Q: A patient with chronic opioid use has developed tolerance. Which of the following effects are the patient *least likely* to become tolerant to?
A. Respiratory depression
B. Euphoria
C. Nausea
D. Constipation
Correct Answer: D – Constipation does **not** develop tolerance.

Q: A patient is tolerant to oxycodone. The provider is considering a switch to hydromorphone. What principle allows the provider to assume similar tolerance to the new opioid?
A. Receptor desensitization
B. Cross-dependence
C. Cross-tolerance
D. Opioid-sparing effect
Correct Answer: C – Opioids show **cross-tolerance** due to shared μ-receptor activity.

Q: Which of the following statements is TRUE regarding opioids and other CNS depressants like benzodiazepines?
A. They share full cross-tolerance.
B. They act on the same receptors.
C. They show no cross-tolerance.
D. They can be substituted for each other in withdrawal.
Correct Answer: C – There is **no cross-tolerance** between opioids and other CNS depressants.

Q: A patient on heroin receives buprenorphine too soon after last use. The patient suddenly experiences sweating, agitation, and abdominal cramps. What likely occurred?
A. Cross-tolerance
B. Post-acute withdrawal
C. Precipitated withdrawal
D. Opioid overdose
Correct Answer: C – Buprenorphine can **displace full agonists** and cause **precipitated withdrawal** if started too early.

Q: At high doses, buprenorphine can block opioid-induced euphoria by:
A. Stimulating dopamine release
B. Irreversibly binding to GABA receptors
C. Displacing full opioid agonists from μ-receptors
D. Acting as a serotonin reuptake inhibitor

Correct Answer: C – It **displaces full agonists** at the μ-receptor, preventing euphoria.

Q: Which of the following best describes noncompetitive antagonists?
A. Their effects are easily reversed with higher doses of agonists.
B. They bind to receptors reversibly.
C. They reduce the maximal effect an agonist can produce.
D. They are commonly used due to short duration.

Correct Answer: C – Noncompetitive antagonists **reduce max response** and **cannot be overcome** by adding more agonist.

Q: Which of the following medications is most likely to prolong the QT interval?
A. Lisinopril
B. Metformin
C. Haloperidol
D. Acetaminophen

Correct Answer: C – **Haloperidol** is a known QT-prolonging antipsychotic.

Q: A patient is taking fluconazole and citalopram. What additional factor would further increase the risk of torsades de pointes?
A. Hyperkalemia
B. Hypomagnesemia
C. Beta-blocker use
D. Opioid tolerance

Correct Answer: B – **Low magnesium** increases the risk of **QT-related arrhythmias**.

Q: Who determines whether a nurse practitioner can prescribe controlled substances in a given state?
A. FDA
B. DEA
C. State Board of Nursing or Medicine
D. Centers for Medicare & Medicaid Services (CMS)

Correct Answer: C – Prescriptive authority is determined by **state boards**.

Q: A hospital uses a closed formulary system. What does this imply for prescribing providers?
A. They can prescribe any FDA-approved drug.
B. Drugs not on the formulary require justification or prior approval.

C. All brand-name drugs are preferred.
D. Controlled substances are excluded.

Correct Answer: B – **Closed formularies** limit prescribing to **approved drugs**, with exceptions needing **special approval**.

Q: Why do albumin-bound drugs stay in the bloodstream during renal filtration?
A. They are actively reabsorbed by the tubules
B. Albumin neutralizes the drug's activity
C. Albumin-drug complexes are too large to pass through glomerular pores
D. They are rapidly metabolized before reaching the kidneys
Answer: C

Q: What best describes the action of noncompetitive antagonists?
A. They bind reversibly and reduce drug half-life
B. They bind irreversibly and reduce the total number of available receptors
C. They compete directly with agonists
D. Their effect increases with higher doses of agonists
Answer: B

Q: How does drug metabolism in children compare to adults?
A. Children metabolize drugs more slowly
B. Metabolism is the same after age 1
C. Children metabolize drugs faster than adults
D. Drug metabolism is independent of age
Answer: C

Q: What causes increased drug sensitivity in neonates?
A. Increased enzyme activity
B. Decreased protein binding
C. Organ immaturity
D. Overactive renal clearance
Answer: C

Q: What is the most important cause of adverse drug reactions in older adults?
A. Polypharmacy
B. Decreased liver function

C. Drug accumulation due to reduced renal excretion
D. Increased receptor sensitivity
Answer: C

Q: Which diuretic class is associated with ototoxicity?
A. Thiazides
B. Potassium-sparing
C. Loop diuretics
D. Carbonic anhydrase inhibitors
Answer: C

Q: Which benefit is common to ACE inhibitors and ARBs in heart failure treatment?
A. Increase LDL
B. Prevent arrhythmias
C. Prolong survival
D. Decrease potassium levels
Answer: C

Q: What effect does losartan have on diabetic retinopathy?
A. Reverses retinopathy
B. Slows development, but not effective for existing retinopathy
C. No effect on any stage
D. Cures microvascular damage
Answer: B

Q: What is the mechanism of action of digoxin?
A. Calcium channel blockade
B. Sympathetic stimulation
C. Inhibits sodium-potassium ATPase
D. Direct β1 receptor activation
Answer: C

Q: Why is potassium level important in digoxin therapy?
A. Potassium enhances digoxin absorption
B. Potassium competes with digoxin for receptor binding

C. Potassium prolongs digoxin half-life
D. Potassium inactivates digoxin
Answer: B

Q: Which beta blockers are approved for heart failure treatment?
A. Atenolol, propranolol, nadolol
B. Metoprolol tartrate, sotalol, esmolol
C. Carvedilol, bisoprolol, metoprolol succinate
D. Labetalol, acebutolol, pindolol
Answer: C

Q: What is a concern when using beta blockers in diabetic patients?
A. Beta blockers raise blood glucose
B. They mask hypoglycemia symptoms
C. They increase insulin secretion
D. They cause ketoacidosis
Answer: B

Q: Which of the following is NOT an effect of mu (μ) receptor activation?
A. Respiratory depression
B. Diarrhea
C. Analgesia
D. Euphoria
Answer: B

Q: Tramadol is absolutely contraindicated with:
A. SSRIs
B. Benzodiazepines
C. MAO inhibitors
D. Beta blockers
Answer: C

Q: Tolerance to opioids develops to all of the following EXCEPT:
A. Euphoria
B. Nausea
C. Respiratory depression
D. Constipation
Answer: D

Q: What is true about naltrexone for opioid use disorder?
A. Given daily only
B. Controlled substance
C. Monthly IM formulation is available
D. Requires DEA waiver
Answer: C

Q: Which of the following is NOT a serious adverse effect of NSAIDs?
A. Hypertension
B. Renal impairment
C. MI
D. Gastric ulcers
Answer: A

Q: When do signs of liver injury typically appear after acetaminophen overdose?
A. Immediately
B. 2–4 hours
C. 48–72 hours
D. 7 days
Answer: C

Q: Abatacept (Orencia) is:
A. An NSAID
B. A corticosteroid
C. A TNF inhibitor
D. A biologic DMARD
Answer: D

Q: Methadone can cause which cardiac effect?
A. Bradycardia
B. QT prolongation
C. AV block
D. Atrial fibrillation
Answer: B

Q: Chronic opioid use in the 1st trimester is associated with:
A. Neural tube defects
B. Cardiac defects
C. Lung malformations
D. Kidney agenesis
Answer: B

Q: What distinguishes naltrexone from naloxone?
A. Naloxone is oral
B. Naltrexone is used for overdose
C. Naltrexone is longer-acting and used for maintenance
D. Naloxone prevents relapse
Answer: C

Q: What is a concern when combining digoxin with diltiazem?
A. Bleeding
B. Hypertension
C. AV block
D. Hyperkalemia
Answer: C

Q: How is nitrate tolerance managed?
A. Increase dose
B. Give with food
C. Provide daily nitrate-free interval
D. Add calcium supplement
Answer: C

Q: Statins are contraindicated during pregnancy due to:
A. Risk of bleeding
B. Teratogenic effects
C. Poor absorption
D. Risk of thromboembolism
Answer: B

Q: What is the first-line pharmacologic treatment for uncomplicated hypertension?
A. Beta blockers
B. Loop diuretics

C. Thiazide diuretics
D. ACE inhibitors
Answer: C

Q: Denosumab is used for all EXCEPT:
A. Osteoporosis
B. Bone metastases
C. Hypercalcemia of malignancy
D. Hyperthyroidism
Answer: D

Q: What is the mechanism of action of cinacalcet?
A. Inhibits osteoclasts
B. Activates calcium-sensing receptor
C. Promotes bone formation
D. Decreases PTH synthesis via Vitamin D
Answer: B

Scenario:
A 65-year-old patient is prescribed a highly protein-bound drug. Lab results show low serum albumin levels.
Question:
How might hypoalbuminemia affect the pharmacokinetics of this drug?
A. Increased free drug concentration leading to enhanced effects and potential toxicity
B. Decreased drug efficacy due to reduced binding
C. No change in drug activity
D. Enhanced drug excretion due to increased filtration
Answer: A
Rationale: Low albumin levels result in fewer binding sites, increasing the free (active) drug concentration, which can enhance effects and risk toxicity.

Scenario:
A patient overdoses on a drug that acts as a noncompetitive antagonist.
Question:
What is the primary characteristic of noncompetitive antagonists?
A. They bind reversibly to receptors
B. Their effects can be overcome by increasing agonist concentration

C. They bind irreversibly, reducing the number of available receptors

D. They enhance the effect of endogenous agonists

Answer: C

Rationale: Noncompetitive antagonists bind irreversibly to receptors, decreasing the number of receptors available for activation, thus reducing the maximal response achievable by agonists.

Scenario:

A 4-year-old child requires medication for an infection.

Question:

How does drug metabolism in children differ from adults?

A. Children metabolize drugs slower than adults

B. Children metabolize drugs at the same rate as adults

C. Children metabolize drugs faster than adults

D. Children cannot metabolize drugs

Answer: C

Rationale: Children often have increased metabolic rates, leading to faster drug metabolism compared to adults.

Scenario:

A neonate is prescribed a medication eliminated by the kidneys.

Question:

Why are neonates at increased risk for adverse drug reactions?

A. Enhanced renal excretion

B. Mature liver enzyme systems

C. Immature organ systems leading to drug accumulation

D. Increased plasma protein binding

Answer: C

Rationale: Neonates have immature liver and kidney functions, leading to reduced drug metabolism and excretion, increasing the risk of drug accumulation and adverse effects.

Scenario:

An 80-year-old patient presents with signs of drug toxicity.

Question:

What is a common cause of adverse drug reactions in older adults?

A. Increased hepatic metabolism

B. Enhanced renal clearance

C. Reduced renal excretion leading to drug accumulation

D. Increased plasma protein levels

Answer: C

Rationale: Aging is associated with decreased renal function, leading to reduced drug clearance and potential accumulation, increasing the risk of toxicity.

Scenario:

A patient on furosemide reports hearing loss.

Question:

Which diuretic class is associated with ototoxicity?

A. Thiazide diuretics

B. Potassium-sparing diuretics

C. Loop diuretics

D. Carbonic anhydrase inhibitors

Answer: C

Rationale: Loop diuretics, like furosemide, can cause ototoxicity, especially at high doses or rapid IV administration.

Scenario:

A patient with heart failure is prescribed an ACE inhibitor and a beta-blocker.

Question:

What is the primary benefit of these medications in heart failure?

A. Symptom relief only

B. No impact on survival

C. Improved symptoms and prolonged survival

D. Increased hospitalization rates

Answer: C

Rationale: ACE inhibitors and certain beta-blockers have been shown to improve symptoms and prolong survival in heart failure patients.

Scenario:

A diabetic patient without retinopathy is started on losartan.

Question:

What effect does losartan have on diabetic retinopathy?

A. Reverses established retinopathy

B. Prevents progression in early stages

C. No effect on retinopathy

D. Worsens retinopathy

Answer: B

Rationale: Losartan has been shown to slow the development and progression of diabetic retinopathy in early stages but not reverse established disease.

Scenario:
A patient is initiated on lisinopril for hypertension.
Question:
What is the recommended starting dose of lisinopril?
A. 2.5 mg daily
B. 5 mg daily
C. 10 mg daily
D. 20 mg daily
Answer: C
Rationale: The typical starting dose for lisinopril in hypertension is 10 mg once daily, as per standard dosing guidelines.

Scenario:
A patient with atrial fibrillation is prescribed digoxin.
Question:
What is the primary mechanism of action of digoxin?
A. Beta-adrenergic blockade
B. Calcium channel inhibition
C. Inhibition of Na+/K+ ATPase leading to increased intracellular calcium
D. Activation of renin-angiotensin system
Answer: C
Rationale: Digoxin inhibits the Na+/K+ ATPase pump, leading to increased intracellular calcium, which enhances cardiac contractility.

Scenario:
A patient on digoxin develops hypokalemia.
Question:
How does hypokalemia affect digoxin toxicity?
A. Decreases risk of toxicity
B. No effect on toxicity
C. Increases risk of toxicity
D. Enhances drug clearance
Answer: C
Rationale: Low potassium levels enhance digoxin's binding to Na+/K+ ATPase, increasing the risk of toxicity.

Scenario:
A patient intolerant to ACE inhibitors is prescribed an ARB.
Question:
What benefits do ARBs provide in heart failure?
A. Only symptom relief
B. No impact on mortality
C. Improve symptoms and reduce mortality

Scenario:
A 65-year-old patient with hypoalbuminemia is prescribed a highly protein-bound drug.
Question:
How might hypoalbuminemia affect the pharmacokinetics of this drug?
Answer:
It may increase the free (active) concentration of the drug, potentially leading to toxicity.
Rationale:
Drugs bound to albumin remain in the bloodstream and are inactive. In hypoalbuminemia, fewer binding sites are available, increasing the free drug concentration and risk of adverse effects.

Scenario:
A patient is administered a noncompetitive antagonist.
Question:
What is the effect of this antagonist on receptor activity?
Answer:
It binds irreversibly to receptors, reducing the number of available receptors for agonists, thereby decreasing the maximal response achievable.
Rationale:
Noncompetitive antagonists bind permanently to receptors, rendering them inactive and reducing the efficacy of agonists regardless of their concentration.

Scenario:
A pediatric patient requires medication dosing.
Question:
How does drug metabolism in children compare to adults?
Answer:
Children often metabolize drugs faster than adults, necessitating careful dosing adjustments.

Rationale:
Due to immature organ systems, children may have increased metabolic rates for certain drugs, affecting dosing requirements.

Scenario:
A neonate is prescribed a new medication.
Question:
Why are neonates at increased risk for adverse drug reactions?
Answer:
Due to organ system immaturity, leading to heightened drug sensitivity.
Rationale:
Immature liver and kidney functions in neonates can impair drug metabolism and excretion, increasing the risk of toxicity.

Scenario:
An elderly patient is experiencing side effects from a renally excreted drug.
Question:
What is a likely cause of these adverse reactions?
Answer:
Reduced renal excretion leading to drug accumulation.
Rationale:
Age-related decline in renal function can decrease drug clearance, necessitating dosage adjustments to prevent toxicity.

Scenario:
A patient on loop diuretics reports hearing loss.
Question:
Which class of diuretics is associated with ototoxicity?
Answer:
Loop diuretics.
Rationale:
Loop diuretics can cause ototoxicity, especially at high doses or rapid IV administration.

Scenario:
A patient with heart failure is prescribed a new medication.
Question:
Which drug class has been shown to prolong survival in heart failure patients?

Answer:
Both ACE inhibitors and ARBs.
Rationale:
These medications improve symptoms, reduce hospitalizations, and have been shown to prolong survival in heart failure patients.

Scenario:
A diabetic patient without retinopathy is prescribed Losartan.
Question:
How does Losartan affect diabetic retinopathy?
Answer:
It slows the development and progression of retinopathy but has no benefit in patients with established retinopathy.
Rationale:
Losartan has been shown to prevent the onset of retinopathy but does not reverse existing damage.

Scenario:
A patient is prescribed Digoxin for heart failure.
Question:
What is the mechanism of action of Digoxin?
Answer:
It inhibits the Na+/K+ ATPase pump, increasing intracellular calcium and enhancing cardiac contractility.
Rationale:
By inhibiting this pump, Digoxin increases calcium availability in cardiac cells, improving contractility.

Scenario:
A patient on Digoxin has low potassium levels.
Question:
Why is hypokalemia concerning in this patient?
Answer:
Low potassium enhances Digoxin binding to its receptor, increasing the risk of toxicity.
Rationale:
Potassium competes with Digoxin for binding sites; low levels can lead to increased Digoxin effects and toxicity.

Question 1

A 75-year-old patient presents with signs of confusion and generalized weakness. Labs show elevated serum drug levels. He has a history of hypertension and chronic kidney disease. Which of the following most likely explains the drug accumulation?

A. Decreased hepatic metabolism

B. Increased GI absorption

C. Reduced renal excretion

D. Protein binding displacement

Answer: C. Reduced renal excretion

Rationale: In older adults, reduced renal function is the most important cause of adverse drug reactions due to drug accumulation.

Question 2

A 4-year-old child requires a dose adjustment for a medication. Which statement about pediatric pharmacokinetics is correct?

A. Children metabolize drugs slower than adults

B. Drug sensitivity is decreased in children

C. Drug metabolism is faster in children than adults

D. They excrete drugs primarily through bile

Answer: C. Drug metabolism is faster in children than adults

Rationale: Children generally metabolize drugs more rapidly than adults due to increased liver enzyme activity.

Question 3

Which statement is correct about noncompetitive antagonists?

A. They bind reversibly to receptors

B. Their effect increases with higher agonist doses

C. They irreversibly reduce the number of receptors available

D. They increase the efficacy of agonists

Answer: C. They irreversibly reduce the number of receptors available

Rationale: Noncompetitive antagonists bind irreversibly, decreasing the number of receptors available and reducing the maximal agonist response.

Question 4

A patient taking a protein-bound drug has low albumin levels. What is the expected pharmacokinetic effect?

A. Increased drug excretion

B. Decreased drug absorption

C. Increased free drug levels

D. Reduced drug distribution

Answer: C. Increased free drug levels

Rationale: Low albumin means fewer binding sites, increasing free (active) drug levels and potentially increasing toxicity.

Question 5

Which receptor is primarily responsible for the effects of opioid analgesics?

A. Delta

B. Sigma

C. Mu

D. Kappa

Answer: C. Mu

Rationale: Opioid analgesics act mainly on mu receptors, which mediate analgesia, euphoria, respiratory depression, and dependence.

Question 6

A patient who is opioid-tolerant is switched from oxycodone to morphine. What is the expected effect?

A. Complete withdrawal symptoms

B. Cross-tolerance allows continued analgesia

C. Overdose due to different mechanisms

D. Immediate pain relief with no risks

Answer: B. Cross-tolerance allows continued analgesia

Rationale: Cross-tolerance exists among opioids, so tolerance to one generally confers tolerance to others.

Question 7

A patient is given buprenorphine for opioid use disorder. Why must the provider ensure the patient is in mild withdrawal first?

A. To ensure immediate relief from pain

B. To reduce nausea

C. To prevent precipitated withdrawal

D. To avoid liver toxicity

Answer: C. To prevent precipitated withdrawal

Rationale: Buprenorphine can displace full agonists and trigger withdrawal symptoms if administered too early.

Question 8

Which medication is known for QT interval prolongation?

A. Methadone

B. Digoxin

C. Losartan

D. Naproxen

Answer: A. Methadone

Rationale: Methadone can prolong the QT interval and increase the risk for torsades de pointes.

Question 9

Which drug should not be combined with tramadol due to risk of hypertensive crisis?

A. Benzodiazepines

B. MAOIs

C. NSAIDs

D. SSRIs

Answer: B. MAOIs

Rationale: Combining tramadol with MAOIs can result in hypertensive crisis; the combination is contraindicated.

Question 10

What opioid effects develop tolerance with prolonged use?

A. Miosis and constipation

B. Euphoria and respiratory depression

C. Constipation and cough suppression

D. Pupil constriction and sedation

Answer: B. Euphoria and respiratory depression

Rationale: Tolerance develops to euphoria, respiratory depression, and nausea, but not to miosis or constipation.

A patient with newly diagnosed rheumatoid arthritis is prescribed methotrexate. Which lab finding requires immediate provider notification?

A. Hemoglobin 13.5 g/dL

B. Platelets 350,000/mm^3

C. ALT 89 U/L

D. ESR 45 mm/hr

Answer: C

Rationale: ALT elevation suggests liver toxicity. Methotrexate can be hepatotoxic and requires liver function monitoring.

A 66-year-old man with hypertension starts lisinopril. Which adverse effect should the provider monitor most closely?

A. Constipation

B. Bradycardia

C. Dry cough

D. Hypoglycemia

Answer: C

Rationale: Dry cough is a common ACE inhibitor side effect due to bradykinin accumulation.