FPGEE for National Association of Boards of Pharmacy (NABP) Practice Exam (Sample)

Study Guide

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Questions

1. When drug concentration exceeds 50% saturation for a metabolic enzyme, the drug elimination follows a combination of which kinetics?

A. First-order and zero-order

B. Zero-order only

C. First-order only

D. First-order and second-order

2. Which of the following is NOT a cause of meningitis?

A. Neisseria meningitidis

B. Streptococcus pneumoniae

C. Influenza virus

D. Common cold virus

3. How often does the FDA visit drug manufacturing facilities to ensure compliance with GMP guidelines?

A. Every year

B. Every 2 years

C. Every 5 years

D. Every 10 years

4. In infants, what is the typical normal RBC count?

A. 4 million/cmm

B. 6 million/cmm

C. 7 million/cmm

D. 8 million/cmm

5. Which class of drugs are inotropic agents?

A. Drugs that lower blood pressure

B. Drugs that stimulate the heart

C. Drugs that prevent blood clotting

D. Drugs that relieve pain

6. What antidote is used for heparin toxicity?

- **A. Vitamin K**
- **B. Protamine sulfate**
- **C. N-acetylcysteine**
- **D. Activated charcoal**

7. Which of the following conditions is NOT a side effect of carbamazepine?

- **A. Thrombocytopenia**
- **B. Increased appetite**
- **C. Hyponatremia**
- **D. Dermatological reactions**

8. What is the primary function of a levigating agent?

- **A. Aids in the initial dispersion of insoluble particles**
- **B. Acts as a preservative in formulations**
- **C. Increases the bioavailability of drugs**
- **D. Enhances taste for oral formulations**

9. What is the effect of fluorination of hydrocortisone at position C-6?

- **A. Increases mineralocorticoid activity**
- **B. Increases glucocorticoid activity with less effect on mineralocorticoid activity**
- **C. Decreases overall activity**
- **D. Reduces side effects**

10. What type of kinetics indicates that a constant percentage of substrate is metabolized per unit time?

- **A. Zero order kinetics**
- **B. First order kinetics**
- **C. Second order kinetics**
- **D. Half-life kinetics**

Answers

1. A
2. D
3. B
4. C
5. B
6. B
7. B
8. A
9. B
10. B

Explanations

1. When drug concentration exceeds 50% saturation for a metabolic enzyme, the drug elimination follows a combination of which kinetics?

A. First-order and zero-order

B. Zero-order only

C. First-order only

D. First-order and second-order

When drug concentration exceeds 50% saturation for a metabolic enzyme, the drug elimination involves a combination of first-order and zero-order kinetics. At lower concentrations, drug metabolism typically operates under first-order kinetics, where the rate of elimination is directly proportional to the drug concentration. As the concentration increases and exceeds the saturation point of the enzyme—where the enzyme becomes saturated and can't process the drug as efficiently—zero-order kinetics starts to take over. In this phase, the elimination rate becomes constant and is independent of the concentration of the drug. This scenario is commonly observed for drugs metabolized by enzymes that have a finite capacity. Thus, when drug levels are high, the elimination follows a mixed model where low concentrations follow first-order kinetics and higher concentrations transition into zero-order kinetics. This dual behavior is crucial for understanding drug dosing and potential toxicity at high concentrations, allowing healthcare professionals to make informed decisions regarding patient management and pharmacotherapy.

2. Which of the following is NOT a cause of meningitis?

A. Neisseria meningitidis

B. Streptococcus pneumoniae

C. Influenza virus

D. Common cold virus

Meningitis is an inflammation of the protective membranes surrounding the brain and spinal cord, typically caused by infections. The pathogens involved in meningitis include bacteria and viruses that can directly invade the central nervous system. Neisseria meningitidis, a type of bacteria, is one of the most common causes of bacterial meningitis, particularly in children and young adults. It can lead to severe illness and has the potential to spread quickly in close communities. Streptococcus pneumoniae is another significant bacterial cause of meningitis. It is responsible for a considerable number of cases, particularly in older adults and in those with underlying health conditions. The influenza virus, while primarily known for causing the flu, can also lead to viral meningitis, although this is less common compared to bacterial causes. Conversely, the common cold virus, typically caused by rhinoviruses, does not cause meningitis. This category of virus is primarily associated with upper respiratory infections and, although it can lead to other complications, meningitis is not one of them. Therefore, stating that the common cold virus is not a cause of meningitis is accurate, as it does not possess the capability to cause inflammation of the protective membranes surrounding the brain and spinal cord as the other listed

3. How often does the FDA visit drug manufacturing facilities to ensure compliance with GMP guidelines?

A. Every year

B. Every 2 years

C. Every 5 years

D. Every 10 years

The FDA conducts inspections of drug manufacturing facilities primarily to ensure compliance with Good Manufacturing Practices (GMP) guidelines, which are crucial for ensuring the safety, quality, and efficacy of pharmaceutical products. The general expectation is that the FDA inspects facilities that produce drugs under its jurisdiction every two years. This time frame is based on the need to monitor manufacturing processes and quality controls regularly, as any lapse could have significant repercussions for public health. While the FDA can inspect facilities more frequently if there are indications of violations or if a facility is classified as higher-risk based on its past compliance history, the standard practice calls for inspections to occur approximately every two years. Other options suggest longer intervals that do not align with the FDA's current inspection strategy, potentially leading to gaps in oversight and increased risks to drug safety and effectiveness. Regular inspections every two years help ensure that manufacturers adhere to necessary quality standards and implement recommended improvements promptly.

4. In infants, what is the typical normal RBC count?

A. 4 million/cmm

B. 6 million/cmm

C. 7 million/cmm

D. 8 million/cmm

In infants, the typical normal red blood cell (RBC) count is higher than in older children and adults due to their different physiological and developmental needs. Generally, the normal RBC count for infants ranges from approximately 4.1 to 6.1 million cells per cubic millimeter (cmm) at birth, and it may increase shortly thereafter, reflecting the increased hemoglobin concentration and the body's immediate demand for oxygen transport during early life. The choice indicating the count of around 7 million cmm aligns with this understanding, as it represents the upper range of normal values that might be observed in younger infants, particularly just after birth when the physiological adaptation to extrauterine life is most pronounced. This increased RBC count helps meet the oxygen demand in a rapidly growing infant. The other options suggest RBC counts that are higher than what is normally expected, which typically do not reflect the physiological norms for healthy infants. Such elevated counts may suggest pathological conditions or abnormalities that are less common in typical infant populations. Therefore, the selection of 7 million cmm captures the essence of normal variations seen in infant RBC counts during this crucial period of development.

5. Which class of drugs are inotropic agents?

A. Drugs that lower blood pressure

B. Drugs that stimulate the heart

C. Drugs that prevent blood clotting

D. Drugs that relieve pain

Inotropic agents are defined as drugs that affect the force or energy of muscular contractions, particularly in the heart. The primary action of these drugs is to stimulate the heart muscle, leading to increased cardiac output. This is particularly important in conditions such as heart failure, where the heart's ability to pump blood effectively is compromised. By enhancing cardiac contractility, inotropic agents help improve symptoms and overall cardiac function. The other options describe different classes of drugs with distinct mechanisms and therapeutic uses. For instance, medications that lower blood pressure primarily work by reducing vascular resistance or blood volume, while those that prevent blood clotting focus on inhibiting the coagulation cascade. Drugs that relieve pain are categorized as analgesics and function through various mechanisms to reduce the perception of pain. Each of these classes serves unique roles in medical treatment, making it clear why the class of drugs that stimulate the heart is the correct answer concerning inotropic agents.

6. What antidote is used for heparin toxicity?

A. Vitamin K

B. Protamine sulfate

C. N-acetylcysteine

D. Activated charcoal

Protamine sulfate is the antidote used for heparin toxicity because it directly neutralizes the effects of heparin, which is an anticoagulant. Heparin works by binding to antithrombin III to inhibit thrombin and factor Xa, thus preventing blood coagulation. When a patient experiences heparin toxicity, such as bleeding complications, protamine sulfate can be administered. It is a positively charged protein that forms a stable complex with heparin, effectively reversing its anticoagulation effect. The dosage of protamine sulfate is determined based on the amount of heparin administered and the time elapsed since administration. Other options are not appropriate for reversing heparin's effects; for example, vitamin K is specifically used to reverse the effects of warfarin, while N-acetylcysteine is an antidote for acetaminophen overdose. Activated charcoal can be used in cases of overdose or poisoning to absorb certain drugs if given in a timely manner, but it does not directly counteract heparin. Thus, protamine sulfate is the appropriate and effective antidote for managing heparin toxicity.

7. Which of the following conditions is NOT a side effect of carbamazepine?

A. Thrombocytopenia

B. Increased appetite

C. Hyponatremia

D. Dermatological reactions

Carbamazepine is commonly known for its various side effects, among which thrombocytopenia, hyponatremia, and dermatological reactions are well-documented. Thrombocytopenia refers to a decrease in blood platelets, which can lead to increased bleeding risk. Hyponatremia, or low sodium levels in the blood, is a notable concern with carbamazepine therapy, as it can cause neurological complications. Dermatological reactions, including skin rashes and possibly more severe reactions like Stevens-Johnson syndrome, are also associated with its use. In contrast, increased appetite is not recognized as a typical side effect of carbamazepine. While other medications may have this effect, carbamazepine is more likely to be associated with weight gain, but not specifically with an increased appetite. Thus, recognizing that increased appetite does not align with the expected side effects of carbamazepine supports the conclusion that it is not a side effect.

8. What is the primary function of a levigating agent?

A. Aids in the initial dispersion of insoluble particles

B. Acts as a preservative in formulations

C. Increases the bioavailability of drugs

D. Enhances taste for oral formulations

The primary function of a levigating agent is to aid in the initial dispersion of insoluble particles. Levigation is a process where solid particles are dispersed in a liquid to form a smooth and uniform paste, which is essential in the formulation of certain pharmaceuticals, such as ointments and creams. The levigating agent forms a wetting layer around the insoluble particles, making it easier to mix and reduce particle size, thus improving the distribution of active ingredients within the formulation. This is particularly important in achieving a consistent dosage and enhancing the overall homogeneity of the product. In contrast, other options refer to different roles that do not pertain to the specific function of a levigating agent. For instance, preservatives are used to prevent microbial growth, while agents that increase bioavailability focus on enhancing the absorption of drugs into systemic circulation. Enhancing taste is relevant for oral formulations' palatability but does not relate to the dispersion of insoluble particles. Therefore, the role of a levigating agent is distinctly linked to facilitating the preparation of uniform mixtures rather than functions associated with preservation, absorption, or taste enhancement.

9. What is the effect of fluorination of hydrocortisone at position C-6?

A. Increases mineralocorticoid activity

B. Increases glucocorticoid activity with less effect on mineralocorticoid activity

C. Decreases overall activity

D. Reduces side effects

Fluorination of hydrocortisone at position C-6 leads to an increase in glucocorticoid activity while having less effect on mineralocorticoid activity. This modification enhances the potency of the glucocorticoid effects, which are primarily involved in metabolic processes, the immune response, and the regulation of inflammation. At the same time, it minimizes the impact on mineralocorticoid activity, which is more associated with sodium retention and fluid balance. This selective enhancement is particularly beneficial in clinical settings where a strong anti-inflammatory effect is desired without the significant water retention and electrolyte imbalance that can accompany increased mineralocorticoid activity. Understanding these pharmacological modifications is crucial in designing corticosteroids that meet the specific therapeutic needs of patients.

10. What type of kinetics indicates that a constant percentage of substrate is metabolized per unit time?

A. Zero order kinetics

B. First order kinetics

C. Second order kinetics

D. Half-life kinetics

First-order kinetics is characterized by a constant percentage of substrate being metabolized per unit time, which means that the rate of reaction is directly proportional to the concentration of the substrate. As the concentration of the substrate decreases, the amount metabolized in a given time interval also decreases, leading to a steady percentage of the remaining substrate being processed. This is frequently observed in drug metabolism, where, for instance, a specific percentage of a drug is eliminated from the body each hour, regardless of the drug's concentration at that time. In contrast, zero-order kinetics indicates that a constant amount of substrate is metabolized over time, independent of its concentration, leading to a linear decrease in substrate level. Second-order kinetics involves reactions where the rate depends on the concentration of two reactants, while half-life kinetics refers to the time required for half of the substrate to be metabolized—this concept can be applicable in first-order reactions but does not define the nature of substrate metabolism over time in the same percentage context as first-order kinetics does.