrough bleeding when standard factor replacement is ineffective. Which drug is this?

A. Factor VIII concentrate

B. Factor IX concentrate

C. Emicizumab

D. Tranexamic acid

E. Recombinant factor VIIa

235. A patient with type 3 von Willebrand disease and severe active bleeding requires direct replacement of both von Willebrand factor and factor VIII, since desmopressin is ineffective given minimal endogenous vWF stores to release. Which product is this?

A. Von Willebrand factor concentrate

B. Desmopressin (IV/intranasal)

C. Factor IX concentrate (IV)

D. Recombinant factor VIIa (IV)

E. Tranexamic acid (IV/oral)

236. A patient undergoing urgent percutaneous coronary intervention who cannot receive an oral P2Y12 inhibitor requires an IV P2Y12 inhibitor with a very short half-life allowing rapid offset, useful as a bridge before or during the procedure. Which drug is this?

A. Clopidogrel (oral)

B. Cangrelor

C. Prasugrel (oral)

D. Ticagrelor (oral)

E. Aspirin

237. A patient with chronic myeloid leukemia refractory or intolerant to imatinib requires a second-generation tyrosine kinase inhibitor with activity against most imatinib-resistant BCR-ABL mutations, though not the T315I gatekeeper mutation. Which drug is this?

A. Bortezomib

B. Lenalidomide

C. Rituximab

D. Carfilzomib

E. Dasatinib

238. A patient with chronic myeloid leukemia harboring the T315I gatekeeper mutation, conferring resistance to dasatinib and other earlier tyrosine kinase inhibitors, requires a third-generation agent specifically active against this mutation. Which drug is this?

A. Imatinib

B. Dasatinib

C. Fedratinib

D. Ponatinib

E. Acalabrutinib

239. A patient with intermediate- or high-risk myelofibrosis and inadequate response to ruxolitinib requires an alternative oral JAK2 inhibitor, carrying a boxed warning for serious and fatal encephalopathy (including Wernicke encephalopathy) requiring thiamine monitoring. Which drug is this?

A. Imatinib

B. Fedratinib

C. Hydroxyurea

D. Dasatinib

E. Ponatinib

240. A patient with chronic lymphocytic leukemia requires a second-generation oral Bruton tyrosine kinase (BTK) inhibitor with improved kinase selectivity and reduced off-target cardiac (atrial fibrillation) risk compared to ibrutinib. Which drug is this?

A. Ibrutinib

B. Acalabrutinib

C. Venetoclax

D. Rituximab

E. Obinutuzumab

241. A patient with chronic lymphocytic leukemia desires a glycoengineered, type II anti-CD20 monoclonal antibody with enhanced antibody-dependent cellular cytotoxicity and direct cell death induction compared to rituximab, often combined with venetoclax or chlorambucil. Which drug is this?

A. Obinutuzumab

B. Rituximab

C. Acalabrutinib

D. Ibrutinib

E. Venetoclax

242. A patient with relapsed or refractory multiple myeloma requires a second-generation IV proteasome inhibitor with more selective, irreversible proteasome binding and reduced peripheral neuropathy risk compared to bortezomib. Which drug is this?

A. Bortezomib

B. Carfilzomib

C. Lenalidomide

D. Daratumumab

E. Isatuximab

243. A patient with relapsed or refractory multiple myeloma desires an alternative anti-CD38 monoclonal antibody to daratumumab, sharing the same target and general mechanism but a distinct binding epitope. Which drug is this?

A. Isatuximab

B. Daratumumab

C. Carfilzomib

D. Bortezomib

E. Lenalidomide

244. A patient with CKD stage 4 and secondary hyperparathyroidism requires a newer prohormone vitamin D analog (25-hydroxyvitamin D3) that undergoes renal 1-alpha-hydroxylation to the active form, useful specifically when residual renal hydroxylation capacity remains adequate. Which drug is this?

A. Calcitriol

B. Paricalcitol

C. Doxercalciferol

D. Cholecalciferol

E. Calcifediol

245. A patient with mild vitamin D insufficiency and preserved kidney function desires over-the-counter vitamin D3 supplementation, requiring both hepatic and renal hydroxylation for full activation, appropriate given intact organ function. Which agent is this?

A. Calcitriol

B. Paricalcitol

C. Calcifediol

D. Cholecalciferol

E. Doxercalciferol

246. A patient with documented vitamin D2 deficiency (as opposed to D3) requires high-dose prescription ergocalciferol repletion, typically given as a weekly high-dose regimen for a defined repletion course. Which vitamin is this?

A. Ergocalciferol

B. Cholecalciferol

C. Calcifediol

D. Calcitriol

E. Paricalcitol

247. A transplant recipient experiencing severe, steroid-refractory acute cellular rejection requires a polyclonal antibody preparation targeting multiple T-cell surface antigens, providing potent lymphocyte depletion for induction or rejection treatment. Which agent is this?

A. Basiliximab (IV)

B. Belatacept (IV)

C. Muromonab-CD3 (IV)

D. Antithymocyte globulin

E. Tacrolimus (oral)

248. A transplant program historically used an older monoclonal antibody targeting the CD3 receptor on T lymphocytes for severe rejection treatment, largely discontinued from the market given cytokine release syndrome risk and availability of better-tolerated alternatives. Which drug is this?

A. Muromonab-CD3

B. Antithymocyte globulin

C. Basiliximab

D. Belatacept

E. Rituximab

249. A dialysis patient with hyperphosphatemia desires an adjunct oral agent that inhibits intestinal sodium-phosphate cotransporters, distinct in mechanism from calcium-based and non-calcium phosphate binders, sometimes used to reduce binder pill burden. Which drug is this?

A. Nicotinamide

B. Sevelamer

C. Lanthanum carbonate

D. Ferric citrate

E. Calcium acetate

250. A patient on continuous renal replacement therapy (CRRT) requires regional anticoagulation of the extracorporeal circuit that avoids systemic anticoagulation bleeding risk, working by chelating ionized calcium within the circuit. Which agent is this?

A. Unfractionated heparin (systemic)

B. Calcium gluconate

C. Argatroban (systemic)

D. Bivalirudin (systemic)

E. Sodium citrate

251. A hemodialysis patient with iron deficiency anemia requires IV iron replacement administered as a low-dose formulation given with each dialysis session, an older, well-established option distinct from once-monthly or single-large-dose formulations. Which agent is this?

A. Ferumoxytol (IV)

B. Sodium ferric gluconate

C. Ferric citrate (oral)

D. Iron isomaltoside (IV)

E. Iron sucrose (IV)

252. A hemodialysis patient with moderate-to-severe CKD-associated pruritus refractory to standard measures requires a novel IV kappa-opioid receptor agonist administered after each dialysis session. Which drug is this?

A. Nalbuphine

B. Naloxone

C. Naltrexone

D. Gabapentin

E. Difelikefalin

253. A patient with cholestatic or opioid-induced pruritus desires an oral mixed opioid agonist-antagonist (kappa agonist, mu antagonist) used off-label for refractory itch, distinct from the newer IV kappa-selective agent used in dialysis patients. Which drug is this?

A. Difelikefalin

B. Hydroxyzine

C. Nalbuphine

D. Naltrexone

E. Naloxone

254. A patient with iron deficiency anemia and prior hypersensitivity reaction to iron dextran requires an alternative IV iron formulation with a low-molecular-weight carbohydrate shell associated with a favorable safety profile, allowing large single-dose administration. Which agent is this?

A. Sodium ferric gluconate complex

B. Ferric citrate

C. Ferumoxytol

D. Iron sucrose

E. Iron isomaltoside

255. A patient with hepatorenal syndrome type 1 requires an IV vasopressin analog that causes splanchnic vasoconstriction, improving renal perfusion by redistributing blood flow away from the dilated splanchnic circulation, used alongside albumin. Which drug is this?

A. Desmopressin

B. Terlipressin

C. Conivaptan

D. Midodrine

E. Octreotide

256. A patient with hepatorenal syndrome or large-volume paracentesis requires IV volume expansion with a plasma protein-based colloid solution, used specifically to prevent post-paracentesis circulatory dysfunction. Which agent is this?

A. Terlipressin

B. Normal saline

C. Albumin (IV)

D. Hydroxyethyl starch

E. Lactated Ringer's

257. A patient with hypertension desires a thiazide-like diuretic distinct from chlorthalidone and metolazone, with the longest half-life among available thiazide-type agents and additional evidence for stroke risk reduction in specific trials. Which drug is this?

A. Hydrochlorothiazide

B. Indapamide

C. Chlorthalidone

D. Metolazone

E. Furosemide

258. A hemodialysis patient with dialysis-related muscle cramps and fatigue, found to have low plasma carnitine levels from dialytic losses, requires supplementation with the amino acid derivative responsible for fatty acid transport into mitochondria. Which agent is this?

A. Coenzyme Q10

B. L-carnitine

C. Thiamine

D. Riboflavin

E. Alpha-lipoic acid

259. A patient with mild erectile dysfunction desires an older oral alpha-2 adrenergic antagonist with modest efficacy, largely supplanted by PDE5 inhibitors but occasionally still used or studied as an adjunct. Which drug is this?

A. Yohimbine

B. Phentolamine (oral)

C. Prazosin

D. Terazosin

E. Doxazosin

260. A patient with erectile dysfunction refractory to oral PDE5 inhibitors desires intracavernosal injection therapy with a nonspecific smooth muscle relaxant (phosphodiesterase inhibitor), often combined with phentolamine and alprostadil in compounded trimix formulations. Which drug is this?

A. Alprostadil

B. Sildenafil

C. Yohimbine

D. Papaverine

E. Tadalafil

261. A patient with erectile dysfunction receiving intracavernosal injection therapy requires an alpha-adrenergic antagonist component (in compounded trimix formulations) to counteract sympathetically-mediated smooth muscle contraction, distinct from papaverine and alprostadil. Which drug is this?

A. Phentolamine

B. Terazosin

C. Tamsulosin

D. Yohimbine

E. Prazosin

262. A male patient with hypogonadotropic hypogonadism desires fertility-preserving therapy that mimics luteinizing hormone activity, stimulating testicular testosterone production and spermatogenesis without suppressing the hypothalamic-pituitary-gonadal axis the way exogenous testosterone would. Which agent is this?

A. Testosterone replacement

B. Clomiphene citrate

C. hCG (IM/SC)

D. Leuprolide

E. Follitropin alfa

263. A child with primary nocturnal enuresis refractory to behavioral interventions and desmopressin requires a tricyclic antidepressant with established efficacy for this indication, working partly through anticholinergic effects and altered sleep architecture. Which drug is this?

A. Amitriptyline

B. Imipramine

C. Nortriptyline

D. Doxepin

E. Desipramine

264. A patient with pheochromocytoma requires preoperative alpha-blockade with an older, irreversible, nonselective alpha-adrenergic antagonist prior to surgical resection, providing more complete and sustained blockade than reversible selective agents. Which drug is this?

A. Terazosin (oral)

B. Prazosin (oral)

C. Doxazosin (oral)

D. Phenoxybenzamine

E. Tamsulosin (oral)

265. A patient with BPH and coexisting hypertension desires an oral selective alpha-1 blocker offering dual benefit for both conditions, requiring gradual dose titration given first-dose orthostatic hypotension risk, distinct from the more uroselective agents. Which drug is this?

A. Terazosin

B. Tamsulosin

C. Silodosin

D. Alfuzosin

E. Doxazosin

266. A patient with overactive bladder desires an older oral antimuscarinic agent, a quaternary ammonium compound with poor CNS penetration (reducing central anticholinergic side effects) but variable and limited bioavailability. Which drug is this?

A. Oxybutynin

B. Propantheline

C. Tolterodine

D. Solifenacin

E. Darifenacin

267. A pregnant patient with an uncomplicated lower urinary tract infection in a region where it remains available requires an oral prodrug beta-lactam antibiotic specifically studied and used for uncomplicated cystitis, hydrolyzed to its active form after absorption. Which drug is this?

A. Cefpodoxime

B. Nitrofurantoin

C. Fosfomycin

D. Amoxicillin

E. Pivmecillinam

268. A patient with a complicated UTI or pyelonephritis-adjacent presentation intolerant to fluoroquinolones requires an oral third-generation cephalosporin with reasonable urinary tract penetration, an alternative oral step-down option after initial parenteral therapy. Which drug is this?

A. Ceftriaxone

B. Cefpodoxime

C. Cefepime

D. Cefdinir

E. Ceftaroline

269. A patient with neurogenic detrusor overactivity refractory to oral antimuscarinics requires intravesical injection of a neurotoxin that inhibits presynaptic acetylcholine release at the neuromuscular junction, providing prolonged symptom relief lasting several months per treatment. Which agent is this?

A. Botulinum toxin

B. Mirabegron

C. Vibegron

D. Oxybutynin

E. Tolterodine

270. A patient with overactive bladder desires an oral antimuscarinic available in both immediate-release and extended-release formulations, one of the original second-generation agents in this class with relative bladder selectivity over salivary gland effects. Which drug is this?

A. Oxybutynin

B. Propantheline

C. Trospium

D. Fesoterodine

E. Tolterodine

271. A patient with moderate inflammatory acne desires a newer, narrow-spectrum oral tetracycline-class antibiotic developed specifically for dermatologic use, with less impact on gut microbiota compared to older broad-spectrum tetracyclines. Which drug is this?

A. Doxycycline

B. Sarecycline

C. Minocycline

D. Tetracycline

E. Tigecycline

272. A patient with acne desires a newer topical antiandrogen that blocks androgen receptors in the sebaceous gland directly, reducing sebum production without significant systemic androgen-blocking effects. Which drug is this?

A. Spironolactone (systemic)

B. Finasteride

C. Flutamide

D. Bicalutamide

E. Clascoterone

273. A patient with atopic dermatitis desires a topical JAK inhibitor cream, providing an alternative nonsteroidal anti-inflammatory mechanism to topical calcineurin inhibitors, approved for short-term and non-continuous chronic use. Which drug is this?

A. Pimecrolimus

B. Tacrolimus topical

C. Ruxolitinib

D. Crisaborole

E. Tapinarof

274. A patient with plaque psoriasis or atopic dermatitis desires a novel topical aryl hydrocarbon receptor agonist, a steroid-free option with a novel mechanism distinct from calcineurin inhibitors, PDE4 inhibitors, and JAK inhibitors. Which drug is this?

A. Crisaborole

B. Ruxolitinib topical

C. Tapinarof

D. Pimecrolimus

E. Calcipotriene

275. A patient with severe plaque psoriasis desires a superpotent (class I) topical corticosteroid for short-term use on thick, resistant plaques, avoiding use on thin-skinned areas (face, groin) given atrophy risk. Which drug is this?

A. Clobetasol

B. Triamcinolone

C. Hydrocortisone

D. Calcipotriene

E. Halobetasol

276. A patient with tinea capitis (scalp dermatophyte infection in a child) requires an older oral antifungal specifically effective for this indication given deep hair follicle penetration, since topical antifungals alone are inadequate. Which drug is this?

A. Terbinafine

B. Fluconazole

C. Itraconazole

D. Ketoconazole

E. Griseofulvin

277. A patient with mild-to-moderate distal subungual onychomycosis desires a topical antifungal nail solution, an alternative to oral terbinafine for patients wishing to avoid systemic therapy, despite generally lower cure rates than oral treatment. Which drug is this?

A. Ciclopirox

B. Sertaconazole

C. Efinaconazole

D. Terbinafine (oral)

E. Griseofulvin

278. A patient with head lice resistant to over-the-counter permethrin requires a prescription topical pediculicide, an organophosphate-class agent with ovicidal activity, applied to dry hair given flammability with heat exposure. Which drug is this?

A. Permethrin

B. Malathion

C. Ivermectin topical

D. Spinosad

E. Crotamiton

279. A patient with scabies who cannot tolerate or has failed permethrin requires an alternative topical scabicide with additional antipruritic properties, applied daily for several days as an alternative regimen. Which drug is this?

A. Malathion topical

B. Lindane

C. Ivermectin oral

D. Permethrin

E. Crotamiton

280. A patient with mild-to-moderate onychomycosis or tinea versicolor desires a topical antifungal available as both a nail lacquer and a cream/shampoo formulation, a broad-spectrum agent with activity against dermatophytes, yeasts, and some bacteria. Which drug is this?

A. Efinaconazole

B. Sertaconazole

C. Terbinafine topical

D. Griseofulvin

E. Ciclopirox

281. A patient with tinea corporis or cutaneous candidiasis desires a topical imidazole antifungal cream with additional antibacterial activity against some gram-positive organisms, an alternative to clotrimazole or miconazole. Which drug is this?

A. Sertaconazole

B. Ciclopirox

C. Efinaconazole

D. Terbinafine topical

E. Griseofulvin

282. A patient with severe, recalcitrant plaque psoriasis desires an alternative superpotent (class I) topical corticosteroid to clobetasol, similarly restricted to short-term use on thick plaques given comparable atrophy risk. Which drug is this?

A. Triamcinolone

B. Hydrocortisone

C. Calcipotriene

D. Mometasone

E. Halobetasol

283. A patient with transfusion-dependent thalassemia and iron overload, intolerant to deferoxamine and deferasirox, requires an alternative oral iron chelator, historically associated with agranulocytosis risk requiring weekly ANC monitoring. Which drug is this?

A. Dimercaprol

B. Deferiprone

C. Trientine

D. Calcium disodium EDTA

E. Succimer

284. A patient with severe local anesthetic systemic toxicity (LAST) presenting with cardiac arrest or refractory seizures requires IV administration of a lipophilic-drug-sequestering therapy, acting as a 'lipid sink' to reduce free plasma concentration of the offending agent. Which therapy is this?

A. Sodium bicarbonate

B. Calcium gluconate

C. Glucagon

D. Methylene blue

E. IV lipid emulsion

285. A patient on warfarin with life-threatening bleeding requires rapid reversal with a concentrated clotting factor product containing factors II, VII, IX, and X, providing faster correction than fresh frozen plasma alone. Which product is this?

A. Vitamin K

B. 4-factor PCC

C. Idarucizumab

D. Andexanet alfa

E. Fresh frozen plasma

286. A patient with a rare clotting factor deficiency for which no specific concentrate exists, presenting with active bleeding, requires transfusion of a blood product containing all clotting factors in their native plasma concentrations. Which product is this?

A. 4-factor PCC

B. Cryoprecipitate

C. Platelets

D. Packed red blood cells

E. Fresh frozen plasma

287. A patient develops an acute dystonic reaction (torticollis, oculogyric crisis) after receiving a dopamine antagonist antiemetic, requiring IV administration of an anticholinergic antihistamine to rapidly reverse the reaction. Which drug is this?

A. Diphenhydramine

B. Promethazine

C. Trimethobenzamide

D. Metoclopramide

E. Ondansetron

288. A patient with ACE inhibitor-induced angioedema refractory to antihistamines, corticosteroids, and epinephrine requires a subcutaneous bradykinin B2-receptor antagonist targeting the bradykinin-mediated mechanism specific to this angioedema subtype. Which drug is this?

A. Epinephrine

B. Diphenhydramine

C. Icatibant (SC)

D. C1 esterase inhibitor concentrate

E. Ecallantide

289. A patient with inhalational anthrax exposure requires an IV monoclonal antibody that neutralizes anthrax toxin by binding protective antigen, used as an adjunct to antibiotic therapy, one of two FDA-approved agents in this specific class. Which drug is this?

A. Raxibacumab

B. Obiltoxaximab

C. Botulinum antitoxin

D. Diphtheria antitoxin

E. Digoxin immune Fab

290. A patient with inhalational anthrax exposure requires the other FDA-approved IV monoclonal antibody targeting anthrax protective antigen, developed and approved separately from obiltoxaximab, also used as an adjunct to antibiotics. Which drug is this?

A. Obiltoxaximab

B. Botulism immune globulin

C. Vaccinia immune globulin

D. Botulinum antitoxin

E. Raxibacumab (IV)

291. An infant with suspected infant botulism (constipation, poor feeding, weak cry, hypotonia) requires a human-derived immune globulin product specifically developed and approved for this pediatric population, distinct from the equine-derived antitoxin used in adult foodborne or wound botulism. Which product is this?

A. Botulinum antitoxin heptavalent

B. Vaccinia immune globulin

C. Diphtheria antitoxin

D. Raxibacumab

E. Botulism immune globulin

292. A patient develops a severe complication following smallpox (vaccinia) vaccination, such as eczema vaccinatum or progressive vaccinia, requiring treatment with a human-derived immune globulin specific to this vaccine virus. Which product is this?

A. Botulinum antitoxin

B. Raxibacumab

C. Vaccinia immune globulin

D. Obiltoxaximab

E. Botulism immune globulin

293. A patient with acute cyanide poisoning requires IV administration of an agent that induces methemoglobin formation, which competitively binds cyanide away from cytochrome oxidase, given as part of the classic cyanide antidote kit alongside sodium thiosulfate. Which drug is this?

A. Amyl nitrite

B. Sodium nitrite (IV)

C. Hydroxocobalamin

D. Methylene blue

E. Sodium thiosulfate

294. A patient in the southwestern United States is bitten by a coral snake, presenting with minimal local tissue findings but risk of delayed neurotoxicity (bulbar symptoms, respiratory failure), requiring species-specific antivenom distinct from pit viper (crotalid) antivenom. Which product is this?

A. Crotalidae polyvalent immune Fab

B. Black widow spider antivenom

C. Coral snake antivenom

D. Scorpion antivenom

E. Digoxin immune Fab

295. A child in Arizona is stung by a Centruroides scorpion, developing severe neuromuscular hyperexcitability (roving eye movements, opisthotonus, respiratory distress), requiring species-specific antivenom for this specific scorpion genus. Which product is this?

A. Coral snake antivenom

B. Crotalidae polyvalent immune Fab

C. Scorpion antivenom (Centruroides)

D. Black widow spider antivenom

E. Digoxin immune Fab

296. A patient receiving anthracycline chemotherapy (doxorubicin) develops accidental extravasation at the IV site, requiring a specific IV antidote that reduces tissue damage through topoisomerase II inhibition and iron chelation, given within 6 hours of extravasation. Which drug is this?

A. Mesna

B. Dexrazoxane

C. Deferoxamine

D. Amifostine

E. Leucovorin

297. A patient receiving ifosfamide chemotherapy requires a co-administered uroprotectant that binds and neutralizes urotoxic metabolites (acrolein) within the bladder, preventing hemorrhagic cystitis. Which drug is this?

A. Dexrazoxane

B. Amifostine

C. Leucovorin

D. Deferoxamine

E. Mesna (IV/oral)

298. A critically ill, mechanically ventilated patient requires continuous IV sedation with a rapid-onset, short-acting agent metabolized independent of hepatic or renal function accumulation, allowing quick neurologic assessment with brief interruption, though carrying risk of a rare but serious infusion syndrome with prolonged high-dose use. Which drug is this?

A. Dexmedetomidine

B. Propofol

C. Midazolam

D. Lorazepam

E. Ketamine

299. A patient requiring rapid sequence intubation who has a documented contraindication to succinylcholine (such as hyperkalemia risk) requires a nondepolarizing neuromuscular blocker with the fastest onset among nondepolarizing agents, allowing intubation conditions comparable to succinylcholine. Which drug is this?

A. Vecuronium

B. Cisatracurium

C. Rocuronium

D. Mivacurium

E. Succinylcholine

300. A critically ill, mechanically ventilated patient requires continuous IV sedation with an alpha-2 adrenergic agonist offering sedation with less respiratory depression than propofol or benzodiazepines, additionally providing some analgesic and anxiolytic effect, though bradycardia and hypotension can occur. Which drug is this?

A. Dexmedetomidine

B. Propofol (IV)

C. Midazolam (IV)

D. Fentanyl (IV)

E. Ketamine (IV)

Answers

1. A. Candesartan, an ARB, provides similar renin-angiotensin system blockade and renal protection as lisinopril without the bradykinin-mediated cough seen with ACE inhibitors. Ramipril is another ACE inhibitor, sharing the same cough risk. Diltiazem and amlodipine are calcium channel blockers. Furosemide is a loop diuretic.

2. A. Irbesartan is an ARB used for hypertension and renal protection in diabetic nephropathy; among the ARBs, valsartan and candesartan have the most specific HFrEF outcome trial data as ACE-inhibitor alternatives, but irbesartan remains a reasonable ARB option for hypertension management in this population. Losartan is an alternative ARB. Telmisartan has the longest half-life among ARBs but is not the specific drug being tested.

3. C. Telmisartan has the longest half-life among ARBs (approximately 24 hours), providing more consistent 24-hour blood pressure control and more forgiving pharmacokinetics if a dose is delayed. Losartan has a shorter half-life requiring more precise dosing timing. Valsartan, candesartan, and irbesartan have intermediate half-lives.

4. D. Ramipril has strong post-MI mortality-reduction trial data (HOPE trial) among ACE inhibitors, distinguishing it from lisinopril and enalapril despite sharing the same class mechanism. Captopril is a shorter-acting ACE inhibitor requiring multiple daily doses. Losartan, valsartan, and candesartan are ARBs, a related but distinct class.

5. D. Captopril, the original ACE inhibitor, has a short half-life requiring dosing two to three times daily, and has historically been used (including sublingually) for rapid blood pressure reduction, though this use has fallen out of favor given unpredictable hypotension. Lisinopril, ramipril, and enalapril are longer-acting ACE inhibitors dosed once or twice daily. Losartan is an ARB.

6. E. Fosinopril has dual renal and hepatic elimination pathways, allowing its use without dose adjustment across a wider range of renal function compared to most other ACE inhibitors, which rely predominantly on renal clearance. Lisinopril, ramipril, enalapril, and captopril are primarily renally eliminated, requiring dose adjustment in renal impairment.

7. A. Felodipine, a dihydropyridine calcium channel blocker, has a shorter half-life than amlodipine, allowing more rapid dose titration to effect, though still dosed once daily. Diltiazem and verapamil are nondihydropyridines. Nicardipine and clevidipine are IV formulations used for acute blood pressure management, not chronic oral titration.

8. A. Isradipine has a relatively short half-life among oral dihydropyridine calcium channel blockers, requiring twice-daily dosing and historically associated with reflex tachycardia in immediate-release formulations, similar to the concern with immediate-release nifedipine. Amlodipine and felodipine are longer-acting, once-daily options. Oral nicardipine is less commonly used than the IV formulation.

9. B. Pravastatin is not significantly metabolized by CYP3A4, unlike simvastatin, lovastatin, and atorvastatin, giving it the least CYP3A4-mediated drug interaction potential among statins and making it a reasonable choice when interacting medications limit other statin options. Fluvastatin is metabolized by CYP2C9, a different but still relevant interaction pathway.

10. A. Pitavastatin is a newer statin notable for achieving substantial LDL reduction at low milligram doses, with minimal CYP450 metabolism, offering an alternative for patients with intolerance to other statins. Rosuvastatin and atorvastatin are also high-intensity options but at higher milligram doses. Simvastatin and lovastatin are older, lower-potency options with more interaction potential.

11. D. Colesevelam, a bile acid sequestrant, binds bile acids in the intestine to lower LDL and has an additional, distinct benefit of modestly improving glycemic control in type 2 diabetes, but requires timing separation from other oral medications given nonspecific binding interactions in the gut.

Ezetimibe inhibits cholesterol absorption via a different mechanism. Niacin, gemfibrozil, and fenofibrate primarily target triglycerides.

12. D. Fenofibrate activates PPAR-alpha to lower triglycerides and modestly raise HDL, with a recognized myopathy risk when combined with statins, particularly gemfibrozil (less so fenofibrate, but caution is still warranted with any fibrate-statin combination). Ezetimibe and colesevelam target LDL, not primarily triglycerides. Niacin has fallen out of favor given lack of outcome benefit. Bempedoic acid targets cholesterol synthesis, not triglycerides.

13. A. Inclisiran, a small interfering RNA (siRNA) therapeutic, reduces hepatic PCSK9 synthesis at the mRNA level, requiring dosing only twice yearly (after an initial loading dose) given its durable gene-silencing mechanism, distinguishing it from the monoclonal antibody PCSK9 inhibitors requiring more frequent dosing. Evolocumab and alirocumab are PCSK9 monoclonal antibodies dosed every 2-4 weeks. Bempedoic acid and ezetimibe work through unrelated mechanisms.

14. C. Enoxaparin, a low-molecular-weight heparin, is dosed subcutaneously based on body weight for outpatient VTE treatment, with more predictable pharmacokinetics than unfractionated heparin, generally not requiring routine anti-Xa monitoring except in specific populations (renal impairment, obesity, pregnancy). Unfractionated heparin requires IV infusion and aPTT monitoring for this indication. Argatroban is a direct thrombin inhibitor. Fondaparinux is a related but distinct pentasaccharide.

15. E. Dalteparin, an alternative low-molecular-weight heparin manufactured via a different depolymerization process than enoxaparin, still carries meaningful HIT antibody cross-reactivity risk (as do all LMWHs) and would not be the preferred choice in confirmed HIT -- fondaparinux or a direct thrombin inhibitor like argatroban is generally preferred in that setting, but dalteparin remains a distinct alternative LMWH for standard VTE treatment outside the HIT context. Unfractionated heparin and enoxaparin carry similar or higher HIT cross-reactivity risk.

16. A. Bivalirudin, a direct thrombin inhibitor with a very short half-life (approximately 25 minutes), is used during PCI given its rapid offset of anticoagulant effect once the infusion is stopped, useful for minimizing periprocedural bleeding risk. Argatroban has a longer half-life and is used more in HIT management. Fondaparinux and enoxaparin have longer durations of action. Warfarin is an oral agent with delayed onset/offset.

17. B. Vorapaxar antagonizes the protease-activated receptor-1 (PAR-1), blocking thrombin-mediated platelet activation through a mechanism distinct from P2Y12 inhibitors, and is used as an adjunct to standard dual antiplatelet therapy in select patients with prior MI or peripheral artery disease, though it carries a boxed warning for bleeding including intracranial hemorrhage. Clopidogrel, prasugrel, and ticagrelor are P2Y12 inhibitors. Aspirin inhibits COX-1.

18. C. Cilostazol, a phosphodiesterase-3 inhibitor, increases walking distance in intermittent claudication through combined vasodilatory and antiplatelet effects, but is contraindicated in heart

failure given the class-wide association between PDE3 inhibition and increased mortality in HF patients. Pentoxifylline is an alternative claudication drug with a different (hemorheologic) mechanism, without the same HF contraindication. Dipyridamole is primarily an antiplatelet/vasodilator without the specific claudication indication. Clopidogrel and aspirin are standard antiplatelets without primary claudication indications.

19. A. Pentoxifylline improves blood viscosity and microcirculatory flow through a hemorheologic mechanism (increasing red cell deformability), providing an alternative to cilostazol for claudication in patients with heart failure, though its clinical efficacy is generally considered more modest. Dipyridamole, clopidogrel, and aspirin are antiplatelet agents with different mechanisms.

20. E. Dipyridamole inhibits phosphodiesterase and adenosine reuptake, providing vasodilatory and antiplatelet effects, and has historically been combined with aspirin (as a fixed-dose combination) for secondary stroke prevention. Clopidogrel and prasugrel are P2Y12 inhibitors. Cilostazol is a PDE3 inhibitor with a different primary indication. Pentoxifylline works through a hemorheologic mechanism.

21. E. Midodrine, an oral alpha-1 agonist prodrug, increases peripheral vascular resistance to raise standing blood pressure in neurogenic orthostatic hypotension, but requires patients to remain upright (not supine) for a period after dosing given risk of supine hypertension. Oral phenylephrine has poor bioavailability, limiting its use for this indication. Droxidopa works through a different (norepinephrine precursor) mechanism. Isoproterenol is a pure beta agonist. Angiotensin II is used in septic shock.

22. D. Droxidopa is an oral norepinephrine precursor, converted to active norepinephrine by dopa-decarboxylase, providing an alternative mechanism to midodrine's direct alpha-1 agonism for neurogenic orthostatic hypotension in autonomic failure conditions. Isoproterenol is a pure beta agonist, the opposite hemodynamic goal. Phenylephrine and angiotensin II are used in acute hypotension/shock, not chronic oral orthostatic hypotension management.

23. B. Isoproterenol, a pure beta-adrenergic agonist (both beta-1 and beta-2, without alpha activity), increases heart rate and can serve as a temporizing measure for symptomatic bradycardia or complete heart block while awaiting definitive pacemaker placement. Phenylephrine is a pure alpha agonist, the opposite effect. Vasopressin, dopamine, and norepinephrine have significant vasoconstrictive or mixed effects not primarily suited to isolated chronotropic support.

24. B. Synthetic angiotensin II directly activates angiotensin II type 1 receptors, providing vasoconstriction through a mechanism distinct from catecholamines and vasopressin, and is used as an adjunctive vasopressor in refractory distributive (including septic) shock unresponsive to standard agents. Phenylephrine, epinephrine, and dopamine work through adrenergic receptors. Midodrine is an oral agent for chronic orthostatic hypotension, not acute shock.

25. C. Disopyramide, a Class Ia antiarrhythmic, has significant anticholinergic effects (dry mouth, urinary retention, constipation) and notable negative inotropic effects requiring caution in heart failure,

distinguishing its side-effect profile from quinidine and procainamide despite the shared Class Ia mechanism. Lidocaine and mexiletine are Class Ib agents. Flecainide is Class Ic. Sotalol is Class III.

26. C. Mexiletine, an oral Class Ib antiarrhythmic structurally related to lidocaine, provides a chronic oral option for ventricular arrhythmia management when IV lidocaine has been effective but ongoing oral therapy is needed. Disopyramide, procainamide, and quinidine are Class Ia agents. Flecainide is Class Ic.

27. B. Procainamide, an IV Class Ia antiarrhythmic, is used for acute termination of sustained ventricular tachycardia, but is associated with a drug-induced lupus-like syndrome with prolonged use, requiring monitoring of antinuclear antibodies (ANA) and N-acetylprocainamide (NAPA) metabolite levels. Disopyramide shares the Class Ia mechanism without this specific lupus association. Mexiletine and lidocaine are Class Ib. Sotalol is Class III.

28. C. Ertugliflozin, an SGLT2 inhibitor alternative to empagliflozin, dapagliflozin, and canagliflozin, shares the class mechanism and has its own cardiovascular safety and outcome trial data (VERTIS CV), providing another within-class option for glycemic and cardiovascular risk management. Sitagliptin and linagliptin are DPP-4 inhibitors. Glipizide is a sulfonylurea.

29. B. Nebivolol is a highly beta-1-selective beta blocker with additional nitric-oxide-mediated vasodilatory properties, offering a theoretically more favorable pulmonary and peripheral vascular side-effect profile compared to nonselective agents, though caution with any beta blocker in reactive airway disease remains prudent. Carvedilol is nonselective with alpha-blocking activity. Metoprolol succinate and bisoprolol are beta-1-selective but lack the vasodilatory NO mechanism. Propranolol is nonselective.

30. C. Bisoprolol, a highly beta-1-selective beta blocker, is one of the three beta blockers (with carvedilol and metoprolol succinate) proven to reduce mortality in HFrEF through large randomized trials. Nebivolol has vasodilatory properties but lacks the same HFrEF mortality-reduction trial base as the three evidence-based agents. Atenolol lacks HFrEF outcome data. Propranolol and labetalol are nonselective/combined agents without this specific mortality benefit.

31. E. Acebutolol has intrinsic sympathomimetic activity (partial beta-agonist activity), theoretically causing less resting bradycardia than beta blockers without this property, though it is used less commonly than agents without ISA given generally less robust outcome data. Metoprolol, bisoprolol, nebivolol, and carvedilol lack significant intrinsic sympathomimetic activity.

32. C. Atenolol, an older beta-1-selective beta blocker, has been widely studied for secondary prevention post-MI, though it lacks the specific HFrEF mortality-reduction data of carvedilol, bisoprolol, and metoprolol succinate, and has fallen out of favor for hypertension given comparatively weaker stroke-prevention data versus other antihypertensive classes in some trials. Nebivolol has vasodilatory properties, a distinct newer profile.

33. E. Prazosin, a nonselective alpha-1 blocker, treats both hypertension and BPH symptoms, requiring bedtime dosing with gradual titration to reduce first-dose syncope risk, similar in concept to doxazosin/terazosin but with a shorter half-life requiring more frequent dosing. Tamsulosin and silodosin are uroselective alpha-1A blockers with minimal antihypertensive effect. Alfuzosin is more uroselective with less blood-pressure-lowering effect.

34. D. Vilanterol is a once-daily LABA available only in fixed-dose combination products (with fluticasone furoate or with umeclidinium), never marketed as monotherapy, distinguishing its availability pattern from formoterol, indacaterol, salmeterol, and olodaterol, which have (or have had) standalone formulations.

35. D. Olodaterol is a once-daily LABA specifically combined with tiotropium in a fixed-dose inhaler, distinguishing its pairing from vilanterol (combined with umeclidinium) despite sharing the same overall LABA/LAMA combination strategy. Formoterol and salmeterol are combined with different ICS partners. Indacaterol is combined with glycopyrronium in some products but is not the specific tiotropium-paired agent.

36. A. Arformoterol is a nebulized LABA formulation, dosed twice daily, providing an option for COPD patients who cannot effectively use a metered-dose or dry-powder inhaler device. Vilanterol, salmeterol, indacaterol, and olodaterol are inhaler-based formulations without a standard nebulized option.

37. A. Ciclesonide is a prodrug ICS activated locally by esterases in lung tissue, theoretically reducing oropharyngeal deposition of active drug and lowering the incidence of local side effects such as oral thrush and dysphonia compared to ICS agents that are already active on deposition. Fluticasone, beclomethasone, budesonide, and mometasone are active on deposition without this specific esterase-activation mechanism.

38. B. Flunisolide, an older ICS, requires more frequent daily dosing than newer agents given a shorter duration of local anti-inflammatory action, and has both inhaled and intranasal formulations useful for patients with concurrent allergic rhinitis. Ciclesonide, fluticasone, budesonide, and mometasone are newer agents with more favorable dosing frequency.

39. E. Reslizumab binds IL-5 directly (like mepolizumab), reducing eosinophil survival, but is dosed by IV weight-based infusion rather than subcutaneous injection, distinguishing its administration route from mepolizumab despite the shared IL-5-ligand-targeting mechanism. Benralizumab targets the IL-5 receptor instead of the ligand. Omalizumab targets IgE. Dupilumab targets the IL-4 receptor alpha. Tezepelumab targets TSLP.

40. C. Revefenacin is a once-daily nebulized long-acting muscarinic antagonist, providing an inhaler-free LAMA option for COPD patients who cannot effectively use handheld inhaler devices, distinct from the inhaler-based LAMAs tiotropium, umeclidinium, aclidinium, and glycopyrrolate. Ipratropium is short-acting. Formoterol, vilanterol, and indacaterol are LABAs.

41. D. Inhaled iloprost, a prostacyclin analog, requires dosing 6 to 9 times daily via nebulizer given its shorter duration of action compared to inhaled treprostinil, reflecting a real tradeoff between dosing frequency and drug half-life among inhaled prostanoids for pulmonary arterial hypertension. Epoprostenol requires continuous IV infusion. Selexipag is oral. Riociguat is an oral sGC stimulator. Bosentan is an oral endothelin receptor antagonist.

42. E. The nicotine lozenge dissolves in the mouth without chewing, providing an alternative to nicotine gum for breakthrough craving relief in patients with dental work, dentures, or jaw discomfort that make chewing gum uncomfortable. The nicotine patch provides steady-state baseline coverage rather than acute breakthrough relief. Varenicline and bupropion are non-nicotine pharmacotherapy options. The nicotine inhaler is a distinct device-based delivery method.

43. A. Poractant alfa, a natural porcine-derived lung surfactant extract, is an alternative to the bovine-derived beractant, both containing surfactant proteins B and C, with some studies suggesting more rapid clinical improvement with poractant alfa related to its higher phospholipid concentration per mL. Calfactant is a distinct bovine-derived alternative. Synthetic surfactant lacks the natural surfactant proteins. Palivizumab is unrelated (RSV prophylaxis).

44. A. Calfactant, extracted from calf lung lavage via a distinct purification process, is an alternative bovine-derived natural surfactant to beractant, both containing surfactant proteins B and C for intratracheal replacement therapy in respiratory distress syndrome. Poractant alfa is porcine-derived, a different source species. Palivizumab and racemic epinephrine are unrelated to surfactant replacement.

45. C. Guaifenesin is an OTC expectorant that increases respiratory tract fluid secretions to reduce sputum viscosity, facilitating cough clearance, distinct from antitussives (dextromethorphan, benzonatate, codeine) that suppress the cough reflex, and from decongestants (pseudoephedrine) that reduce nasal mucosal swelling.

46. A. Dextromethorphan acts centrally on the medullary cough center, structurally related to opioids but lacking significant analgesic effect or meaningful abuse potential at standard antitussive doses, making it a common OTC cough suppressant ingredient. Guaifenesin is an expectorant. Benzonatate acts peripherally. Pseudoephedrine is a decongestant. Codeine is an opioid with genuine abuse potential and prescription-only status in most contexts.

47. C. Benzonatate, structurally related to local anesthetics like tetracaine, numbs stretch receptors in the respiratory tract and lungs, suppressing the cough reflex peripherally rather than centrally, and carries a specific risk of fatal overdose in children with accidental ingestion of intact capsules. Dextromethorphan acts centrally. Guaifenesin is an expectorant. Codeine is a central-acting opioid antitussive. Pseudoephedrine is a decongestant.

48. D. Nirsevimab, a novel long-acting monoclonal antibody against the RSV fusion protein, provides RSV prophylaxis with a single dose covering an entire RSV season, distinguishing its dosing schedule from palivizumab, which requires monthly injections throughout the season. Ribavirin is used for

established severe RSV infection, a different role. Racemic epinephrine treats croup. Ivermectin is unrelated.

49. D. Nedocromil, an inhaled mast cell stabilizer, shares cromolyn sodium's mechanism of preventing mast cell degranulation but with a somewhat longer duration of action, though both agents have largely been supplanted by ICS therapy in current asthma management given the need for very frequent dosing. Zafirlukast and montelukast are leukotriene receptor antagonists. Zileuton inhibits leukotriene synthesis. Omalizumab is an injectable anti-IgE biologic.

50. E. Pseudoephedrine, an oral alpha-adrenergic agonist decongestant, constricts nasal mucosal blood vessels without the rebound congestion (rhinitis medicamentosa) risk associated with prolonged topical nasal decongestant sprays like oxymetazoline, though it carries its own concerns (blood pressure elevation, restricted OTC sales given methamphetamine precursor status). Cetirizine is an antihistamine. Fluticasone nasal is a corticosteroid. Ipratropium and azelastine nasal sprays target rhinorrhea and allergic symptoms respectively, not primary decongestion.

51. B. Ethambutol is included in first-line four-drug TB therapy (RIPE) specifically to help prevent resistance emergence during the initial phase, with optic neuritis (particularly red-green color discrimination loss) as its most notable dose-related toxicity, requiring baseline visual acuity/color vision testing and periodic monitoring. Isoniazid and rifampin are core components with different toxicity profiles (hepatotoxicity, peripheral neuropathy for isoniazid). Pyrazinamide causes hyperuricemia/hepatotoxicity. Streptomycin causes ototoxicity/nephrotoxicity.

52. B. Pyrazinamide is most associated with hyperuricemia and arthralgias among the first-line TB drugs, and is typically given only during the initial 2-month intensive phase of therapy, after which the regimen continues with isoniazid and rifampin (plus ethambutol until susceptibility is confirmed) for the continuation phase. Isoniazid causes peripheral neuropathy/hepatotoxicity. Ethambutol causes optic neuritis. Rifampin causes orange body fluid discoloration/hepatotoxicity/drug interactions. Streptomycin causes ototoxicity.

53. C. Bedaquiline, a novel diarylquinoline, inhibits mycobacterial ATP synthase through a mechanism distinct from other TB drug classes, and carries a boxed warning for QT prolongation and increased mortality risk observed in trials, requiring baseline and periodic ECG monitoring during MDR-TB treatment. Rifabutin and rifapentine are rifamycin-class drugs. Clofazimine is a riminophenazine. Streptomycin is an aminoglycoside.

54. C. Streptomycin, an injectable aminoglycoside, was among the original first-line TB drugs before fully oral regimens became standard, and is now generally reserved for drug-resistant disease given ototoxicity and nephrotoxicity risk shared with other aminoglycosides. Rifabutin, bedaquiline, clofazimine, and rifapentine are oral agents used in various TB regimens without this specific injectable/aminoglycoside toxicity profile.

55. E. Rifabutin, a rifamycin-class drug, has less potent CYP3A4 induction than rifampin, reducing the magnitude of drug interactions with protease inhibitor-based antiretroviral therapy, making it preferred over rifampin in patients with HIV on such regimens. Bedaquiline and clofazimine are used for drug-resistant TB. Streptomycin is an injectable. Pyrazinamide lacks this specific CYP3A4 interaction profile relevant to the antiretroviral concern.

56. A. Rifapentine, a long-acting rifamycin, is used once weekly in combination with isoniazid for 12 weeks (the 3HP regimen) as a shorter alternative to 9 months of daily isoniazid monotherapy for latent TB infection, improving treatment completion rates. Rifabutin is used more for active TB/HIV interaction management. Bedaquiline and clofazimine are used for drug-resistant active TB. Streptomycin is an injectable.

57. B. Clofazimine, a riminophenazine antimycobacterial used for both multidrug-resistant TB and leprosy, causes reversible red-brown skin and bodily fluid discoloration with prolonged use, a distinctive and expected side effect patients should be counseled about. Rifabutin, bedaquiline, streptomycin, and rifapentine lack this specific characteristic discoloration.

58. D. Pentamidine, administered as an aerosolized inhalation for prophylaxis or IV for active infection, is used for Pneumocystis pneumonia prevention and treatment in patients with severe sulfa allergy precluding TMP-SMX use, though it carries its own toxicity profile including pancreatitis, hypoglycemia, and QT prolongation with IV use. Oral dapsone, atovaquone alone, and clindamycin-primaquine are alternative sulfa-sparing options but are not the specific aerosolized/IV agent described. Trimethoprim alone lacks adequate PCP efficacy without sulfamethoxazole.

59. C. Codeine, a mild opioid antitussive, is often combined with guaifenesin or antihistamine components in prescription cough preparations, and carries genuine (if modest relative to stronger opioids) abuse potential and prescription/controlled-substance status, distinguishing it from the non-opioid, minimal-abuse-potential dextromethorphan. Guaifenesin is an expectorant without antitussive/abuse potential. Benzonatate is a non-opioid peripherally-acting antitussive. Pseudoephedrine is a decongestant.

60. D. Ensifentrine, a novel dual phosphodiesterase-3 and phosphodiesterase-4 inhibitor, combines bronchodilator (via PDE3 inhibition) and anti-inflammatory (via PDE4 inhibition) effects in a single inhaled agent, a distinct dual mechanism from the PDE4-selective oral roflumilast. Theophylline and aminophylline are older, less selective methylxanthine bronchodilators. Zileuton is a 5-lipoxygenase inhibitor unrelated to PDE inhibition.

61. C. Lansoprazole is available as a delayed-release orally disintegrating tablet, useful for patients with dysphagia or nasogastric tube feeding who cannot swallow standard capsules, distinguishing its formulation options from omeprazole and esomeprazole. Pantoprazole is available as an IV formulation, useful in a different clinical scenario (NPO patients). Rabeprazole lacks this specific ODT formulation.

62. D. Pantoprazole is available as an IV formulation for hospitalized patients unable to take oral medications, such as those with active GI bleeding, and has relatively less CYP2C19-mediated drug interaction potential compared to omeprazole, an important consideration with concurrent clopidogrel use. Lansoprazole, esomeprazole, rabeprazole, and dexlansoprazole are primarily oral formulations.

63. C. Dexlansoprazole, the R-enantiomer of lansoprazole, uses a novel dual delayed-release formulation providing two separate drug-release phases, extending acid suppression duration and allowing once-daily dosing without meal-timing requirements. Omeprazole, pantoprazole, rabeprazole, and lansoprazole use standard single-release delayed formulations.

64. C. Rabeprazole is activated across a broader range of intragastric pH than omeprazole, contributing to a more rapid onset of acid suppression, useful in conditions like Zollinger-Ellison syndrome requiring prompt, potent acid control. Lansoprazole, pantoprazole, dexlansoprazole, and esomeprazole have somewhat slower onset given more pH-dependent activation.

65. E. Cimetidine, an older H2 receptor antagonist, has significantly more CYP450 (particularly CYP3A4 and CYP2D6) drug interaction potential than famotidine, and is historically associated with gynecomastia and other antiandrogenic effects with prolonged use, given weak antiandrogen receptor binding. Nizatidine has a more favorable interaction profile. Ranitidine has been withdrawn from the market. Omeprazole is a PPI, a different class.

66. B. Nizatidine undergoes minimal hepatic metabolism, being eliminated primarily unchanged by the kidneys, making it a reasonable H2 receptor antagonist alternative to famotidine in patients with hepatic impairment, though renal dose adjustment is needed instead. Cimetidine has significant hepatic CYP450 involvement. Ranitidine has been withdrawn from the market. Omeprazole and esomeprazole are PPIs.

67. B. Dolasetron carries a specific boxed warning for dose-dependent QT prolongation, leading to restriction of its IV formulation to only antiemetic indications (not the higher doses previously used for other purposes) given observed torsades de pointes risk, a more pronounced QT concern than with ondansetron. Granisetron and palonosetron are alternative 5-HT3 antagonists with different specific safety emphases. Metoclopramide has a different (dopamine-antagonist) mechanism. Aprepitant is an NK1 antagonist.

68. C. Palonosetron, a second-generation 5-HT3 receptor antagonist, has a notably longer half-life (approximately 40 hours) than ondansetron or granisetron, providing extended antiemetic coverage into the delayed phase after chemotherapy with a single dose. Dolasetron has a shorter half-life and a specific QT boxed warning. Metoclopramide has a different mechanism. Aprepitant is an NK1 antagonist, typically used adjunctively rather than as the primary 5-HT3-class agent.

69. A. Aprepitant, an oral NK1 receptor antagonist, is added to a 5-HT3 antagonist and dexamethasone for triple antiemetic prophylaxis in highly emetogenic chemotherapy regimens, but has notable CYP3A4 interaction potential (both as a substrate and moderate inhibitor) requiring medication reconciliation.

Dolasetron, palonosetron, and ondansetron are 5-HT3 antagonists. Metoclopramide has a dopamine-antagonist mechanism.

70. B. Fosaprepitant is an IV prodrug rapidly converted to aprepitant after administration, providing NK1 receptor antagonist antiemetic coverage for patients unable to tolerate oral prophylaxis before chemotherapy. Oral aprepitant is the parent drug requiring oral administration. Dolasetron, palonosetron, and ondansetron are 5-HT3 antagonists, a different mechanism.

71. C. Bezlotoxumab, a monoclonal antibody targeting C. difficile toxin B, is given as a single IV infusion adjunctive to standard antibiotic therapy to reduce the risk of recurrent C. difficile infection, working through toxin neutralization rather than direct antimicrobial activity. Fidaxomicin, oral vancomycin, and metronidazole are direct antibiotics against C. difficile. Rifaximin is used for hepatic encephalopathy and traveler's diarrhea.

72. E. Natalizumab targets alpha-4 integrin broadly (both alpha-4-beta-1 and alpha-4-beta-7), blocking leukocyte adhesion and migration into gut (and other) tissue, distinguishing it from the gut-selective alpha-4-beta-7-targeting vedolizumab, and carrying a boxed warning for progressive multifocal leukoencephalopathy (PML) given its broader immunosuppressive reach. Ustekinumab targets IL-12/23. Golimumab and certolizumab pegol target TNF-alpha. Risankizumab targets IL-23 selectively.

73. C. Risankizumab selectively targets the p19 subunit specific to IL-23 (rather than the shared p40 subunit targeted by ustekinumab, which blocks both IL-12 and IL-23), offering a more IL-23-selective biologic option for Crohn disease refractory to other biologic classes. Natalizumab targets alpha-4 integrin. Golimumab, certolizumab pegol, and infliximab target TNF-alpha.

74. E. Mirikizumab selectively targets IL-23, similar in mechanism to risankizumab but with its own distinct clinical trial program specifically establishing efficacy in ulcerative colitis. Natalizumab targets alpha-4 integrin broadly. Ustekinumab targets the shared IL-12/23 p40 subunit. Golimumab targets TNF-alpha. Vedolizumab targets gut-selective integrin.

75. E. Balsalazide is an oral 5-aminosalicylate prodrug, linked via an azo bond to an inert carrier molecule, cleaved by colonic bacterial azoreductase to release active mesalamine specifically in the colon, avoiding the sulfapyridine-related side effects seen with sulfasalazine. Infliximab and vedolizumab are biologics. Oral budesonide is a corticosteroid with high first-pass metabolism.

76. B. Olsalazine consists of two mesalamine molecules joined by an azo bond, cleaved by colonic bacteria to release two active mesalamine moieties, avoiding the sulfapyridine component responsible for many sulfasalazine-related side effects, though watery diarrhea is a recognized olsalazine-specific side effect. Balsalazide uses a different (single mesalamine plus inert carrier) azo-bond structure. Sulfasalazine retains the sulfapyridine moiety being avoided.

77. B. Lubiprostone selectively activates type 2 chloride channels on the apical membrane of intestinal epithelial cells, increasing intestinal fluid secretion to soften stool and promote motility, a mechanism

distinct from the guanylate cyclase-C agonism of linaclotide and plecanatide. Prucalopride is a 5-HT4 receptor agonist. Senna and bisacodyl are stimulant laxatives.

78. A. Tenapanor inhibits the intestinal sodium/hydrogen exchanger 3 (NHE3), reducing sodium absorption and thereby increasing intestinal fluid content and accelerating transit for IBS-C, a mechanism entirely distinct from the guanylate cyclase or chloride channel agents, and is separately studied and approved for hyperphosphatemia management in dialysis patients given reduced intestinal phosphate absorption as a downstream effect. Lubiprostone, linaclotide, and plecanatide work through different secretory mechanisms. Prucalopride is a prokinetic.

79. B. Alvimopan is a peripherally-acting mu-opioid receptor antagonist specifically FDA-approved for accelerating GI recovery and reducing postoperative ileus duration after bowel resection, restricted to short-term inpatient use given a boxed warning for myocardial infarction risk with extended outpatient use. Methylnaltrexone and naloxegol are used for chronic opioid-induced constipation, not postoperative ileus. Naloxone and naltrexone have greater CNS penetration risk.

80. B. Tegaserod, a 5-HT4 receptor partial agonist, was withdrawn from the market given cardiovascular safety concerns identified in postmarketing surveillance, then later reintroduced with restricted access limited to women under 65 without cardiovascular risk factors, for IBS-C specifically. Prucalopride is a full 5-HT4 agonist with a more favorable cardiac safety profile. Linaclotide, plecanatide, and lubiprostone work through unrelated secretory mechanisms.

81. A. Prochlorperazine, a dopamine antagonist with antiemetic and antipsychotic properties, is used IV or IM for severe nausea/vomiting from non-chemotherapy causes and has additional evidence for acute migraine treatment, distinguishing its use pattern from metoclopramide despite the shared dopamine-antagonist mechanism class. Ondansetron, aprepitant, and palonosetron work through non-dopaminergic mechanisms. Ranitidine has been withdrawn from the market.

82. E. Promethazine, a sedating antihistamine with dopamine-antagonist properties, is used as an additional antiemetic option for hyperemesis gravidarum refractory to first-line therapy, though notable sedation and extrapyramidal side-effect risk (as with other phenothiazine-class drugs) limit its use to situations where other options are inadequate. Diphenhydramine is a less potent antiemetic antihistamine. Trimethobenzamide works through a less well-characterized mechanism with more modest efficacy evidence.

83. C. Trimethobenzamide is an older antiemetic with a less well-characterized mechanism of action (thought to involve the chemoreceptor trigger zone) compared to the well-defined dopamine or serotonin antagonism of newer agents, generally considered less effective but with a comparatively milder side-effect profile, including less sedation than promethazine. Ondansetron, prochlorperazine, promethazine, and metoclopramide have better-defined and generally more potent antiemetic mechanisms.

84. E. Dronabinol, an oral synthetic cannabinoid (delta-9-THC), is used for chemotherapy-induced nausea and vomiting refractory to standard antiemetics and separately for appetite stimulation in cancer-

or HIV-related cachexia, a dual indication distinguishing it from standard antiemetic classes. Aprepitant, ondansetron, prochlorperazine, and metoclopramide lack the appetite-stimulation indication and work through entirely different receptor mechanisms.

85. D. Etodolac, an acetic acid derivative NSAID, has a long enough half-life to permit once-daily or twice-daily dosing for osteoarthritis, with some COX-2 preferential activity at typical doses. Ibuprofen and naproxen are propionic acid derivatives. Ketorolac is limited to short-term use. Celecoxib is a COX-2-selective inhibitor, a different subclass.

86. D. Nabumetone is a prodrug NSAID with a notably long half-life (approximately 24 hours) among nonselective agents, converted to its active metabolite after absorption, allowing once-daily dosing with a distinct nonacidic prodrug structure that may reduce direct gastric mucosal irritation compared to other NSAIDs. Diclofenac requires more frequent dosing. Ketorolac is short-term only. Meloxicam is COX-2 preferential. Sulindac is a different prodrug NSAID.

87. C. Oxaprozin, a propionic acid derivative NSAID, has an unusually long half-life (over 40 hours), permitting once-daily dosing despite belonging to a class (propionic acids) typically requiring more frequent administration. Ketoprofen and fenoprofen are propionic acid NSAIDs with shorter half-lives requiring multiple daily doses. Etodolac and nabumetone are acetic acid/prodrug NSAIDs, different subclasses.

88. C. Fenoprofen, a propionic acid NSAID historically among the first marketed in this class alongside ibuprofen, has a shorter half-life requiring three to four times daily dosing, distinguishing its dosing frequency from longer-acting propionic acids like naproxen and oxaprozin. Ketorolac is limited to short-term parenteral/oral use. Etodolac is an acetic acid derivative.

89. E. Mefenamic acid, a fenamate-class NSAID, has a dual mechanism inhibiting both prostaglandin synthesis (like standard NSAIDs) and directly antagonizing prostaglandin receptor binding, contributing to its particular effectiveness for dysmenorrhea, though limited to short-term use given GI and hematologic toxicity concerns with prolonged therapy. Ibuprofen, naproxen, ketorolac, and diclofenac lack this specific dual mechanism.

90. E. Tolmetin, an acetic acid derivative NSAID structurally related to indomethacin, is less commonly used today given a comparatively less favorable side-effect profile and shorter duration of action relative to newer NSAID options. Ketorolac is limited to short-term use. Etodolac and nabumetone have more favorable dosing profiles. Sulindac is a related but distinct acetic acid prodrug.

91. D. Diflunisal, a salicylate derivative NSAID (though not metabolized to salicylic acid itself), has minimal effect on platelet aggregation compared to most NSAIDs, though as a COX inhibitor it still carries cross-reactivity risk in patients with true aspirin-exacerbated respiratory disease. Ibuprofen, naproxen, and ketorolac significantly inhibit platelet function. Celecoxib has a different (COX-2-selective) mechanism with its own distinct cross-reactivity profile.

92. A. Ketoprofen is a potent propionic acid NSAID requiring comparatively lower milligram doses than ibuprofen for equivalent anti-inflammatory effect, though its shorter half-life requires more frequent dosing (three to four times daily for immediate-release formulations). Naproxen and oxaprozin have longer half-lives. Fenoprofen requires similarly frequent dosing but at different potency. Etodolac is an acetic acid derivative.

93. B. Bimekizumab selectively inhibits both IL-17A and IL-17F, a broader dual-cytokine blockade within the IL-17 pathway distinct from the IL-17A-only targeting of secukinumab and ixekizumab, offering an option for patients with inadequate response to single-cytokine IL-17 blockade. Ustekinumab targets IL-12/23. Guselkumab targets IL-23 selectively.

94. A. Deucravacitinib selectively inhibits TYK2 (tyrosine kinase 2), a member of the JAK family but with a distinct regulatory (pseudokinase) domain-binding mechanism that provides more selective cytokine pathway inhibition (IL-23, IL-12, type I interferon) than pan-JAK inhibitors, and notably lacks the boxed warning burden of JAK1/2/3 inhibitors like upadacitinib and tofacitinib. Baricitinib is a JAK1/2 inhibitor. Apremilast is a PDE4 inhibitor, an unrelated mechanism.

95. D. Cyclosporine, a calcineurin inhibitor primarily associated with transplant immunosuppression, has been used off-label for severe refractory RA given its T-cell-suppressive effect via calcineurin/NFAT pathway inhibition, though renal toxicity and hypertension limit long-term use in this population. Methotrexate and leflunomide are standard conventional DMARDs. Tacrolimus is a related but distinct calcineurin inhibitor sometimes used similarly. Azathioprine has a different (purine synthesis) mechanism.

96. E. Azathioprine, a purine analog DMARD, inhibits purine synthesis and requires TPMT (thiopurine methyltransferase) or NUDT15 genotyping/phenotyping before initiation, since patients with deficient enzyme activity are at markedly increased risk of severe, potentially life-threatening myelosuppression at standard doses. Leflunomide inhibits pyrimidine synthesis, a different pathway. Cyclosporine is a calcineurin inhibitor. Hydroxychloroquine has a distinct, poorly-defined immunomodulatory mechanism without this specific genetic testing requirement.

97. B. Gold sodium thiomalate, an injectable gold-salt DMARD, was historically used for RA but has been largely abandoned in current practice given a narrow therapeutic window and significant toxicity including nephrotic syndrome and mucocutaneous reactions, especially relative to the more favorable risk-benefit profile of modern biologic and targeted synthetic DMARDs. Penicillamine is a different historic DMARD with its own distinct toxicity profile. Hydroxychloroquine, sulfasalazine, and leflunomide remain in current conventional DMARD use.

98. E. Penicillamine, a copper-chelating agent with a historic RA indication thought to work through disruption of disulfide bonds and reduced rheumatoid factor production, is now rarely used for RA given toxicity concerns (bone marrow suppression, proteinuria, and rare but serious autoimmune syndromes), though it retains its primary modern role in Wilson disease copper chelation. Gold sodium thiomalate is a different historic DMARD. Hydroxychloroquine, sulfasalazine, and leflunomide remain in current use.

99. C. Vecuronium, an aminosteroid nondepolarizing neuromuscular blocker, has an intermediate onset and duration with relative cardiovascular stability (minimal histamine release or autonomic effects), commonly used for maintenance paralysis after intubation. Succinylcholine is depolarizing with a much faster onset/offset, typically used for the intubation itself rather than maintenance. Rocuronium is a faster-onset aminosteroid alternative. Cisatracurium and mivacurium are benzylisoquinolone-class agents with different clearance mechanisms.

100. B. Succinylcholine, the only depolarizing neuromuscular blocker in clinical use, has the fastest onset of paralysis among all NMBs (useful for rapid sequence intubation), but is contraindicated in hyperkalemia-prone conditions (burns, crush injury, neuromuscular disease) and in patients susceptible to malignant hyperthermia given its triggering potential. Vecuronium, rocuronium, cisatracurium, and mivacurium are nondepolarizing agents without these specific contraindications.

101. B. Topical capsaicin depletes substance P from sensory nerve terminals with repeated application, providing localized analgesic effect for musculoskeletal pain through a peripheral, non-centrally-acting mechanism distinct from oral muscle relaxants. Methocarbamol, baclofen, cyclobenzaprine, and tizanidine are centrally-acting oral muscle relaxants without this topical, substance-P-depleting mechanism.

102. D. The lidocaine patch delivers a local anesthetic (sodium channel blocker) directly to a localized area of musculoskeletal or neuropathic pain, with minimal systemic absorption given the topical route, distinguishing its mechanism from oral muscle relaxants and from capsaicin's substance-P-depletion mechanism. Methocarbamol, baclofen, and tizanidine are systemic, centrally-acting oral muscle relaxants.

103. D. Metaxalone, a centrally-acting muscle relaxant, carries a recognized though uncommon hepatotoxicity risk requiring patient counseling and consideration of baseline liver function in higher-risk patients, a distinguishing safety consideration relative to some other centrally-acting muscle relaxants. Baclofen and tizanidine are used more for chronic spasticity. Cyclobenzaprine has more prominent anticholinergic/sedation effects as its primary safety concern. Methocarbamol has a more favorable hepatic safety profile.

104. B. Chlorzoxazone, a chlorinated benzoxazole-derivative muscle relaxant, is generally considered to have milder sedation than cyclobenzaprine, though it requires dosing three to four times daily given its shorter duration of action, and shares some hepatotoxicity risk considerations with the broader centrally-acting muscle relaxant class. Baclofen and tizanidine are used more for chronic spasticity. Metaxalone and methocarbamol are alternative centrally-acting agents with distinct structures.

105. D. Belimumab, a monoclonal antibody targeting B-lymphocyte stimulator (BLyS, also called BAFF), reduces autoreactive B-cell survival and is FDA-approved as an adjunct to standard therapy for active SLE, including lupus nephritis. Rituximab targets CD20 directly on B cells, a different mechanism. Tocilizumab targets IL-6. Abatacept blocks T-cell costimulation. Anifrolumab targets the type I interferon receptor, a distinct pathway.

106. B. Anifrolumab blocks the type I interferon receptor, targeting the interferon signaling pathway implicated in lupus pathogenesis, a mechanism distinct from belimumab's B-cell-survival-factor targeting, offering an additional adjunct option for SLE refractory to standard therapy. Rituximab targets CD20. Tocilizumab targets IL-6. Abatacept blocks T-cell costimulation.

107. E. Sirolimus, an mTOR inhibitor, stabilizes lung function in lymphangioleiomyomatosis (a disease with tuberous sclerosis complex-related musculoskeletal and systemic manifestations) by inhibiting the mTOR pathway implicated in the abnormal smooth-muscle-like cell proliferation, and is separately used as a calcineurin-inhibitor-sparing option in transplant immunosuppression. Tacrolimus and cyclosporine are calcineurin inhibitors, a different mechanism. Azathioprine and mycophenolate mofetil are antiproliferative agents without this specific mTOR mechanism.

108. B. Everolimus, an alternative oral mTOR inhibitor to sirolimus with a distinct pharmacokinetic profile (shorter half-life, different formulation), has specific FDA approvals for tuberous sclerosis complex-associated subependymal giant cell astrocytoma and renal angiomyolipoma, in addition to transplant immunosuppression and select oncology indications. Tacrolimus and cyclosporine are calcineurin inhibitors. Azathioprine and mycophenolate mofetil are antiproliferative agents without this mTOR mechanism.

109. D. Ampicillin-sulbactam combines ampicillin with the beta-lactamase inhibitor sulbactam, providing coverage against anaerobes and many beta-lactamase-producing organisms, though with a narrower gram-negative spectrum (notably lacking reliable Pseudomonas coverage) than piperacillin-tazobactam. Cefepime and meropenem have broader gram-negative coverage including Pseudomonas. Ceftriaxone lacks anaerobic coverage. Aztreonam covers gram-negatives only.

110. A. Cefdinir, an oral third-generation cephalosporin, provides activity against beta-lactamase-producing H. influenzae and M. catarrhalis, common causes of otitis media refractory to amoxicillin, with a convenient oral dosing option for outpatient pediatric use. Cefazolin (first-generation) has narrower gram-negative coverage. Cefepime (fourth-generation) is IV only. Ceftriaxone is not available orally. Aztreonam lacks gram-positive coverage.

111. C. Ceftaroline, a fifth-generation cephalosporin, is notable for MRSA activity (via altered penicillin-binding protein affinity) in addition to typical cephalosporin gram-negative and streptococcal coverage, useful for MRSA pneumonia or skin/soft tissue infections. Cefepime (fourth-generation) and ceftriaxone (third-generation) lack MRSA activity. Cefazolin (first-generation) has narrow gram-positive-predominant coverage without MRSA activity. Aztreonam lacks gram-positive coverage entirely.

112. A. Ertapenem, a carbapenem with once-daily dosing convenience, lacks reliable activity against Pseudomonas aeruginosa and Acinetobacter species (unlike meropenem and imipenem-cilastatin), making it more appropriate for complicated intra-abdominal or community-acquired infections where these organisms are not a concern. Imipenem-cilastatin and meropenem provide broader

antipseudomonal coverage. Aztreonam covers gram-negatives only, without the broad-spectrum carbapenem profile.

113. C. Imipenem-cilastatin combines imipenem with cilastatin, a renal dehydropeptidase-I inhibitor, preventing renal enzymatic breakdown of imipenem that would otherwise inactivate the antibiotic and potentially generate a nephrotoxic metabolite, a formulation requirement unique among carbapenems. Ertapenem and meropenem do not require this specific enzyme-inhibitor pairing. Aztreonam is a monobactam, not a carbapenem.

114. E. Dalbavancin, a lipoglycopeptide antibiotic, has an extremely long half-life allowing a single-dose or two-dose (one week apart) IV regimen for the entire treatment course of skin/soft tissue infections or bacteremia, offering a notable convenience advantage over standard multi-week vancomycin therapy. Daptomycin, linezolid, and ceftaroline require more frequent dosing. Tedizolid is an oxazolidinone with a different mechanism.

115. C. Tedizolid, an oxazolidinone alternative to linezolid, is dosed once daily for a shorter 6-day treatment course for acute bacterial skin and skin structure infections, with a reportedly lower risk of myelosuppression than linezolid, though data on serotonin syndrome risk with concurrent serotonergic drugs remains more limited. Daptomycin and ceftaroline are alternative MRSA-active agents with different mechanisms. Dalbavancin is a lipoglycopeptide. Vancomycin requires more frequent dosing with therapeutic monitoring.

116. A. Tigecycline, a glycylcycline antibiotic structurally related to tetracyclines, is active against many tetracycline-resistant strains through modified ribosomal binding, but carries an FDA boxed warning for increased all-cause mortality risk observed in pooled trial data relative to comparator antibiotics, generally reserving its use for situations without suitable alternatives. Doxycycline and minocycline are standard tetracyclines without this specific mortality warning. Ceftaroline and dalbavancin are unrelated antibiotic classes.

117. D. Polymyxin B, a polymyxin-class antibiotic administered systemically IV, is reserved for multidrug-resistant gram-negative infections such as carbapenem-resistant Enterobacterales when other options are inadequate, given significant nephrotoxicity and neurotoxicity risk, distinct from colistimethate's more common inhaled/topical use pattern for respiratory applications. Aztreonam, ceftaroline, and meropenem are unrelated antibiotic classes with different resistance coverage and toxicity profiles. Tigecycline is a glycylcycline.

118. E. Pyrimethamine, a folate antagonist, is combined with sulfadiazine (a synergistic antifolate combination) and folinic acid (leucovorin, to protect host cells from antifolate-related hematologic toxicity while sparing the parasite, which cannot use exogenous folinic acid) for treatment of toxoplasmosis. Atovaquone alone and trimethoprim alone are alternative but less standard options. Azithromycin has different antitoxoplasma activity considerations.

119. D. Nifurtimox, a nitrofuran-class antiparasitic, is one of two first-line agents (with benznidazole) for treating acute Chagas disease caused by Trypanosoma cruzi, most effective when given early in the acute phase of infection. Miltefosine and sodium stibogluconate treat leishmaniasis. Eflornithine treats African trypanosomiasis (a related but distinct parasite). Praziquantel treats trematode/cestode infections, unrelated to Chagas disease.

120. D. Miltefosine, an oral alkylphosphocholine originally developed as an antineoplastic agent, is the first oral treatment option for visceral and cutaneous leishmaniasis, offering a notable advantage over the injectable options historically required for this disease. Nifurtimox treats Chagas disease. Eflornithine treats African trypanosomiasis. Sodium stibogluconate is an injectable pentavalent antimonial alternative for leishmaniasis. Praziquantel is unrelated.

121. C. Eflornithine, an ornithine decarboxylase inhibitor, is used for late-stage (CNS-involving) West African (Trypanosoma brucei gambiense) trypanosomiasis, sometimes combined with nifurtimox in nifurtimox-eflornithine combination therapy (NECT) to improve outcomes and shorten treatment duration. Miltefosine and sodium stibogluconate treat leishmaniasis. Nifurtimox alone is used for Chagas disease, a related but distinct trypanosomal infection.

122. E. Niclosamide inhibits mitochondrial oxidative phosphorylation (ATP production) in tapeworm segments, providing an alternative to praziquantel for intestinal tapeworm infections, though it lacks efficacy against tissue-invasive cestode infections (e.g., cysticercosis) where praziquantel or albendazole are preferred. Mebendazole, albendazole, ivermectin, and diethylcarbamazine target different parasitic organisms (nematodes/filariae) through different mechanisms.

123. A. IV artesunate, an artemisinin derivative, is the WHO-preferred first-line treatment for severe P. falciparum malaria, demonstrated in large trials to reduce mortality compared to quinine, with rapid parasite clearance and a favorable safety profile. Chloroquine is ineffective against resistant P. falciparum. Mefloquine and atovaquone-proguanil are oral agents not preferred for severe/critical malaria. Primaquine addresses hepatic hypnozoites, not acute severe blood-stage disease.

124. B. Mefloquine, a weekly oral antimalarial chemoprophylaxis option, is an alternative for travelers with contraindications to atovaquone-proguanil or doxycycline (including young children and later pregnancy), though it carries a notable neuropsychiatric side-effect profile (vivid dreams, anxiety, rarely psychosis) requiring careful patient selection and counseling, and is contraindicated with a history of seizures or certain psychiatric conditions. Chloroquine is only appropriate for chloroquine-sensitive regions. Primaquine requires G6PD screening and is not standard prophylaxis for most travelers. Quinine sulfate and artesunate are treatment, not prophylaxis, agents.

125. E. Famciclovir is a prodrug converted to penciclovir after absorption, providing an alternative oral antiviral to valacyclovir (a prodrug of acyclovir) for suppressive or episodic genital herpes therapy, with generally comparable efficacy and dosing convenience between the two prodrug options. Acyclovir is the parent compound with lower oral bioavailability than the prodrugs. Ganciclovir, foscarnet, and cidofovir are used primarily for CMV or resistant herpesvirus infections.

126. A. Letermovir inhibits the viral terminase complex, a novel mechanism distinct from the DNA polymerase inhibition of ganciclovir/valganciclovir, notably avoiding myelosuppression as a limiting toxicity and making it useful for CMV prophylaxis in transplant recipients where bone marrow suppression from other agents is a significant concern. Foscarnet and cidofovir target DNA polymerase with significant nephrotoxicity. Acyclovir has weak CMV activity.

127. A. Bictegravir, an integrase strand transfer inhibitor with a high barrier to resistance, is combined with tenofovir alafenamide and emtricitabine in a widely used once-daily single-tablet HIV regimen. Dolutegravir is an alternative high-barrier integrase inhibitor but is the comparator, not the drug in this specific combination. Raltegravir requires twice-daily dosing in most regimens. Elvitegravir requires pharmacokinetic boosting. Cabotegravir is formulated as a long-acting injectable, not part of a daily oral single tablet.

128. B. Cabotegravir, formulated as a long-acting injectable, is administered intramuscularly every one to two months in combination with injectable rilpivirine, providing an option for HIV-suppressed patients who prefer to eliminate daily oral dosing entirely. Bictegravir, dolutegravir, raltegravir, and elvitegravir are oral integrase inhibitors requiring daily dosing.

129. D. Sofosbuvir, an oral nucleotide analog NS5B polymerase inhibitor, serves as the backbone component of several modern interferon-free direct-acting antiviral combination regimens for chronic hepatitis C, typically paired with an NS5A inhibitor for a complete regimen. Ribavirin is an older, less-targeted antiviral now used only adjunctively in select hepatitis C regimens. Entecavir, tenofovir disoproxil, and lamivudine are hepatitis B (not C) antivirals.

130. A. Lacosamide selectively enhances slow inactivation of voltage-gated sodium channels, a mechanism distinct from the fast-inactivation-enhancing effect of most other sodium-channel AEDs (phenytoin, carbamazepine), and is available in both oral and IV formulations for focal seizures. Brivaracetam works through SV2A binding. Cenobamate has a dual sodium-channel/GABA mechanism. Rufinamide is used for Lennox-Gastaut syndrome. Cannabidiol has an incompletely understood mechanism.

131. D. Brivaracetam, a structural analog of levetiracetam, binds synaptic vesicle protein 2A (SV2A) with higher affinity and selectivity, potentially offering improved efficacy or tolerability in some patients with inadequate response to levetiracetam, though both drugs share the same overall SV2A mechanism. Lacosamide targets sodium channel slow inactivation. Cenobamate has a dual mechanism. Rufinamide is used for Lennox-Gastaut syndrome.

132. E. Cenobamate has a dual mechanism, enhancing sodium channel inactivation and acting as a positive allosteric modulator at GABA-A receptors, but requires a notably slow titration schedule over multiple weeks to reduce the risk of drug reaction with eosinophilia and systemic symptoms (DRESS), a severe hypersensitivity reaction observed with more rapid titration in trials. Lacosamide and brivaracetam have single, distinct mechanisms. Rufinamide is used for Lennox-Gastaut syndrome. Cannabidiol has a different mechanism profile.

133. E. Rufinamide, a triazole-derivative AED used as adjunctive therapy for Lennox-Gastaut syndrome-associated seizures, shortens the QT interval, requiring caution and ECG monitoring in patients with Familial Short QT syndrome given risk of exacerbating this already-shortened repolarization interval. Lacosamide, brivaracetam, and cenobamate lack this specific QT-shortening effect. Cannabidiol is also used for Lennox-Gastaut syndrome but through a different mechanism without this QT consideration.

134. C. Cannabidiol (Epidiolex), a plant-derived cannabinoid AED, requires monitoring of hepatic transaminases, particularly with concurrent valproic acid use, given an elevated hepatotoxicity risk observed with this combination in clinical trials, and is FDA-approved for seizures associated with Dravet syndrome, Lennox-Gastaut syndrome, and tuberous sclerosis complex. Lacosamide, brivaracetam, rufinamide, and cenobamate lack this specific hepatotoxicity interaction emphasis with valproic acid.

135. D. Zolmitriptan is available as a nasal spray formulation in addition to oral tablets, offering rapid onset useful for patients with nausea/vomiting limiting oral absorption during a migraine attack, though it shares the same class-wide cardiovascular vasoconstriction contraindications as other triptans. Naratriptan and frovatriptan have longer half-lives but slower onset. Almotriptan and eletriptan are oral-only formulations.

136. B. Lasmiditan, a selective 5-HT1F receptor agonist, provides acute migraine relief without significant vasoconstrictive activity (since 5-HT1F receptors are not located on vascular smooth muscle), making it suitable for patients with cardiovascular contraindications to triptans, though it carries a driving-impairment warning requiring an 8-hour wait before operating a vehicle. Rimegepant and atogepant are CGRP receptor antagonist gepants, a different drug class. Zolmitriptan is a triptan with vasoconstrictive contraindications.

137. D. Rimegepant, an oral CGRP receptor antagonist, is uniquely approved for both acute migraine treatment and preventive use (dosed every other day for prevention), offering dual-purpose therapy with a single medication, distinguishing it from ubrogepant (acute only) and atogepant (preventive only). Lasmiditan is a 5-HT1F agonist. Zolmitriptan is a triptan.

138. D. Atogepant, an oral CGRP receptor antagonist, was specifically developed and approved for migraine prevention only, distinguishing its indication from ubrogepant (acute treatment only) and rimegepant (both acute and preventive use). Lasmiditan is a 5-HT1F agonist for acute treatment. Zolmitriptan is a triptan.

139. C. Fremanezumab, a monoclonal antibody targeting the CGRP ligand itself (rather than its receptor, which erenumab targets), is dosed monthly or quarterly by subcutaneous injection for migraine prevention, offering a mechanistically distinct option within the CGRP-targeting biologic class. Rimegepant and ubrogepant are oral small-molecule gepants. Lasmiditan is a 5-HT1F agonist.

140. D. Dihydroergotamine, an ergot alkaloid, has combined 5-HT1 receptor agonism with additional alpha-adrenergic and dopaminergic activity, used IV, IM, or intranasally for acute severe migraine refractory to oral triptans, typically given with an antiemetic given significant associated nausea, and sharing vasoconstrictive contraindications with the triptan class. Zolmitriptan and sumatriptan are triptans. Rimegepant is a gepant. Lasmiditan is a 5-HT1F agonist.

141. E. Tacrine, the first acetylcholinesterase inhibitor approved for Alzheimer disease, is largely abandoned in current practice given significant hepatotoxicity requiring frequent liver function monitoring, having been superseded by donepezil, rivastigmine, and galantamine with more favorable safety profiles. Memantine is an NMDA receptor antagonist, a different mechanism.

142. D. Selegiline, an older MAO-B inhibitor, requires twice-daily dosing (unlike once-daily rasagiline) and is metabolized to amphetamine-like metabolites (L-amphetamine and L-methamphetamine), a distinguishing pharmacokinetic feature that can occasionally cause insomnia or other stimulant-like effects if dosed too late in the day. Entacapone is a COMT inhibitor. Amantadine has a different, weaker dopaminergic/antiglutamatergic mechanism. Rotigotine is a dopamine agonist patch. Levodopa-carbidopa is the core dopamine replacement therapy.

143. B. Trihexyphenidyl, an anticholinergic agent, is useful specifically for tremor-predominant Parkinson disease symptoms in younger patients with preserved cognition, but is generally avoided in older patients given significant risk of confusion, memory impairment, and other anticholinergic cognitive side effects. Amantadine has a different, weaker mechanism useful more for dyskinesia. Entacapone is a COMT inhibitor. Rotigotine is a dopamine agonist. Selegiline is an MAO-B inhibitor.

144. B. Tofersen, an antisense oligonucleotide administered intrathecally, reduces production of mutant SOD1 protein specifically in SOD1 gene mutation-associated ALS, a genetically targeted therapy distinct from the broader-acting riluzole and edaravone. Nusinersen is an antisense oligonucleotide for spinal muscular atrophy, a different disease and target. Risdiplam is an oral SMN2 splicing modifier, also for SMA.

145. D. Nusinersen, an antisense oligonucleotide administered intrathecally, modifies SMN2 gene splicing to increase production of functional SMN protein in spinal muscular atrophy, addressing the underlying genetic deficiency in SMN1 function. Tofersen targets SOD1 in ALS, a different disease and mechanism. Risdiplam is an oral (not intrathecal) SMN2 splicing modifier for the same disease. Onasemnogene abeparvovec is a gene replacement therapy, a different modality. Edaravone treats ALS.

146. B. Risdiplam, an oral small-molecule SMN2 splicing modifier, is taken daily at home, increasing functional SMN protein production similarly to nusinersen but avoiding the need for repeated intrathecal administration via lumbar puncture. Tofersen targets SOD1 in ALS. Onasemnogene abeparvovec is a one-time gene replacement therapy, a different modality. Nusinersen requires intrathecal dosing.

147. D. Efgartigimod, a neonatal Fc receptor (FcRn) antagonist, reduces circulating IgG autoantibody levels (including pathogenic acetylcholine receptor antibodies) by blocking IgG recycling, a mechanism

distinct from complement inhibition (eculizumab) or B-cell depletion (rituximab), offering a novel approach for refractory generalized myasthenia gravis. Pyridostigmine provides symptomatic acetylcholinesterase inhibition without addressing the underlying autoantibody burden. IVIG works through a different, broader immunomodulatory mechanism.

148. E. Siponimod, an oral S1P receptor modulator with greater subtype selectivity (S1P1 and S1P5) than fingolimod, is specifically approved for active secondary progressive multiple sclerosis, a distinct indication reflecting trial data in this MS subtype. Ocrelizumab and natalizumab are IV infusion biologics. Interferon beta-1a and glatiramer acetate are older injectable, less potent options without this specific S1P mechanism.

149. B. Teriflunomide inhibits dihydroorotate dehydrogenase, blocking pyrimidine synthesis and reducing proliferation of activated lymphocytes, a mechanism related to leflunomide's active metabolite (teriflunomide is in fact leflunomide's primary active metabolite), dosed once daily as an oral disease-modifying therapy for relapsing MS. Siponimod and fingolimod are S1P modulators. Ocrelizumab is an IV anti-CD20 biologic. Cladribine is a purine analog.

150. A. Cladribine, an oral purine analog, is given as two short annual treatment courses (each consisting of a few days of dosing in two monthly cycles), providing durable immune reconstitution-type disease control for highly active relapsing MS without requiring continuous daily dosing, a unique administration pattern among MS DMTs. Teriflunomide and dimethyl fumarate require continuous daily dosing. Siponimod and fingolimod require continuous daily S1P modulation.

151. D. Fluoxetine has the longest half-life among SSRIs, with its active metabolite norfluoxetine extending effective duration even further, giving it the lowest discontinuation syndrome risk in the class and making it a reasonable choice for patients with adherence concerns or history of missed doses. Sertraline and escitalopram have intermediate half-lives. Paroxetine has a short half-life with the highest discontinuation syndrome risk. Citalopram has an intermediate half-life.

152. E. Citalopram carries an FDA warning for dose-dependent QT prolongation, with a maximum recommended daily dose of 40 mg (20 mg in patients over 60, with hepatic impairment, or on CYP2C19 inhibitors), a specific labeling restriction not shared to the same degree by other SSRIs. Sertraline, fluoxetine, paroxetine, and escitalopram lack this specific dose-capping QT warning, though QT effects can occur with any SSRI at sufficient doses.

153. D. Levomilnacipran, a newer SNRI structurally related to milnacipran, has a distinctly higher norepinephrine-to-serotonin reuptake inhibition ratio compared to other SNRIs (such as venlafaxine or duloxetine), and is dosed once daily for MDD. Bupropion is a norepinephrine-dopamine reuptake inhibitor, a different class. Duloxetine is an SNRI with a more balanced reuptake profile rather than this norepinephrine-predominant ratio. Sertraline is an SSRI. Trazodone is a serotonin antagonist/reuptake inhibitor (SARI), a different mechanism.

154. E. Low-dose trazodone is widely used off-label for insomnia given potent histamine H1 and serotonin 5-HT2A receptor antagonism producing sedation, with minimal serotonin reuptake inhibition at these low doses (its antidepressant effect requires higher doses that engage reuptake inhibition more significantly). Mirtazapine is also sedating but through a distinct alpha-2/5-HT2/5-HT3 mechanism. Sertraline, bupropion, and venlafaxine are not typically used for this off-label sedative purpose.

155. E. Doxepin has strong combined serotonin and norepinephrine reuptake inhibition among tricyclic antidepressants along with pronounced antihistaminic and anticholinergic effects, and at low doses is separately FDA-approved specifically for insomnia; at antidepressant doses it requires the same cardiac conduction monitoring precautions (baseline ECG in older patients or those with cardiac risk factors) shared by the TCA class. Nortriptyline and desipramine are secondary amine TCAs with relatively less anticholinergic burden. Trazodone is a non-TCA sedating antidepressant.

156. D. Nortriptyline, the active secondary amine metabolite of amitriptyline, has comparatively less anticholinergic and sedating burden than the parent tertiary amine compound, making it a preferred TCA choice in older adults when tricyclic therapy is specifically indicated (e.g., for neuropathic pain or treatment-resistant depression) despite the general preference to avoid TCAs in this population given fall and cardiac risk. Doxepin, amitriptyline, and imipramine are tertiary amine TCAs with more anticholinergic effect.

157. C. Phenelzine, an irreversible, nonselective MAO inhibitor, requires strict dietary tyramine restriction (aged cheeses, cured meats, certain fermented foods) to avoid hypertensive crisis from excess catecholamine release when monoamine oxidase-mediated tyramine breakdown is blocked, and requires washout periods before/after switching to serotonergic antidepressants given serotonin syndrome risk. Transdermal selegiline at low doses has less dietary restriction requirement given more selective MAO-B inhibition at the skin-delivered dose. Bupropion, mirtazapine, and trazodone are non-MAOI antidepressants.

158. A. Tranylcypromine, structurally related to amphetamine, is an irreversible MAO inhibitor with some inherent stimulant-like properties, historically favored for atypical depression features (hypersomnia, hyperphagia, rejection sensitivity) though sharing the same dietary tyramine restriction and drug interaction precautions as phenelzine. Isocarboxazid is another MAOI without this specific amphetamine-related structure. Selegiline transdermal has more selective MAO-B inhibition at low doses. Bupropion is not an MAOI.

159. D. Cariprazine, a partial agonist at dopamine D2 and D3 receptors (with notably higher D3 affinity than aripiprazole), has a comparatively favorable metabolic profile among atypical antipsychotics, and is approved for schizophrenia as well as bipolar mania/depression and MDD adjunct. Olanzapine, clozapine, and quetiapine have more significant metabolic side effects. Risperidone has an intermediate metabolic profile without this specific D3-selective partial agonism.

160. A. Iloperidone is an atypical antipsychotic requiring gradual titration given orthostatic hypotension risk, with a distinct receptor-binding profile among second-generation agents; among newer agents,

lumateperone is notable for its unique combined mechanism (D2 partial agonism, serotonin reuptake inhibition, and glutamatergic modulation), but iloperidone itself is characterized by its need for slow dose titration to mitigate alpha-1-adrenergic-mediated orthostatic effects, distinguishing its practical use pattern from cariprazine and aripiprazole. Asenapine is sublingual. Ziprasidone has QT considerations. Olanzapine has significant metabolic effects.

161. B. Lumateperone has a unique combined mechanism including serotonin reuptake inhibition alongside dopamine D2 and serotonin 5-HT2A receptor modulation, is notable for minimal metabolic side effects (weight, lipid, glucose) among atypical antipsychotics, and requires no dose titration, simplifying initiation. Iloperidone requires gradual titration for orthostatic hypotension. Cariprazine has a different (D3-preferential partial agonist) mechanism. Pimavanserin lacks direct D2 activity.

162. C. Pimavanserin is specifically approved for Parkinson disease psychosis, working through selective serotonin 5-HT2A inverse agonism without direct dopamine receptor blocking activity, avoiding the motor symptom worsening that standard antipsychotics (even relatively 'Parkinson-friendly' agents like quetiapine and clozapine, which retain some D2 activity) can cause in this particularly dopamine-sensitive population. Olanzapine and risperidone have more significant D2 blockade, generally avoided in Parkinson disease psychosis.

163. B. Perphenazine, an intermediate-potency typical antipsychotic, has a side-effect profile falling between the more sedating, hypotension-prone low-potency agents like chlorpromazine and the more EPS-prone high-potency agents like haloperidol and fluphenazine, offering a middle-ground option within the typical antipsychotic class. Cariprazine, lumateperone, pimavanserin, and asenapine are atypical (second-generation) antipsychotics with different overall receptor-binding profiles.

164. B. Thioridazine has the highest QT prolongation risk among typical antipsychotics, leading to an FDA black-box warning and its use being reserved for schizophrenia refractory to other treatments given the significant cardiac arrhythmia risk. Chlorpromazine shares low-potency sedating properties but with somewhat less pronounced QT risk. Haloperidol and fluphenazine are higher-potency agents with more EPS but different QT emphasis. Perphenazine is an intermediate-potency agent.

165. D. Pimozide is specifically FDA-approved for Tourette syndrome tic suppression refractory to standard therapy, notable for QT prolongation risk requiring baseline and periodic ECG and electrolyte assessment, along with numerous drug interaction precautions given CYP3A4/CYP2D6 metabolism. Haloperidol is used off-label for tics but lacks this specific Tourette-syndrome FDA approval framing. Chlorpromazine and fluphenazine are typical antipsychotics without this specific indication. Thioridazine has the highest overall QT risk among typicals but lacks this specific Tourette approval.

166. C. Modafinil, a wakefulness-promoting agent with a mechanism thought to involve weak dopamine reuptake inhibition among other actions, is used for excessive daytime sleepiness in narcolepsy, obstructive sleep apnea, and shift work disorder, with lower abuse potential (Schedule IV) than the amphetamine-based stimulants (Schedule II) traditionally used for these indications. Lisdexamfetamine,

methylphenidate, and dexmethylphenidate are Schedule II stimulants. Sodium oxybate treats cataplexy/EDS through an entirely different GABA-B mechanism.

167. D. Pitolisant, a histamine H3 receptor antagonist/inverse agonist, increases histaminergic neurotransmission to promote wakefulness in narcolepsy, and is notable for being non-scheduled (unlike modafinil's Schedule IV status), reflecting its distinct, non-dopaminergic mechanism and low abuse potential. Modafinil and armodafinil are Schedule IV wakefulness agents. Sodium oxybate is a Schedule III agent for cataplexy/EDS. Solriamfetol is a dopamine-norepinephrine reuptake inhibitor for EDS.

168. A. Suvorexant, a dual orexin receptor antagonist, blocks wake-promoting orexin neuropeptide signaling to facilitate sleep onset and maintenance, a mechanism distinct from the GABA-A receptor potentiation of Z-drugs (zolpidem, eszopiclone, zaleplon), though it remains a Schedule IV controlled substance given some dependence potential, with next-day somnolence as a primary practical concern. Ramelteon works through melatonin receptor agonism, a different non-scheduled mechanism.

169. E. Ramelteon, a selective MT1/MT2 melatonin receptor agonist, promotes sleep onset without the dependence potential of Z-drugs or orexin antagonists, and is notably not a controlled substance given its distinct receptor mechanism and minimal abuse liability in studies. Zolpidem, eszopiclone, and zaleplon are Schedule IV Z-drugs. Suvorexant is also Schedule IV.

170. A. Tasimelteon, a melatonin receptor agonist, is specifically FDA-approved for non-24-hour sleep-wake disorder, a circadian rhythm disorder common in totally blind individuals without light perception (who lack the light-based cue needed to entrain their circadian rhythm to a 24-hour cycle), a distinct indication from ramelteon's insomnia approval despite mechanistic similarity. Suvorexant and zolpidem lack melatonin-receptor-based mechanisms. OTC melatonin lacks the specific regulatory approval and standardized dosing for this indication.

171. E. Mixed amphetamine salts (dextroamphetamine-amphetamine) combine dextroamphetamine and levoamphetamine in a fixed ratio, providing an alternative Schedule II stimulant class (amphetamine-based rather than methylphenidate-based) for ADHD, distinct from the prodrug lisdexamfetamine which requires enzymatic conversion to release active dextroamphetamine. Dexmethylphenidate is methylphenidate-based. Atomoxetine, viloxazine, and guanfacine are non-stimulant options.

172. E. Norgestimate-ethinyl estradiol combines a progestin with minimal androgenic activity, often specifically marketed and FDA-approved for acne treatment given this favorable androgen profile compared to older progestins. Drospirenone-ethinyl estradiol has antimineralocorticoid rather than antiandrogenic emphasis. Desogestrel-ethinyl estradiol uses a different third-generation progestin. Dienogest-estradiol valerate is a distinct newer combination.

173. B. Desogestrel-ethinyl estradiol contains a third-generation progestin associated with a comparatively increased venous thromboembolism risk relative to second-generation progestins like levonorgestrel, an important counseling point when selecting among combined oral contraceptive options, particularly in patients with other VTE risk factors. Norgestimate-ethinyl estradiol has a more

neutral VTE risk profile. Norelgestromin-ethinyl estradiol is a transdermal patch formulation. Dienogest-estradiol valerate and drospirenone-ethinyl estradiol are distinct progestin combinations.

174. C. The norelgestromin-ethinyl estradiol transdermal patch is applied weekly for three consecutive weeks followed by a patch-free fourth week, delivering norelgestromin (which is metabolized in part to norgestrel) transdermally as an alternative to daily oral dosing, though total estrogen exposure may be somewhat higher than with oral formulations. The vaginal ring and implant are different delivery routes. DMPA is an injectable progestin-only method. A standard combined oral contraceptive requires daily dosing rather than weekly patch application.

175. E. Dienogest is an oral progestin with high progesterone-receptor selectivity and minimal estrogenic, androgenic, or glucocorticoid cross-reactivity, specifically FDA-approved for management of endometriosis-associated pain through combined antiproliferative and anti-inflammatory effects on endometrial tissue. Norethindrone acetate, medroxyprogesterone, drospirenone, and levonorgestrel are progestins used more commonly for contraception or other indications rather than being the specific dienogest-branded endometriosis product.

176. E. Fulvestrant, a selective estrogen receptor degrader (SERD), both blocks and promotes degradation of the estrogen receptor, administered as a monthly intramuscular injection, offering a mechanistically distinct approach from oral selective estrogen receptor modulators (SERMs) like tamoxifen, which have partial agonist activity at some tissues. Anastrozole, letrozole, and exemestane are aromatase inhibitors, a different class blocking estrogen synthesis rather than acting at the receptor.

177. D. Anastrozole, a nonsteroidal aromatase inhibitor, blocks peripheral conversion of androgens to estrogens (the primary postmenopausal estrogen source, since ovarian production has ceased), generally preferred over tamoxifen for postmenopausal adjuvant hormone receptor-positive breast cancer therapy given superior outcomes demonstrated in large trials. Fulvestrant is a SERD. Tamoxifen and raloxifene are SERMs. Ospemifene is used for dyspareunia, not breast cancer treatment.

178. A. Toremifene, a SERM structurally related to tamoxifen, shares a similar overall mechanism of selective estrogen receptor modulation but has a distinct pharmacokinetic profile, and is FDA-approved specifically for metastatic hormone receptor-positive breast cancer in postmenopausal women. Exemestane is a steroidal aromatase inhibitor. Fulvestrant is a SERD. Tamoxifen is the reference SERM this drug is compared against. Anastrozole is a nonsteroidal aromatase inhibitor, a different class.

179. E. Exemestane, a steroidal aromatase inactivator, irreversibly binds and inactivates the aromatase enzyme, a mechanistically distinct approach from the reversible nonsteroidal aromatase inhibitors (anastrozole, letrozole), sometimes retaining effectiveness after nonsteroidal aromatase inhibitor failure given this structural difference. Fulvestrant is a SERD. Tamoxifen is a SERM.

180. C. Abemaciclib, a CDK4/6 inhibitor, blocks cyclin-dependent kinase 4/6-mediated cell cycle progression from G1 to S phase, combined with an aromatase inhibitor or fulvestrant for hormone receptor-positive, HER2-negative metastatic breast cancer, adding a cell-cycle-targeted mechanism to

standard endocrine therapy. Trastuzumab targets HER2, a different pathway not applicable here. Tamoxizen, fulvestrant, and anastrozole are hormonal agents without direct CDK4/6 inhibition.

181. A. Goserelin, a GnRH agonist alternative to leuprolide, is formulated as a subcutaneous implant with monthly or quarterly (12-week) dosing intervals for prostate cancer or endometriosis, sharing the same overall GnRH agonist mechanism (initial flare followed by downregulation and suppression of gonadotropin release) as leuprolide but with a distinct depot delivery system. Triptorelin, nafarelin, and histrelin are alternative GnRH agonists with their own distinct formulations. Danazol is an androgen derivative, a different mechanism.

182. A. Triptorelin, a GnRH agonist, is available in an extended-release depot formulation providing up to 6-month dosing intervals for prostate cancer, among the longest available among GnRH agonist depot options, reducing injection frequency compared to more standard monthly or 3-month formulations. Goserelin has monthly/quarterly implant options. Nafarelin is a nasal spray formulation. Histrelin uses a different (very long, 12-month) subdermal implant approach for a different primary indication (central precocious puberty).

183. B. Nafarelin, a GnRH agonist formulated as an intranasal spray, requires multiple daily doses given rapid absorption and short duration of action, an older delivery approach less commonly used today for central precocious puberty given the dosing burden compared to long-acting injectable or implant options. Histrelin uses a long-acting subdermal implant. Leuprolide and goserelin are injectable/implant depot formulations. Triptorelin has extended-release depot options.

184. C. Histrelin, formulated as a subdermal implant, provides GnRH agonist suppression for up to 12 months per placement, the longest duration among available delivery systems for central precocious puberty management, requiring only annual implant replacement. Nafarelin requires multiple daily intranasal doses. Leuprolide, goserelin, and triptorelin have shorter (monthly to 6-month) dosing intervals in their most common formulations for this indication.

185. D. Flutamide, an older nonsteroidal antiandrogen, blocks androgen receptor binding but requires dosing three times daily given a shorter half-life than newer antiandrogens like bicalutamide, and carries a more significant hepatotoxicity risk requiring liver function monitoring. Bicalutamide requires only once-daily dosing. Enzalutamide and apalutamide are newer-generation antiandrogens. Abiraterone inhibits androgen synthesis rather than blocking the receptor.

186. A. Bicalutamide, an oral nonsteroidal antiandrogen with once-daily dosing, is commonly combined with a GnRH agonist (combined androgen blockade) to prevent the initial testosterone flare associated with GnRH agonist initiation and to provide more complete androgen receptor blockade. Flutamide requires more frequent dosing. Enzalutamide, apalutamide, and abiraterone are newer-generation agents used more in castration-resistant disease.

187. C. Flibanserin, a serotonin 1A receptor agonist/serotonin 2A receptor antagonist (structurally related to antidepressant compounds), is taken daily at bedtime for premenopausal hypoactive sexual

desire disorder, and requires alcohol avoidance given a significant risk of hypotension and syncope with concurrent use, a specific boxed-warning interaction. Bremelanotide is an as-needed subcutaneous injection rather than a daily oral agent. Testosterone is used off-label with different administration. Sildenafil and bupropion lack this specific HSDD FDA approval and daily oral dosing pattern.

188. E. Bremelanotide, a melanocortin receptor agonist, is administered as an as-needed subcutaneous injection prior to anticipated sexual activity (rather than daily dosing like flibanserin), for premenopausal hypoactive sexual desire disorder, with transient nausea and blood pressure elevation as notable side effects requiring counseling. Flibanserin requires daily dosing. Testosterone is used off-label. Sildenafil and bupropion lack this specific HSDD indication.

189. E. Prasterone, an intravaginal DHEA (dehydroepiandrosterone) preparation, is locally converted within vaginal tissue to both estrogens and androgens, providing a nonestrogen-labeled option (though estrogenic metabolites are produced locally) for moderate-to-severe dyspareunia due to vulvovaginal atrophy. Vaginal estrogen cream and conjugated estrogens are direct estrogen preparations. Ospemifene and raloxifene are oral SERMs.

190. B. Topical miconazole, an azole antifungal, is considered first-line and safe for vulvovaginal candidiasis treatment during pregnancy, providing an alternative to oral fluconazole, which carries teratogenicity concerns particularly with higher or repeated dosing. Clotrimazole troche is an oral lozenge for oropharyngeal candidiasis, a different formulation/indication. Nystatin has lower efficacy for vulvovaginal candidiasis. Tinidazole treats trichomoniasis/bacterial vaginosis, not candidiasis.

191. A. Terconazole, an intravaginal triazole antifungal, provides an alternative to miconazole and clotrimazole for vulvovaginal candidiasis through the same general azole class mechanism (inhibiting fungal cell membrane ergosterol synthesis), useful when resistance or intolerance to imidazole-class options (miconazole, clotrimazole) is a concern. Nystatin has a different (polyene) mechanism with lower efficacy for this indication. Tinidazole, metronidazole, and clindamycin vaginal treat bacterial vaginosis or trichomoniasis, not candidiasis.

192. E. Intravaginal boric acid suppositories, an older and inexpensive option with antiseptic and mild antifungal/antibacterial properties, are used as an adjunct for recurrent bacterial vaginosis or vulvovaginal candidiasis refractory to standard azole or antibiotic therapy, though patients must be counseled that boric acid is toxic if taken orally and is for vaginal use only. Terconazole and miconazole are standard azole antifungals. Metronidazole gel and clindamycin vaginal cream are standard bacterial vaginosis treatments.

193. C. Insulin lispro, a rapid-acting insulin analog, has one of the fastest onsets of action among rapid-acting insulins, making it well-suited for continuous subcutaneous insulin infusion pump therapy given its quick absorption after subcutaneous delivery. Insulin degludec and glargine are ultra-long/long-acting basal insulins, not used in pumps for bolus dosing. NPH is intermediate-acting with a delayed, less predictable peak. Insulin detemir is also a long-acting basal analog.

194. A. Insulin glulisine, a rapid-acting insulin analog, carries labeling allowing administration immediately before or within 20 minutes after starting a meal, offering dosing flexibility valuable in patients (such as young children) with unpredictable meal intake. Insulin degludec and glargine are long-acting basal insulins dosed independent of meals. NPH is intermediate-acting, not used for precise meal coverage. Insulin detemir is also a basal, not prandial, insulin.

195. A. Insulin degludec, an ultra-long-acting basal insulin analog, provides a flatter, more stable time-action profile than older long-acting analogs, with a duration exceeding 24 hours and reduced nocturnal hypoglycemia risk, supporting flexible once-daily dosing. Insulin lispro, glulisine, and aspart are rapid-acting prandial insulins, not basal agents. NPH is intermediate-acting with a more pronounced peak and shorter duration.

196. E. Glimepiride, a second-generation sulfonylurea, stimulates pancreatic insulin secretion independent of glucose levels, carrying among the higher risks of hypoglycemia and weight gain within its class, warranting cautious use in elderly patients prone to hypoglycemia unawareness. Metformin does not cause hypoglycemia as monotherapy. Sitagliptin (a DPP-4 inhibitor) and acarbose have low hypoglycemia risk as monotherapy. Pioglitazone is a thiazolidinedione, a different mechanism with weight gain but low intrinsic hypoglycemia risk.

197. D. Glyburide, an older second-generation sulfonylurea, remains widely used given its low cost, providing effective glycemic control in resource-limited settings despite an increased hypoglycemia risk profile relative to some newer agents, particularly in renal impairment or the elderly. Repaglinide and nateglinide are meglitinides, a related but distinct rapid-onset insulin secretagogue class. Sitagliptin is a DPP-4 inhibitor. Canagliflozin is an SGLT2 inhibitor.

198. D. Rosiglitazone, a thiazolidinedione, was heavily restricted or withdrawn from many markets after post-marketing meta-analyses raised concerns about an increased risk of myocardial infarction, a signal not shared by pioglitazone (the other major thiazolidinedione still in wide use). Empagliflozin is an SGLT2 inhibitor with cardiovascular benefit data, unrelated. Metformin and exenatide have favorable or neutral cardiovascular profiles. Glipizide is a sulfonylurea, a different class.

199. C. Exenatide, the original GLP-1 receptor agonist, requires twice-daily subcutaneous injection before meals, a dosing burden that has led to it being less commonly prescribed since the introduction of once-weekly (exenatide extended-release, dulaglutide, semaglutide) and once-daily (liraglutide) formulations. Semaglutide and dulaglutide are once-weekly agents. Liraglutide is once-daily. Tirzepatide is a dual GIP/GLP-1 agonist, once-weekly.

200. C. Sotagliflozin, a dual SGLT1/SGLT2 inhibitor, is approved as adjunctive therapy to insulin in type 1 diabetes, with its additional SGLT1 inhibition reducing intestinal glucose absorption beyond the renal glucose effects of SGLT2-selective agents. Dapagliflozin, empagliflozin, canagliflozin, and ertugliflozin are SGLT2-selective inhibitors, not approved for type 1 diabetes given elevated diabetic ketoacidosis risk in that population without the added SGLT1 benefit.

201. B. Pramlintide, a synthetic amylin analog, is injected before meals as an adjunct to insulin therapy in type 1 (and type 2) diabetes, slowing gastric emptying and suppressing inappropriate postprandial glucagon secretion to improve postprandial glucose control. Liraglutide is a GLP-1 receptor agonist, not amylin-based, and not typically combined with prandial insulin in type 1 diabetes. Sitagliptin, acarbose, and repaglinide act through different, non-amylin mechanisms.

202. D. Diazoxide, given orally, opens pancreatic beta-cell ATP-sensitive potassium channels, suppressing insulin release, and serves as first-line medical therapy for congenital hyperinsulinism before pancreatectomy is considered in refractory cases. Octreotide and somatostatin also suppress insulin secretion but act through a different (somatostatin receptor) mechanism and are typically reserved for diazoxide-unresponsive cases. Glucagon raises glucose acutely but does not address the underlying hyperinsulinism. Insulin glargine would worsen hypoglycemia.

203. B. Desiccated thyroid extract, an older animal-derived (porcine) preparation containing a fixed T4:T3 ratio, is generally not preferred by endocrinologists given batch-to-batch inconsistency in hormone content compared to synthetic, precisely dosed levothyroxine. Liothyronine is synthetic T3 alone. Levothyroxine is synthetic T4 alone, the standard of care. Methimazole and propylthiouracil are antithyroid drugs used for hyperthyroidism, not replacement therapy.

204. E. Potassium perchlorate competitively inhibits the sodium-iodide symporter, blocking iodine uptake into the thyroid; it was historically used therapeutically for hyperthyroidism but has been largely abandoned given aplastic anemia risk, and it is also recognized as an environmental goitrogen. Radioactive iodine ablates thyroid tissue via a different mechanism. Potassium iodide (Lugol's solution) provides excess iodine (Wolff-Chaikoff effect) rather than blocking uptake. Methimazole and propylthiouracil block thyroid hormone synthesis, not iodine uptake.

205. C. Pasireotide, a newer multireceptor-targeted somatostatin analog with broader binding affinity (including SSTR5) compared to first-generation agents, can provide additional benefit in select patients with acromegaly inadequately controlled on first-generation somatostatin receptor ligands like octreotide. Cabergoline and bromocriptine are dopamine agonists, a different mechanism used mainly for prolactinomas. Pegvisomant is a growth hormone receptor antagonist, a distinct third-line option.

206. B. Mitotane, an adrenolytic agent, selectively destroys adrenal cortical cells and is used both for tumor control and as adjuvant therapy in metastatic, inoperable adrenocortical carcinoma, requiring careful therapeutic drug monitoring given its narrow therapeutic window and significant toxicity profile. Ketoconazole, metyrapone, and osilodrostat are steroidogenesis inhibitors used for Cushing syndrome, not selectively cytotoxic to adrenal tissue. Etomidate is used for acute, severe hypercortisolism, typically in ICU settings.

207. B. Somatropin, recombinant human growth hormone, is given as daily subcutaneous injections to children with confirmed growth hormone deficiency to support normal linear growth and body composition. Mecasermin (recombinant IGF-1) is reserved for severe primary IGF-1 deficiency where

the growth hormone receptor pathway itself is defective. Desmopressin treats diabetes insipidus, unrelated. Pegvisomant and octreotide are used to suppress, not replace, growth hormone activity.

208. E. Mecasermin, recombinant IGF-1, is used for severe primary IGF-1 deficiency with growth hormone receptor insensitivity (Laron syndrome), bypassing the defective growth hormone receptor pathway by directly replacing the downstream mediator of growth hormone action. Somatropin (recombinant growth hormone) would be ineffective in this receptor-insensitive population. Octreotide and pegvisomant suppress, rather than replace, growth-hormone-axis activity. Desmopressin treats diabetes insipidus.

209. A. Conivaptan, an IV vasopressin V1a/V2-receptor antagonist (vaptan), treats euvolemic or hypervolemic hyponatremia including SIADH refractory to fluid restriction in hospitalized patients, requiring close sodium monitoring to avoid overly rapid correction and osmotic demyelination risk. Desmopressin is a vasopressin analog, worsening hyponatremia, the opposite mechanism. Tolvaptan is the oral vaptan formulation. Fludrocortisone and hydrocortisone are corticosteroids, unrelated to vasopressin receptor blockade.

210. A. Chlorpropamide, an older first-generation sulfonylurea, is recognized for potentiating antidiuretic hormone effect at the renal collecting duct, causing drug-induced SIADH and hyponatremia, an adverse effect more prominent with this older agent than with newer second-generation sulfonylureas. Metformin, sitagliptin, pioglitazone, and acarbose do not share this antidiuretic-potentiating mechanism.

211. B. Brinzolamide, a topical carbonic anhydrase inhibitor distinct in formulation (suspension rather than solution) from dorzolamide though sharing the same sulfonamide-related structural class and mechanism of reducing aqueous humor production, requires the same caution regarding sulfa allergy history. Timolol is a beta-blocker. Latanoprost is a prostaglandin analog. Brimonidine is an alpha-2 agonist. Pilocarpine is a cholinergic agonist.

212. B. Carteolol, a topical nonselective beta-blocker, provides an alternative to timolol for reducing aqueous humor production through beta-adrenergic blockade, and carries some intrinsic sympathomimetic activity that may lessen certain systemic beta-blockade effects (such as resting bradycardia) compared to timolol. Latanoprostene bunod is a prostaglandin/nitric oxide donor. Netarsudil is a Rho kinase inhibitor. Apraclonidine is an alpha-2 agonist. Dorzolamide is a carbonic anhydrase inhibitor.

213. E. Latanoprostene bunod, a newer prostaglandin analog, is metabolized to latanoprost acid plus a nitric oxide-donating moiety, providing a dual mechanism (increased uveoscleral outflow from the prostaglandin component and increased trabecular meshwork outflow from the nitric oxide component) distinguishing it from single-mechanism prostaglandin analogs. Travoprost, bimatoprost, and unoprostone are prostaglandin analogs without the nitric oxide-donating component. Carbachol is a cholinergic agonist.

214. D. Carbachol, a direct-acting cholinergic agonist with both muscarinic and nicotinic activity, provides a more potent and longer-acting miotic effect than pilocarpine, useful for narrow-angle glaucoma or during ophthalmic surgery to achieve rapid, sustained pupillary constriction. Brimonidine and apraclonidine are alpha-2 agonists. Timolol is a beta-blocker. Latanoprost is a prostaglandin analog, none sharing this direct cholinergic mechanism.

215. C. Besifloxacin, a fourth-generation fluoroquinolone formulated specifically for ophthalmic use (not available systemically, limiting resistance selection pressure), provides enhanced gram-positive coverage compared to earlier-generation fluoroquinolones and benefits from prolonged corneal tissue retention allowing less frequent dosing. Ciprofloxacin and ofloxacin are earlier-generation fluoroquinolones with relatively less gram-positive activity. Moxifloxacin and gatifloxacin are also fourth-generation but are additionally available systemically.

216. D. Sulfacetamide, an older sulfonamide-class topical antibiotic, remains occasionally used for bacterial conjunctivitis given low cost, though growing bacterial resistance has limited its reliability as reliable first-line therapy compared to newer fluoroquinolone options. Tobramycin is an aminoglycoside. Erythromycin and bacitracin are also older topical antibiotics but through different mechanisms (protein synthesis inhibition and cell wall synthesis inhibition respectively). Trifluridine is an antiviral, not antibacterial.

217. B. Natamycin, a topical polyene antifungal, is the only FDA-approved agent specifically for fungal keratitis, particularly effective against Fusarium species, a common cause following contact lens-related corneal trauma. Fluconazole, voriconazole, itraconazole, and amphotericin B are systemic or compounded antifungals sometimes used off-label or as adjuncts in severe/refractory fungal keratitis, but natamycin remains first-line given its specific approval and corneal penetration profile for this indication.

218. C. Trifluridine, a topical antiviral eye drop, is FDA-approved for herpes simplex keratitis and requires frequent dosing (up to 9 times daily during active infection) given its short ocular surface residence time, one of the few agents specifically formulated for topical ophthalmic antiviral use. Valacyclovir, famciclovir, and acyclovir are oral/systemic antivirals sometimes used as alternatives or adjuncts. Foscarnet is reserved for acyclovir-resistant herpes infections, typically administered systemically or by injection.

219. E. Emedastine, a topical selective H1-receptor antihistamine eye drop, provides relief from allergic conjunctivitis symptoms and serves as an alternative dual-mechanism-class agent alongside olopatadine and ketotifen, though emedastine itself is primarily a pure antihistamine (rather than combined antihistamine/mast-cell stabilizer) with a distinct receptor-binding profile. Azelastine nasal spray treats allergic rhinitis, not conjunctivitis directly. Cetirizine and levocetirizine are oral antihistamines.

220. C. Bepotastine, a topical antihistamine with mast cell-stabilizing properties, provides a similar dual mechanism to olopatadine for allergic conjunctivitis with a duration of action supporting twice-daily dosing. Ketotifen ophthalmic is a related dual-mechanism agent but a distinct molecule. Cyclosporine

ophthalmic and lifitegrast target dry eye disease through immunomodulation, a different indication. Lodoxamide is a mast cell stabilizer without antihistamine activity.

221. B. Cevimeline, an oral muscarinic agonist with relative selectivity for M1 and M3 receptors, stimulates salivary and lacrimal gland secretion in Sjogren syndrome-related xerostomia and xerophthalmia, offering a longer duration of action compared to oral pilocarpine. Bethanechol is a muscarinic agonist used primarily for urinary retention, a different indication. Neostigmine, pyridostigmine, and physostigmine are acetylcholinesterase inhibitors, a different mechanism.

222. E. Finafloxacin, a newer fluoroquinolone otic suspension formulated to remain effective at the acidic pH of the infected ear canal, is approved for both otitis externa and, notably, acute otitis media with tympanostomy tubes, reflecting a safety profile considered acceptable with a non-intact tympanic membrane. Neomycin, gentamicin, and tobramycin otic preparations carry ototoxicity concerns with middle ear exposure through a perforation. Ofloxacin otic is also considered relatively safe in this setting but is a distinct, earlier-generation fluoroquinolone.

223. E. Acetic acid otic solution restores the normal acidic pH of the ear canal, creating an environment inhibitory to bacterial and fungal growth, providing a simple, inexpensive, antibiotic-free option for mild otitis externa or as an adjunct to antibiotic therapy. Hydrogen peroxide is used for cerumen/debris removal, not pH-based antimicrobial effect. Carbamide peroxide is a cerumenolytic. Chlorhexidine is a broader-spectrum antiseptic, a different mechanism.

224. B. Fluocinolone otic solution, formulated in an oil-based vehicle, is used for chronic otitis externa with significant canal inflammation and is compatible with ear wick placement in a narrowed or edematous canal, reducing inflammation and associated pruritus. Mometasone nasal spray treats allergic rhinitis, a different site. Triamcinolone, betamethasone, and dexamethasone are corticosteroids used in other formulations/indications rather than this specific oil-based otic preparation.

225. C. Xylometazoline, a topical alpha-adrenergic nasal decongestant, provides an alternative to oxymetazoline with a somewhat shorter duration of action, though it carries the same risk of rebound congestion (rhinitis medicamentosa) if used beyond the recommended 3-day limit. Cetirizine and levocetirizine are oral antihistamines. Azelastine nasal spray is a topical antihistamine. Mometasone nasal spray is a topical corticosteroid, none sharing this direct vasoconstrictive decongestant mechanism.

226. E. Levobunolol, an older nonselective beta-blocker eye drop similar in mechanism to timolol, has been largely supplanted by newer glaucoma agents (prostaglandin analogs, Rho kinase inhibitors) but remains occasionally used, requiring the same systemic beta-blockade precautions (bradycardia, bronchospasm) as other topical nonselective beta-blockers. Betaxolol is cardioselective (beta-1 selective), a distinguishing feature. Carteolol shares intrinsic sympathomimetic activity in a related but distinct formulation. Brimonidine and apraclonidine are alpha-2 agonists.

227. E. Unoprostone, an older docosanoid (prostaglandin-related) eye drop, works partly by reducing episcleral venous pressure and increasing trabecular outflow, a distinct mechanism emphasis compared

to the primarily uveoscleral-outflow-increasing mechanism of newer prostaglandin analogs, and is now rarely used given its comparatively modest efficacy. Latanoprost, bimatoprost, travoprost, and latanoprostene bunod are newer, more potent prostaglandin analogs with the uveoscleral-outflow-predominant mechanism.

228. C. Gatifloxacin ophthalmic, a fourth-generation fluoroquinolone, provides an alternative to moxifloxacin for bacterial conjunctivitis and, unlike besifloxacin (formulated exclusively for ophthalmic use), is also available as a systemic oral formulation in some markets. Ciprofloxacin and ofloxacin are earlier-generation fluoroquinolones. Tobramycin is an aminoglycoside. Natamycin is an antifungal, not an antibacterial agent.

229. A. Ferumoxytol, an IV iron-carbohydrate complex, allows large single-dose administration (up to 510 mg) with a comparatively low reported rate of hypersensitivity reactions, offering a distinct formulation option from ferric carboxymaltose for chronic kidney disease-related iron deficiency anemia. Iron sucrose and ferrous sulfate are other iron formulations with different dosing profiles. Sodium ferric gluconate and iron dextran are additional distinct IV iron formulations.

230. A. Methoxy polyethylene glycol-epoetin beta (methoxy PEG-epoetin beta), a PEGylated erythropoiesis-stimulating agent with an extended half-life, allows dosing as infrequently as once monthly, distinguishing it from the more frequent dosing schedules of epoetin alfa and darbepoetin alfa. Erythropoietin (epoetin alfa) and darbepoetin alfa require more frequent dosing. Romiplostim and eltrombopag are thrombopoietin receptor agonists, a different mechanism for thrombocytopenia rather than anemia.

231. E. Luspatercept, a novel erythroid maturation agent, binds select TGF-beta superfamily ligands to promote late-stage erythroid maturation through a mechanism distinct from erythropoiesis-stimulating agents, providing an option for myelodysplastic syndrome-associated anemia refractory to ESA therapy. Darbepoetin alfa is a conventional ESA acting earlier in erythropoiesis. Eltrombopag, romiplostim, and avatrombopag are thrombopoietin receptor agonists for thrombocytopenia, an unrelated indication.

232. D. Eculizumab, the original terminal complement (C5) inhibitor, requires dosing every 2 weeks after an initial loading period for paroxysmal nocturnal hemoglobinuria and other complement-mediated conditions, and served as the parent molecule from which the longer-acting ravulizumab was later engineered. Ravulizumab is the newer, longer-acting successor requiring less frequent dosing. Rituximab and obinutuzumab are anti-CD20 antibodies. Daratumumab is an anti-CD38 antibody, unrelated mechanisms.

233. E. Aminocaproic acid, a lysine-analog antifibrinolytic similar in mechanism to tranexamic acid (both inhibit plasminogen activation), has a shorter half-life requiring more frequent dosing, providing an alternative for fibrinolytic bleeding or short-term hereditary angioedema prophylaxis. Vitamin K and protamine sulfate reverse different anticoagulant mechanisms (warfarin and heparin respectively). Desmopressin releases stored factor VIII/vWF. Factor VIII concentrate provides direct factor replacement, a different mechanism.

234. E. Recombinant factor VIIa, an IV bypassing agent, activates the coagulation cascade downstream of the factor VIII/IX-dependent tenase complex, providing hemostatic control for breakthrough bleeding in hemophilia A or B patients with high-titer inhibitors rendering standard factor replacement ineffective. Factor VIII and IX concentrates require inhibitor-free status for efficacy. Emicizumab provides prophylaxis rather than acute bypassing therapy for active bleeds. Tranexamic acid is an antifibrinolytic adjunct, not a bypassing agent.

235. A. Von Willebrand factor concentrate, containing both von Willebrand factor and factor VIII, provides direct replacement therapy for severe active bleeding in type 3 (most severe, near-complete vWF deficiency) von Willebrand disease, where desmopressin is ineffective given minimal endogenous vWF stores available to release. Desmopressin works by releasing stored endogenous vWF, ineffective when stores are absent. Factor IX concentrate treats hemophilia B. Recombinant factor VIIa and tranexamic acid are adjunctive, not primary replacement, therapies.

236. B. Cangrelor, an IV P2Y12 inhibitor, has a very short half-life (minutes) allowing rapid onset and offset of antiplatelet effect, useful as a bridging agent during percutaneous coronary intervention when oral P2Y12 inhibitors cannot be given or rapid reversibility is needed before surgery. Clopidogrel, prasugrel, and ticagrelor are oral P2Y12 inhibitors with longer onset/offset profiles. Aspirin is a COX-1 inhibitor, a different antiplatelet mechanism.

237. E. Dasatinib, a second-generation BCR-ABL tyrosine kinase inhibitor, retains activity against most imatinib-resistant BCR-ABL mutations, providing an option for chronic myeloid leukemia refractory or intolerant to imatinib, though it lacks activity against the T315I gatekeeper mutation (requiring ponatinib in that specific setting). Bortezomib and carfilzomib are proteasome inhibitors used in multiple myeloma. Lenalidomide is an immunomodulatory agent. Rituximab is an anti-CD20 antibody, none used for CML.

238. D. Ponatinib, a third-generation BCR-ABL tyrosine kinase inhibitor, retains activity specifically against the T315I gatekeeper mutation that confers resistance to imatinib, dasatinib, and other earlier-generation tyrosine kinase inhibitors, though its use carries significant arterial thrombosis risk requiring careful monitoring. Imatinib and dasatinib lack activity against T315I. Fedratinib is a JAK2 inhibitor for myelofibrosis, an unrelated indication. Acalabrutinib is a BTK inhibitor for B-cell malignancies.

239. B. Fedratinib, an oral JAK2 inhibitor, provides an alternative for intermediate- or high-risk myelofibrosis with inadequate response to ruxolitinib, but carries a boxed warning for serious and fatal encephalopathy (including Wernicke encephalopathy), requiring baseline and ongoing thiamine level monitoring and repletion before and during therapy. Imatinib, dasatinib, and ponatinib are BCR-ABL inhibitors for CML, an unrelated indication. Hydroxyurea is a cytoreductive agent with a different mechanism and lower specificity.

240. B. Acalabrutinib, a second-generation Bruton tyrosine kinase (BTK) inhibitor, offers improved kinase selectivity and a reduced off-target cardiac risk profile (notably less atrial fibrillation) compared to first-generation ibrutinib, providing an alternative targeted therapy option for chronic lymphocytic

leukemia. Ibrutinib is the first-generation BTK inhibitor with more off-target kinase activity. Venetoclax is a BCL-2 inhibitor, a different mechanism. Rituximab and obinutuzumab are anti-CD20 antibodies, not BTK inhibitors.

241. A. Obinutuzumab, a glycoengineered type II anti-CD20 monoclonal antibody, provides enhanced antibody-dependent cellular cytotoxicity and more direct (non-apoptotic) cell death induction compared to the type I antibody rituximab, and is commonly combined with venetoclax or chlorambucil in chronic lymphocytic leukemia regimens. Rituximab is the original type I anti-CD20 antibody. Acalabrutinib and ibrutinib are BTK inhibitors. Venetoclax is a BCL-2 inhibitor, each a different mechanism.

242. B. Carfilzomib, a second-generation IV proteasome inhibitor, provides more selective, irreversible proteasome binding and a reduced peripheral neuropathy risk compared to bortezomib, though it carries its own distinct cardiotoxicity monitoring considerations, used for relapsed or refractory multiple myeloma. Bortezomib is the first-generation, reversible proteasome inhibitor. Lenalidomide is an immunomodulatory agent. Daratumumab and isatuximab are anti-CD38 antibodies, each a different mechanism.

243. A. Isatuximab, an alternative anti-CD38 monoclonal antibody to daratumumab, shares the same target and general mechanism (inducing CD38-expressing plasma cell death through multiple immune-mediated pathways) but binds a distinct epitope, providing an option for relapsed or refractory multiple myeloma including in some daratumumab-refractory settings. Daratumumab is the original anti-CD38 antibody. Carfilzomib and bortezomib are proteasome inhibitors. Lenalidomide is an immunomodulatory agent, each a different mechanism.

244. E. Calcifediol, an extended-release formulation of 25-hydroxyvitamin D3 (the prohormone form requiring renal 1-alpha-hydroxylation for activation), is used specifically in CKD stage 3-4 secondary hyperparathyroidism when residual renal hydroxylation capacity remains sufficient to convert it to active calcitriol, distinguishing it from directly active vitamin D analogs. Calcitriol, paricalcitol, and doxercalciferol are already-active or renally-independent-activation vitamin D analogs used more broadly across CKD stages including dialysis.

245. D. Cholecalciferol (vitamin D3), the standard over-the-counter vitamin D supplement, requires both hepatic 25-hydroxylation and renal 1-alpha-hydroxylation for full activation to calcitriol, an appropriate choice for mild insufficiency in patients with preserved hepatic and renal function capable of completing both activation steps. Calcitriol is already fully active, bypassing this requirement. Paricalcitol, calcifediol, and doxercalciferol are prescription analogs used in more advanced CKD settings.

246. A. Ergocalciferol (vitamin D2), a plant/fungal-derived prescription vitamin D formulation distinct from the animal/skin-derived cholecalciferol (D3), is typically given as a high-dose weekly regimen for a defined repletion course in documented significant vitamin D deficiency. Cholecalciferol is the D3 form, more commonly used for routine supplementation. Calcifediol, calcitriol, and paricalcitol are prescription analogs used in the CKD-mineral bone disease setting rather than general deficiency repletion.

247. D. Antithymocyte globulin, a polyclonal antibody preparation raised against multiple T-cell surface antigens, provides potent T-lymphocyte depletion used for induction immunosuppression in high-immunologic-risk transplants or treatment of severe, steroid-refractory acute cellular rejection. Basiliximab is a monoclonal (single-target) IL-2 receptor antagonist. Belatacept is a costimulation blocker. Muromonab-CD3 is an older monoclonal anti-CD3 antibody, a related but distinct historical agent. Tacrolimus is a maintenance calcineurin inhibitor.

248. A. Muromonab-CD3 (OKT3), an older murine monoclonal antibody targeting the CD3 receptor on T lymphocytes, was historically used for severe transplant rejection treatment but has been largely discontinued from the market given significant cytokine release syndrome risk and the availability of better-tolerated alternatives such as antithymocyte globulin. Antithymocyte globulin is the polyclonal alternative still in use. Basiliximab and belatacept are newer, better-tolerated agents. Rituximab is an anti-CD20 antibody, a different target.

249. A. Nicotinamide (a form of vitamin B3) inhibits intestinal sodium-phosphate cotransporters, providing an adjunct mechanism distinct from calcium-based binders (calcium acetate) and non-calcium binders (sevelamer, lanthanum carbonate, ferric citrate) that primarily bind phosphate directly in the gut lumen, sometimes used in combination to reduce overall binder pill burden. Sevelamer, lanthanum carbonate, and ferric citrate work through direct phosphate-binding mechanisms rather than transporter inhibition.

250. E. Sodium citrate, used for regional anticoagulation of the CRRT circuit, chelates ionized calcium within the extracorporeal circuit to prevent clotting, with calcium then replaced systemically post-filter, avoiding the systemic bleeding risk associated with heparin or direct thrombin inhibitor-based systemic anticoagulation. Unfractionated heparin, argatroban, and bivalirudin all provide systemic anticoagulation with associated bleeding risk. Calcium gluconate is used to replace the calcium removed by citrate chelation, not as the anticoagulant itself.

251. B. Sodium ferric gluconate complex, an older, well-established IV iron formulation, is typically administered as a low-dose formulation given with each hemodialysis session, an established dosing pattern distinct from once-monthly or single-large-dose formulations like ferumoxytol. Ferric citrate is an oral phosphate binder with iron absorption effects, a different route/purpose. Iron isomaltoside and iron sucrose are other distinct IV iron formulations with different dosing schedules.

252. E. Difelikefalin, a novel peripherally-restricted IV kappa-opioid receptor agonist, is FDA-approved specifically for moderate-to-severe CKD-associated pruritus in hemodialysis patients, administered after each dialysis session, targeting a pathway distinct from the antihistamine and gabapentinoid approaches traditionally used with limited efficacy. Nalbuphine is an oral kappa-agonist/mu-antagonist sometimes used off-label for pruritus, a related but distinct agent. Naloxone and naltrexone are opioid antagonists. Gabapentin is used off-label with less specific mechanism.

253. C. Nalbuphine, an oral mixed opioid agonist-antagonist (kappa receptor agonist, mu receptor antagonist), is used off-label for cholestatic or opioid-induced pruritus refractory to standard measures,

providing an alternative oral option distinct from the newer IV kappa-selective agent (difelikefalin) approved specifically for dialysis-associated pruritus. Hydroxyzine is a first-generation antihistamine with limited efficacy for this specific itch mechanism. Naltrexone and naloxone are pure opioid antagonists without the mixed agonist component.

254. E. Iron isomaltoside, an IV iron formulation with a low-molecular-weight carbohydrate (isomaltoside) shell, is associated with a favorable safety profile and allows large single-dose administration, providing an alternative for patients with prior hypersensitivity reactions to older formulations such as iron dextran. Sodium ferric gluconate complex and iron sucrose require smaller, more frequent dosing. Ferric citrate is an oral agent. Ferumoxytol is a distinct large-single-dose iron-carbohydrate complex with its own separate safety considerations.

255. B. Terlipressin, an IV vasopressin analog, causes splanchnic vasoconstriction, improving renal perfusion in hepatorenal syndrome type 1 by redistributing blood flow away from the pathologically dilated splanchnic circulation characteristic of advanced cirrhosis, typically used alongside IV albumin. Desmopressin is a vasopressin analog used for diabetes insipidus and bleeding disorders, not this splanchnic-vasoconstriction indication. Conivaptan is a vasopressin receptor antagonist, the opposite mechanism. Midodrine is an alpha-1 agonist sometimes used as an alternative but through a different mechanism. Octreotide is sometimes used adjunctively but through a different (somatostatin) mechanism.

256. C. IV albumin, a plasma protein-based colloid solution, is used for volume expansion in hepatorenal syndrome (alongside terlipressin) and specifically to prevent post-paracentesis circulatory dysfunction after large-volume paracentesis, given its oncotic properties supporting effective intravascular volume expansion. Normal saline and lactated Ringer's are crystalloid solutions with less sustained oncotic effect. Hydroxyethyl starch, a synthetic colloid, carries acute kidney injury risk, making it a poor choice in this population.

257. B. Indapamide, a thiazide-like diuretic distinct from both chlorthalidone and metolazone, has one of the longest half-lives among available thiazide-type agents and has specific trial evidence supporting stroke risk reduction, distinguishing its evidence base somewhat from other agents in the class. Hydrochlorothiazide has a shorter half-life and less potent antihypertensive effect per its shorter duration. Chlorthalidone and metolazone are related but pharmacologically distinct thiazide-like agents. Furosemide is a loop diuretic, a different class.

258. B. L-carnitine, an amino acid derivative responsible for transporting long-chain fatty acids into mitochondria for beta-oxidation, is supplemented in hemodialysis patients with documented low plasma carnitine levels (from dialytic losses) presenting with dialysis-related muscle cramps, fatigue, or intradialytic hypotension. Coenzyme Q10, thiamine, riboflavin, and alpha-lipoic acid are other supplements without this specific fatty-acid-transport mechanism or established role in dialysis-related carnitine deficiency.

259. A. Yohimbine, an older oral alpha-2 adrenergic antagonist, has modest efficacy for erectile dysfunction through increased central and peripheral noradrenergic tone, largely supplanted by PDE5 inhibitors given their superior efficacy and tolerability, though yohimbine is occasionally still used or studied as an adjunct or alternative. Phentolamine's primary ED-related use is intracavernosal injection, not oral. Prazosin, terazosin, and doxazosin are alpha-1 blockers used for BPH/hypertension, a different mechanism and indication.

260. D. Papaverine, injected intracavernosally, acts as a nonspecific smooth muscle relaxant (via broad phosphodiesterase inhibition) for erectile dysfunction refractory to oral PDE5 inhibitors, and is a common component of compounded trimix formulations alongside phentolamine and alprostadil. Alprostadil is a prostaglandin E1 analog, a distinct single-agent intracavernosal option. Sildenafil and tadalafil are oral PDE5 inhibitors. Yohimbine is an oral alpha-2 antagonist.

261. A. Phentolamine, injected intracavernosally as a nonselective alpha-adrenergic antagonist component of compounded trimix formulations, counteracts sympathetically-mediated cavernosal smooth muscle contraction, complementing papaverine's direct smooth muscle relaxant effect and alprostadil's prostaglandin-mediated mechanism. Terazosin, tamsulosin, and prazosin are oral alpha blockers used for BPH or hypertension, a different route and indication. Yohimbine is an oral alpha-2 antagonist for mild ED.

262. C. Human chorionic gonadotropin (hCG), which mimics luteinizing hormone activity at the testicular Leydig cell LH receptor, stimulates endogenous testosterone production and supports spermatogenesis in hypogonadotropic hypogonadism, preserving fertility potential unlike exogenous testosterone replacement, which suppresses the hypothalamic-pituitary-gonadal axis and spermatogenesis. Testosterone replacement would suppress rather than support fertility. Clomiphene citrate works differently, at the hypothalamic estrogen receptor. Leuprolide, a GnRH agonist, would suppress rather than stimulate this axis at continuous dosing.

263. B. Imipramine, a tricyclic antidepressant, has established efficacy for pediatric nocturnal enuresis refractory to behavioral interventions and desmopressin, working partly through anticholinergic effects on bladder capacity and alteration of sleep architecture (reduced REM/deep sleep arousal threshold effects), though cardiac conduction monitoring and careful dosing are required given TCA toxicity risk in children. Amitriptyline, nortriptyline, doxepin, and desipramine are other TCAs without this specific established pediatric enuresis indication.

264. D. Phenoxybenzamine, an older, irreversible, nonselective alpha-adrenergic antagonist, provides preoperative alpha-blockade for pheochromocytoma prior to surgical resection, offering more complete and sustained blockade than reversible selective alpha-1 blockers, helping prevent intraoperative hypertensive crisis from catecholamine release during tumor manipulation. Terazosin, prazosin, and doxazosin are reversible, selective alpha-1 blockers used primarily for BPH or hypertension. Tamsulosin is also a selective alpha-1 blocker for BPH.

265. A. Terazosin, an oral selective alpha-1 blocker, provides dual benefit for both BPH symptoms and coexisting hypertension, requiring gradual dose titration starting at bedtime given significant first-dose orthostatic hypotension risk, distinguishing it from more uroselective agents (tamsulosin, silodosin) with less blood-pressure-lowering effect. Tamsulosin and silodosin are more uroselective with less antihypertensive effect. Alfuzosin and doxazosin are other alpha-1 blockers with somewhat different selectivity/hypotension profiles.

266. B. Propantheline, an older oral antimuscarinic quaternary ammonium compound, has poor CNS penetration given its charged quaternary structure (reducing central anticholinergic side effects compared to tertiary amine antimuscarinics), but suffers from variable and limited oral bioavailability, contributing to its decreased use relative to newer agents. Oxybutynin, tolterodine, solifenacin, and darifenacin are tertiary amine antimuscarinics with better CNS penetration (and correspondingly more central side effect potential) but more reliable bioavailability.

267. E. Pivmecillinam, an oral prodrug beta-lactam antibiotic hydrolyzed to its active form (mecillinam) after absorption, is specifically studied and used for uncomplicated cystitis including in pregnancy in regions where it is available, offering a beta-lactam option with a favorable resistance profile for this indication. Cefpodoxime is an oral cephalosporin sometimes used as an alternative. Nitrofurantoin and fosfomycin are other first-line agents for uncomplicated cystitis through different mechanisms. Amoxicillin has more resistance concerns for empiric UTI treatment.

268. B. Cefpodoxime, an oral third-generation cephalosporin with reasonable urinary tract penetration, serves as an alternative oral step-down option after initial parenteral therapy for complicated UTI or pyelonephritis in patients intolerant to fluoroquinolones. Ceftriaxone, cefepime, and ceftaroline are parenteral cephalosporins used for initial treatment, not oral step-down. Cefdinir is another oral cephalosporin with relatively less reliable urinary tract concentration for this specific step-down role.

269. A. Botulinum toxin, injected intravesically (into the bladder detrusor muscle), inhibits presynaptic acetylcholine release at the neuromuscular junction, providing prolonged relief (typically 6-9 months per treatment) for neurogenic detrusor overactivity refractory to oral antimuscarinic therapy. Mirabegron and vibegron are oral beta-3 agonists, a different class and route. Oxybutynin and tolterodine are oral antimuscarinics, the therapy class already failed in this refractory scenario.

270. E. Tolterodine, one of the original second-generation antimuscarinics developed with relative bladder selectivity over salivary gland muscarinic receptor effects (compared to earlier nonselective agents like oxybutynin), is available in both immediate-release and extended-release formulations for overactive bladder. Oxybutynin is an earlier-generation, less bladder-selective antimuscarinic. Propantheline is an older quaternary agent. Trospium and fesoterodine are other, distinct newer-generation antimuscarinics.

271. B. Sarecycline, a newer, narrow-spectrum oral tetracycline-class antibiotic developed specifically for acne treatment, has less impact on gut microbiota compared to older broad-spectrum tetracyclines (doxycycline, minocycline) given its narrower antibacterial activity outside the target acne-associated

organisms. Doxycycline and minocycline are broader-spectrum tetracyclines commonly used for acne but with more gut microbiota disruption. Tetracycline is the original agent. Tigecycline is a broad-spectrum IV glycylcycline used for serious infections.

272. E. Clascoterone, a newer topical antiandrogen, blocks androgen receptors directly in the sebaceous gland to reduce sebum production and inflammatory acne lesions, without the significant systemic androgen-blocking effects associated with oral antiandrogens like spironolactone. Spironolactone is an oral antiandrogen with systemic effects (used off-label for acne). Finasteride, flutamide, and bicalutamide are systemic antiandrogens for other indications (BPH, prostate cancer), not topical acne therapy.

273. C. Topical ruxolitinib, a JAK1/JAK2 inhibitor cream, provides a nonsteroidal anti-inflammatory option for atopic dermatitis through cytokine signaling blockade, approved for short-term and non-continuous chronic use given a boxed warning shared with oral JAK inhibitors regarding malignancy, thrombosis, and cardiovascular risk (though systemic absorption from topical use is minimal). Pimecrolimus and tacrolimus topical are calcineurin inhibitors, a different mechanism. Crisaborole is a topical PDE4 inhibitor. Tapinarof is a topical aryl hydrocarbon receptor agonist.

274. C. Tapinarof, a novel topical aryl hydrocarbon receptor agonist, provides a steroid-free treatment option for plaque psoriasis and atopic dermatitis through a distinct mechanism (modulating Th17 cytokine pathways and skin barrier gene expression) separate from calcineurin inhibitors, PDE4 inhibitors, and JAK inhibitors. Crisaborole is a PDE4 inhibitor. Ruxolitinib topical is a JAK inhibitor. Pimecrolimus is a calcineurin inhibitor. Calcipotriene is a vitamin D analog, another distinct mechanism.

275. A. Clobetasol, a superpotent (class I) topical corticosteroid, is used short-term for thick, resistant psoriatic plaques on the trunk or extremities, with use avoided on thin-skinned areas (face, groin, axillae) given significant skin atrophy risk with prolonged application. Triamcinolone is a mid-potency corticosteroid, appropriate for a broader range of body sites. Hydrocortisone is a low-potency corticosteroid, appropriate for facial or sensitive-skin use. Calcipotriene is a nonsteroidal vitamin D analog.

276. E. Griseofulvin, an older oral antifungal, remains a standard treatment for tinea capitis given effective deep hair follicle penetration, since topical antifungal therapy alone is inadequate to clear dermatophyte infection within the hair shaft and follicle. Terbinafine is also effective for tinea capitis (particularly Trichophyton species) and increasingly used as an alternative, but griseofulvin remains the longest-established, broadest-spectrum option historically used first-line, especially for Microsporum species. Fluconazole, itraconazole, and ketoconazole are less specifically established for this pediatric indication.

277. C. Efinaconazole, a topical antifungal nail solution, provides an alternative to oral terbinafine for mild-to-moderate distal subungual onychomycosis in patients wishing to avoid systemic antifungal therapy (and associated hepatotoxicity monitoring), despite generally lower cure rates than oral treatment given limited nail plate penetration. Ciclopirox is another topical antifungal nail lacquer with

even lower cure rates. Sertaconazole is a topical antifungal used for skin, not nail, infections. Griseofulvin is an oral antifungal, primarily for tinea capitis.

278. B. Malathion, a prescription topical organophosphate pediculicide, has ovicidal activity (killing lice eggs, not just live lice) and is applied to dry hair with a caution regarding flammability given its alcohol-based vehicle when exposed to open flame or heat sources, used for head lice resistant to over-the-counter permethrin. Permethrin is the over-the-counter first-line agent already failed in this scenario. Ivermectin topical and spinosad are alternative pediculicides without this specific organophosphate mechanism. Crotamiton treats scabies, not lice.

279. E. Crotamiton, a topical scabicide with additional antipruritic properties, provides an alternative regimen (applied daily for several consecutive days) for scabies in patients who cannot tolerate or have failed permethrin, though it is generally considered less effective overall than permethrin. Malathion is a pediculicide for lice, not primarily used for scabies. Lindane carries significant neurotoxicity concerns limiting use. Oral ivermectin is an alternative systemic option for refractory or crusted scabies, a different route.

280. E. Ciclopirox, a broad-spectrum topical antifungal with additional antibacterial activity, is available as both a nail lacquer formulation for onychomycosis and cream/shampoo formulations for tinea versicolor or seborrheic dermatitis, reflecting its versatility across dermatophyte, yeast, and some bacterial pathogens. Efinaconazole is specifically a nail solution. Sertaconazole and terbinafine topical are skin-focused antifungal formulations. Griseofulvin is an oral, not topical, antifungal.

281. A. Sertaconazole, a topical imidazole antifungal cream, treats tinea corporis and cutaneous candidiasis with additional activity against some gram-positive bacterial organisms, providing an alternative to clotrimazole or miconazole within the imidazole antifungal class. Ciclopirox and efinaconazole are used more specifically for nail or broader dermatophyte/yeast coverage. Terbinafine topical is an allylamine, a different antifungal class. Griseofulvin is an oral antifungal.

282. E. Halobetasol, an alternative superpotent (class I) topical corticosteroid to clobetasol, is similarly restricted to short-term use on thick, recalcitrant psoriatic plaques given comparable skin atrophy and systemic absorption risk with prolonged use. Triamcinolone is a mid-potency corticosteroid. Hydrocortisone is low-potency. Calcipotriene is a nonsteroidal vitamin D analog. Mometasone is a mid-to-high potency corticosteroid, less potent than the class I agents.

283. B. Deferiprone, an oral iron chelator, provides an alternative for transfusion-dependent thalassemia iron overload in patients intolerant to deferoxamine or deferasirox, but carries a boxed warning for agranulocytosis requiring weekly absolute neutrophil count monitoring throughout therapy. Dimercaprol, trientine, calcium disodium EDTA, and succimer are chelators used for other heavy metal toxicities (lead, copper, arsenic), not primarily for transfusional iron overload.

284. E. IV lipid emulsion (Intralipid) therapy acts as a 'lipid sink,' sequestering lipophilic drugs such as local anesthetics within the intravascular lipid phase, reducing free plasma concentration and reversing

cardiotoxicity or seizures in severe local anesthetic systemic toxicity (LAST), and is also used adjunctively in some other lipophilic drug overdoses (certain calcium channel blockers, beta-blockers, tricyclics). Sodium bicarbonate, calcium gluconate, glucagon, and methylene blue treat other specific toxidromes through unrelated mechanisms.

285. B. 4-factor prothrombin complex concentrate (PCC), containing concentrated factors II, VII, IX, and X, provides rapid reversal of warfarin-associated life-threatening bleeding, achieving faster INR correction with a smaller infusion volume than fresh frozen plasma. Vitamin K provides slower reversal over hours given its onset requiring new factor synthesis. Idarucizumab and andexanet alfa reverse different anticoagulants (dabigatran and factor Xa inhibitors respectively), not warfarin.

286. E. Fresh frozen plasma, containing all clotting factors at their native plasma concentrations, provides replacement therapy for rare clotting factor deficiencies lacking a specific concentrate product, or for complex coagulopathy (such as in massive transfusion or liver failure) requiring broad factor replacement. 4-factor PCC contains only factors II, VII, IX, and X. Cryoprecipitate contains concentrated fibrinogen, factor VIII, von Willebrand factor, and factor XIII, a narrower factor profile. Platelets and packed red blood cells address different blood components.

287. A. Diphenhydramine, given IV, rapidly reverses acute dystonic reactions (torticollis, oculogyric crisis, opisthotonus) caused by dopamine antagonist medications (such as metoclopramide or antipsychotics) through its anticholinergic activity, which restores the dopamine-acetylcholine balance disrupted by dopamine receptor blockade. Promethazine and trimethobenzamide are themselves dopamine-antagonist antiemetics that can cause this reaction, not treat it. Metoclopramide is a common causative agent. Ondansetron works through a different (5-HT3) mechanism without this dystonic reaction risk.

288. C. Icatibant, a subcutaneous bradykinin B2-receptor antagonist, directly targets the bradykinin-mediated mechanism underlying ACE inhibitor-induced angioedema (distinct from histamine-mediated allergic angioedema), providing a specific treatment option when standard antihistamine/corticosteroid/epinephrine therapy (effective mainly for histamine-mediated angioedema) fails. Epinephrine and diphenhydramine target histamine-mediated pathways. C1 esterase inhibitor concentrate and ecallantide are used primarily for hereditary angioedema (C1 inhibitor deficiency), a related but distinct bradykinin-mediated condition.

289. B. Obiltoxaximab, an IV monoclonal antibody, neutralizes anthrax toxin by binding protective antigen, preventing toxin entry into host cells, used as an adjunct to appropriate antibacterial therapy for inhalational anthrax, and is one of two FDA-approved monoclonal antibodies specifically for this indication (alongside raxibacumab). Botulinum antitoxin, diphtheria antitoxin, and digoxin immune Fab target entirely different toxins through antibody-based neutralization of their respective targets.

290. E. Raxibacumab, the second FDA-approved IV monoclonal antibody targeting anthrax protective antigen, was developed and approved separately from obiltoxaximab, and is similarly used as an adjunct to appropriate antibacterial therapy for inhalational anthrax rather than as monotherapy. Obiltoxaximab

is the other agent in this same specific two-drug class. Botulism immune globulin and vaccinia immune globulin target entirely different toxins/pathogens. Botulinum antitoxin neutralizes botulinum toxin, unrelated to anthrax.

291. E. Botulism immune globulin intravenous (BIG-IV), a human-derived immune globulin concentrate, is specifically developed and FDA-approved for infant botulism, offering a product distinct from the equine-derived heptavalent botulinum antitoxin used for adult foodborne or wound botulism, with the human-derived formulation reducing hypersensitivity reaction risk in infants. Botulinum antitoxin heptavalent is the equine-derived product for older patients. Vaccinia immune globulin and diphtheria antitoxin target entirely different pathogens/toxins.

292. C. Vaccinia immune globulin, a human-derived immune globulin specific to vaccinia virus, treats severe complications of smallpox (vaccinia) vaccination such as eczema vaccinatum, progressive vaccinia, or ocular vaccinia, providing passive immunity against the vaccine virus itself. Botulinum antitoxin, raxibacumab, obiltoxaximab, and botulism immune globulin target entirely different toxins or pathogens unrelated to vaccinia virus complications.

293. B. Sodium nitrite, given IV, induces methemoglobin formation, which competitively binds cyanide away from mitochondrial cytochrome oxidase, restoring cellular respiration; it forms part of the classic cyanide antidote kit alongside inhaled amyl nitrite (used as a bridge before IV access) and IV sodium thiosulfate (which provides sulfur for cyanide's enzymatic conversion to less toxic thiocyanate). Amyl nitrite is the inhalational bridging agent. Hydroxocobalamin is a newer, alternative cyanide antidote with a different (direct cyanide-binding) mechanism preferred in smoke inhalation given lower methemoglobinemia risk. Sodium thiosulfate is the third classic antidote kit component.

294. C. Coral snake antivenom, specific to elapid (coral snake) venom, is required for coral snake envenomation given the distinct neurotoxic mechanism (alpha-neurotoxin-mediated neuromuscular blockade) compared to the hemotoxic, tissue-destructive venom of pit vipers (rattlesnakes, copperheads, cottonmouths), for which crotalidae polyvalent immune Fab is used instead. Black widow spider antivenom and scorpion antivenom target entirely different venoms. Digoxin immune Fab treats digoxin toxicity, unrelated to envenomation.

295. C. Scorpion antivenom specific to Centruroides species treats severe neuromuscular hyperexcitability (roving eye movements, opisthotonus, excessive secretions, respiratory distress) from Centruroides scorpion envenomation, a syndrome distinct from other venomous bites/stings and requiring this species-specific antivenom for effective neutralization. Coral snake antivenom, crotalidae polyvalent immune Fab, and black widow spider antivenom target entirely different venoms. Digoxin immune Fab treats digoxin toxicity.

296. B. Dexrazoxane, given IV within 6 hours of anthracycline extravasation, reduces local tissue damage through a combination of topoisomerase II inhibition (blocking the mechanism of anthracycline-induced DNA damage) and iron chelation (reducing free-radical-mediated tissue injury), and is separately also used to reduce cumulative anthracycline cardiotoxicity risk. Mesna protects against a

different chemotherapy toxicity (hemorrhagic cystitis from cyclophosphamide/ifosfamide). Deferoxamine is a general iron chelator without this specific extravasation indication. Amifostine and leucovorin protect against other, unrelated chemotherapy toxicities.

297. E. Mesna, co-administered with ifosfamide (and high-dose cyclophosphamide), binds and neutralizes urotoxic metabolites (particularly acrolein) within the bladder, preventing hemorrhagic cystitis, a well-recognized dose-limiting toxicity of these oxazaphosphorine chemotherapy agents. Dexrazoxane protects against anthracycline-related cardiotoxicity and extravasation injury, an unrelated toxicity. Amifostine protects against certain other chemotherapy/radiation toxicities. Leucovorin rescues from methotrexate toxicity. Deferoxamine is an iron chelator.

298. B. Propofol, a rapid-onset, short-acting IV sedative-hypnotic, allows quick neurologic assessment with brief infusion interruption given its short context-sensitive half-time even after prolonged infusion, but carries risk of propofol infusion syndrome (a rare but serious complication including metabolic acidosis, rhabdomyolysis, and cardiac dysfunction) with prolonged high-dose use, particularly in critically ill patients. Dexmedetomidine is an alpha-2 agonist sedative with a different profile (less respiratory depression, no infusion syndrome risk). Midazolam and lorazepam are benzodiazepines with more accumulation risk in hepatic/renal impairment. Ketamine has a distinct dissociative mechanism.

299. C. Rocuronium, a nondepolarizing neuromuscular blocker, has the fastest onset among nondepolarizing agents (particularly at higher intubating doses), allowing intubation conditions approaching those of succinylcholine, making it the preferred alternative when succinylcholine is contraindicated (hyperkalemia risk, malignant hyperthermia susceptibility, or other conditions). Vecuronium, cisatracurium, and mivacurium are other nondepolarizing agents with slower onset. Succinylcholine is the depolarizing agent contraindicated in this scenario.

300. A. Dexmedetomidine, an alpha-2 adrenergic agonist sedative, offers sedation with comparatively less respiratory depression than propofol or benzodiazepines, additionally providing some analgesic and anxiolytic properties, allowing patients to remain more easily arousable and cooperative, though bradycardia and hypotension are recognized dose-related adverse effects requiring monitoring. Propofol carries more significant respiratory depression risk and infusion syndrome concerns. Midazolam is a benzodiazepine with more accumulation risk. Fentanyl is an opioid analgesic without primary sedative-hypnotic classification. Ketamine has a distinct dissociative mechanism.