

Chapter 20: Introduction to Central Nervous System Pharmacology

Test Bank

MULTIPLE CHOICE

1. A psychiatric nurse is teaching a patient about an antidepressant medication. The nurse tells the patient that therapeutic effects may not occur for several weeks. The nurse understands that this is likely the result of:
 - a. changes in the brain as a result of prolonged drug exposure.
 - b. direct actions of the drug on specific synaptic functions in the brain.
 - c. slowed drug absorption across the blood-brain barrier.
 - d. tolerance to exposure to the drug over time.

ANS: A

It is thought that beneficial responses to central nervous system (CNS) drugs are delayed because they result from adaptive changes as the CNS modifies itself in response to prolonged drug exposure, and that the responses are not the result of the direct effects of the drugs on synaptic functions. The blood-brain barrier prevents protein-bound and highly ionized drugs from crossing into the CNS, but it does not slow the effects of drugs that can cross the barrier. Tolerance is a decreased response to a drug after prolonged use.

PTS: 1

DIF: Cognitive Level: Application

REF: p. 173

TOP: Nursing Process: Implementation

MSC: NCLEX Client Needs Category: Physiologic Integrity: Pharmacologic and Parenteral Therapies

2. A nurse is teaching a group of nursing students how the CNS adapts to psychotherapeutic medications. Which statement by a nursing student indicates a need for further teaching?
 - a. "Adaptation can lead to tolerance of these drugs with prolonged use."
 - b. "Adaptation helps explain how physical dependence occurs."
 - c. "Adaptation often must occur before therapeutic effects develop."
 - d. "Adaptation results in an increased sensitivity to side effects over time."

ANS: D

With adaptation of the central nervous system to prolonged exposure to CNS drugs, many adverse effects diminish and therapeutic effects remain. Adaptation helps explain how tolerance and physical dependence occur, as the brain adapts to the presence of the drug. Therapeutic effects can take several weeks to manifest, because they appear to work by initiating adaptive changes in the brain.

PTS: 1

DIF: Cognitive Level: Analysis

REF: p. 174

TOP: Nursing Process: Evaluation

MSC: NCLEX Client Needs Category: Physiologic Integrity: Pharmacologic and Parenteral Therapies

3. A group of nursing students asks a nurse to explain the blood-brain barrier. The nurse would be correct to say that the blood-brain barrier:
 - a. prevents some potentially toxic substances from crossing into the central nervous system.
 - b. causes infants to be less sensitive to CNS drugs and thus require larger doses.
 - c. allows only ionized or protein-bound drugs to cross into the central nervous system.

d. prevents lipid-soluble drugs from entering the central nervous system.

ANS: A

The blood-brain barrier can prevent some drugs and some toxic substances from entering the CNS. The blood-brain barrier in infants is not fully developed, so infants are more sensitive to CNS drugs and often require lower doses. The blood-brain barrier prevents highly ionized and protein-bound drugs from crossing into the CNS and allows lipid-soluble drugs and those that can cross via specific transport systems to enter.

PTS: 1

DIF: Cognitive Level: Analysis

REF: p. 173

TOP: Nursing Process: Evaluation

MSC: NCLEX Client Needs Category: Physiologic Integrity: Pharmacologic and Parenteral Therapies

4. A nurse is teaching a group of students about how CNS drugs are developed. Which statement by a student indicates a need for further teaching?
- “Central nervous system drug development relies on observations of their effects on human behavior.”
 - “Studies of new central nervous system drugs in healthy subjects can produce paradoxical effects.”
 - “Our knowledge of the neurochemical and physiologic changes that underlie mental illness is incomplete.”
 - “These drugs are developed based on scientific knowledge of CNS transmitters and receptors.”

ANS: D

The deficiencies in knowledge about how CNS transmitters and receptors work make systematic development of CNS drugs difficult. Testing in healthy subjects often leads either to no effect or to paradoxical effects. Medical knowledge of the neurochemical and physiologic changes underlying mental illness is incomplete. The development of CNS drugs depends less on knowledge of how the CNS functions and how these drugs affect that process and more on how administering one of these agents leads to changes in behavior.

PTS: 1

DIF: Cognitive Level: Analysis

REF: p. 174

TOP: Nursing Process: Assessment

MSC: NCLEX Client Needs Category: Physiologic Integrity: Pharmacologic and Parenteral Therapies

5. A patient asks a nurse to explain what drug tolerance means. The nurse responds by telling the patient that when tolerance occurs, it means the patient:
- has developed a psychologic dependence on the drug.
 - may need increased amounts of the drug over time.
 - will cause an abstinence syndrome if the drug is discontinued abruptly.
 - will have increased sensitivity to drug side effects.

ANS: B

When tolerance develops, a dose increase may be needed, because a decreased response may occur with prolonged use. Psychologic dependence involves cravings for drug effects and does not define tolerance. Physical dependence occurs when the drug becomes necessary for the brain to function “normally,” meaning the patient should be weaned from the drug slowly to prevent an abstinence syndrome. Patients may have a decreased sensitivity to drug side effects over time as the brain adapts to the medication.

PTS: 1

DIF: Cognitive Level: Comprehension

REF: p. 174

TOP: Nursing Process: N/A

MSC: NCLEX Client Needs Category: Physiologic Integrity: Physiologic Adaptation

6. An infant who receives a drug that does not produce CNS side effects in adults exhibits drowsiness and sedation. The nurse understands that this is because of differences in which physiologic system in infants and adults?
- Blood-brain barrier
 - First-pass effect
 - Gastrointestinal absorption
 - Renal filtration

ANS: A

The blood-brain barrier is not fully developed at birth, making infants much more sensitive to CNS drugs than older children and adults. CNS symptoms may include sedation and drowsiness. The first-past effect and GI absorption affect metabolism and absorption of drugs, and renal filtration affects elimination of drugs, all of which may alter drug levels.

PTS: 1 DIF: Cognitive Level: Comprehension REF: p. 173

TOP: Nursing Process: N/A

MSC: NCLEX Client Needs Category: Physiologic Integrity: Physiologic Adaptation

MULTIPLE RESPONSE

1. Which monoamines act as neurotransmitters in the central nervous system? (*Select all that apply.*)
- Acetylcholine
 - Norepinephrine
 - Serotonin
 - Dopamine
 - Epinephrine
 - Histamine

ANS: B, C, D, E

Acetylcholine and histamines are not monoamines.

PTS: 1 DIF: Cognitive Level: Comprehension REF: p. 173

TOP: Nursing Process: Assessment

MSC: NCLEX Client Needs Category: Physiologic Integrity: Pharmacologic and Parenteral Therapies

2. Which are medical applications of central nervous system drugs? (*Select all that apply.*)
- Analgesia
 - Anesthesia
 - Depression
 - Euphoria
 - Seizure control

ANS: A, B, E

CNS drugs have medical uses for pain management, anesthesia, and seizure control. Depression and euphoria are side effects that can contribute to abuse of these drugs.

PTS: 1 DIF: Cognitive Level: Comprehension REF: p. 173

TOP: Nursing Process: Assessment

MSC: NCLEX Client Needs Category: Physiologic Integrity: Pharmacologic and Parenteral Therapies