

Unit 1

Fundamental Concepts and Principles of Pharmacology

Chapter 1

Introduction to Pharmacology and Drug Regulations in Canada

Question 1**Type:** MCMA

What key elements are included in the definition of Pharmacology?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Physiological effects of drugs
2. Chemical makeup of drugs
3. Formularies of drugs
4. Approval processes for new drugs
5. Mechanism of action

Correct Answer: 1,2,5

Rationale 1: The definition of pharmacology includes the actual responses produced by the drug

Rationale 2: The study of medicines include how they are made, including their chemical properties.

Rationale 3: Formularies are a list of drugs and are not an element that defines pharmacology

Rationale 4: Approval processes for new drugs is important understanding but not an element of the definition of pharmacology.

Rationale 5: How a drug exerts its effect is an element of the defined term pharmacology.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 1-1: Define pharmacology

Question 2**Type:** MCSA

While many substances can be considered drugs, which of the following drug definitions is the most accurate?

1. Any substance that is found in nature or that normally occurs in the body.
2. Any substance that is synthesized and tested in the laboratory setting.
3. Substances that are taken to prevent, cure, or reduce symptoms of a medical condition
4. Substances that can be isolated from natural substances in nature

Correct Answer: 3

Rationale 1: A drug is not a substance that is found in nature or that normally occurs in the human body.

Rationale 2: A drug is not only a substance that is synthesized and tested.

Rationale 3: A drug is considered to be any substance that is taken to prevent, cure, or reduce symptoms of a medical condition.

Rationale 4: A drug is not only a substance isolated from natural substances.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 1-4: Compare and contrast conventional drugs, biologics and natural health products.

Question 3**Type:** MCSA

Pharmacotherapy is a critical intervention for many conditions, and a key part of nursing intervention. Which statement best describes pharmacotherapy?

1. The study of medicine and drug therapy
2. The application of natural substances to cure diseases
3. The application of drugs for the prevention and treatment of disease and human suffering
4. The understanding of the difference between trade and generic medications

Correct Answer: 3

Rationale 1: Pharmacotherapy is not just the study of medicine and drug therapy.

Rationale 2: Pharmacotherapy is not the application of natural substances to cure diseases.

Rationale 3: Pharmacotherapy is the application of drugs for the prevention and treatment of diseases and human suffering.

Rationale 4: Pharmacotherapy comprises more than understanding the difference between trade and generic drugs.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 1-3: Compare and contrast therapeutics and pharmacology

Question 4

Type: MCMA

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

A student nurse is learning about how drugs are dispensed in her pharmacology class. Which of the following are considered true in dispensing of prescription drugs when compared to over the counter (OTC)?

1. May only be obtained by a physician
2. Are easily obtainable
3. Choice of drug is usually more specific
4. Frequency of the drug can be controlled

Correct Answer: 3,4

Rationale 1: Prescription drugs are not *only* available by physicians, other health care providers can write prescriptions.

Rationale 2: Prescription drugs are *less* easily obtainable than OTC, they require an appointment with a health care provider.

Rationale 3: The choice of drug is considered more specific because the health care provider has the opportunity to examine the client and come up with a diagnosis.

Rationale 4: The dose and frequency of the drug is controlled through prescription dispensing.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Teaching/Learning

Learning Outcome: 1-5: Identify the advantages and disadvantages of prescription and over-the-counter (OTC) drugs

Question 5

Type: MCMA

Which of the following criteria are assessed in order to market a pharmaceutical drug?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Efficacy
2. Need
3. Cost
4. Safety
5. Quality

Correct Answer: 1,4,5

Rationale 1: The Therapeutic Products Directorate (TPD), a branch of Health Canada authorizes marketing of a pharmaceutical drug or medical device once a manufacturer presents sufficient scientific evidence of the product's safety, efficacy, and quality.

Rationale 2: The need for a particular drug does not influence the marketing of drugs in Canada. Despite need, all drugs must go through the same degree of rigour in order to promote safety, efficacy and quality.

Rationale 3: Cost is not considered criteria for marketing drugs.

Rationale 4: The Therapeutic Products Directorate (TPD), a branch of Health Canada authorizes marketing of a pharmaceutical drug or medical device once a manufacturer presents sufficient scientific evidence of the product's safety, efficacy, and quality.

Rationale 5: The Therapeutic Products Directorate (TPD), a branch of Health Canada authorizes marketing of a pharmaceutical drug or medical device once a manufacturer presents sufficient scientific evidence of the product's safety, efficacy, and quality.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcomes: 1-7: Discuss the role of Health Canada and the Health Products and Food Branch (HPFB) of Health Canada and its Therapeutic Products Directorate in the drug approval process.

Question 6

Type: MCMA

Mrs. Morton expresses concern to the nurse about a new drug on the market that has been prescribed for her health condition; she worries about the safety of the medication. What can the nurse tell Mrs. Morton about drug regulatory standards in Canada that are intended to protect patients?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. All drugs go through a 3 step approval process before marketed for human use.
2. The first phase of clinical trials involves testing on 1000-3000 individuals with the target disorder.
3. Once a drug is considered safe on animals, the manufacturer applies for clinical trials.
4. Health Canada continues to monitor the safety of drugs even after initial marketing

Correct Answer: 3,4

Rationale 1: Drugs go through a 7 step approval process from pre-clinical trials to the monitoring of drugs after marketing.

Rationale 2: The first phase of clinical trials involves a small group of healthy individuals.

Rationale 3: After the preclinical trials, an application for Clinical trials is submitted to Health Canada.

Rationale 4: Health Canada monitors the efficacy of the drug and any safety concerns after it has been marketed. This is done by regular inspection, notices, newsletters, and feedback from consumers and healthcare professionals.

Cognitive Level: Remembering

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 1-6 Identify key Canadian Drug regulations that help to ensure the safety and efficacy of medications.

Question 7

Type: MCSA

In clinical trials, a new drug is tested on healthy individuals. Which of the following is a reason for this step in the process?

1. To determine adverse effects.
2. To identify how a drug is metabolized
3. To determine drug incompatibilities.
4. To maximize a drug's effectiveness at different doses.

Correct Answer: 2

Rationale 1: Adverse effects would be determined during pre-clinical trials.

Rationale 2: Clinical investigators perform tests on 20 to 100 healthy volunteers to determine dosage and to assess how the drug is absorbed, metabolized, and excreted by the body.

Rationale 3: This occurs during the last phase of clinical trials.

Rationale 4: This occurs during pre-clinical trials.

Cognitive Level: Remembering

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 1-8: Describe the stages of approval for therapeutic and biologic drugs in Canada.

Question 8

Type: MCSA

Which of the following characteristics are true of a biologic?

1. A biologic is an ingredient extracted from plants.
2. Insulin is an example of a biologic.
3. Biologics have no adverse effects.
4. Biologics do not require a prescription.

Correct Answer: 2

Rationale 1: Natural health products (nhps)(not biologics) may include natural plant extracts,

Rationale 2:Biologics are agents naturally produced in animal cells; Examples of biologics include hormones,(hormone) monoclonal antibodies, natural blood products and components, interferon, and vaccines.

Rationale 3: Biologics are therapeutics that can produce adverse effects if not given according to proven treatment regimes.

Rationale 4: Biologics are not available over the counter.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 1-4: Compare and contrast conventional drugs, biologics, and natural health products.

Question 9

Type: MCSA

Mr Brisbois is in the pre-operative assessment clinic for consults before his knee replacement. . The pharmacist asks him about prescription, OTC and herbals remedies that he is currently taking. Mr Brisbois asks him why information on herbals is important. What is the best response?

1. Herbal remedies may be ordered to enhance recovery.
2. Herbals can be substituted for prescribed drugs because of their decreased incidence of adverse effects

3. Some herbals may contain the same ingredients as prescription drugs in different forms.
4. Herbals may be ordered instead of prescription drugs to control costs

Correct Answer: 3

Rationale 1: While herbals may be used to enhance recovery, they are normally not ordered by a physician. It is most important that the health care providers know about all medications to decrease incidence of receiving multiple forms of the same drug and herbals that may counteract ordered medications necessary for recovery.

Rationale 2: Herbal medications can have adverse effects and can interact with prescribed drugs.

Rationale 3: To ensure that the client does not receive two different forms of the same drug or drugs that may counter-act the home remedy.

Rationale 4: There is no evidence to support that herbals would be substituted for thoroughly studied medications, ordered for a specific effect.

Cognitive Level: Remembering

Client Need: Physiological Integrity Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process-Implementation

Learning Outcome: 1-4: Compare and contrast conventional drugs, biologics, and natural health products.

Question 10

Type: MCSA

A new drug has been approved by Health Canada for the treatment of psoriasis. What determines when a health care provider will be able to order it for his clients?

1. Once approved by Health Canada, medications are available in all provinces and territories.
2. Medication will be available after the 4 level provincial testing is completed
3. Following direct to consumer advertising to determine market need.
4. Following a Common Drug Review to provide a formulary listing recommendation.

Correct Answer: 4

Rationale 1: Each territory and province decides on whether to include newly approved drugs in their formularies.

Rationale 2: There is no specific testing completed at the provincial level.

Rationale 3: Direct to consumer marketing of prescription medications is not allowed in Canada.

Rationale 4: A common Drug Review is completed after Health Canada's approval process to expedite jurisdictional review for provinces and territories.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 1-8 Describe the stages of approval for therapeutic and biologic drugs in Canada.

Question 11

Type: MCSA

How is information collected for Health Canada regarding adverse drug reactions after administration of a new drug on the market?

1. Voluntary reporting to local Health Authority.
2. Mandated reporting to the Institute for Safe Medication Practices.
3. Direct reporting to Health Canada.
4. Voluntary reporting to Canadian Adverse Drug Reaction Monitoring Program.

Correct Answer: 4

Rationale 1: Reporting to only the Health Authority would be insufficient in identifying adverse reaction trends nation wide.

Rationale 2: Reporting adverse reactions is voluntary. While the ISMP mandates safe medication practices, they are more concerned with medication errors.

Rationale 3: Reporting is to the CADRMP, not directly to Health Canada.

Rationale 4: The CADRMP collects data from health care professionals and consumers regarding adverse drug reactions. These are then listed in the Canadian Adverse Drug Monitoring Information System(CADMIS) a database used to compile data on reported reactions from drugs.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

NLN Competencies: Knowledge and Science: Relationships between knowledge/science and quality and safe patient care

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 1-6: Identify key Canadian drug regulations that help to ensure the safety and efficacy of medications.

Question 12

Type: MCSA

The nurse is teaching a class about over-the-counter (OTC) medications at a senior citizen centre. Which statement by a participant indicates the teaching was effective?

1. "Over-the-counter medications are safe, as long as we don't take them at the same time as our prescription medications."
2. "Over-the-counter medications are safe; otherwise, they would require a prescription."
3. "We should inform our primary health care provider of any OTC drugs used because of the potential of interacting with our prescription medications."

4. "We must read all the label directions before taking any over-the-counter medications."

Correct Answer: 3

Rationale 1: Some OTC medications can be taken with prescription medications; others cannot.

Rationale 2: Although they have a high margin of safety, OTC medications are not without risks.

Rationale 3: Elderly clients often take multiple medications and should consult with their health care provider before taking any over-the-counter medication or supplement to ensure there are no risks for drug interactions.

Rationale 4: It is important for clients to read all directions on the label, but this will not protect them if there is a contraindication with another medication they are taking; therefore, they must consult their primary health care provider before taking any OTC medications.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Evaluation

Learning Outcome: 1-5: Identify the advantages and disadvantages of prescription and over the counter drugs.

Question 13

Type: MCSA

Nursing students are studying how foods and health products are regulated and approved for sale in Canada. Which of the following products is regulated through the Therapeutic Products Directorate?

1. Biologics
2. Food supplements
3. Medications
4. Herbal Supplements

Correct Answer: 3

Rationale 1: Biologics are approved through Biologics & Genetic Therapies Directorate

Rationale 2: Approval for food supplements is not covered by the Therapeutic Products Directorate

Rationale 3: The Therapeutic Products Directorate (TPD) authorizes marketing of a pharmaceutical drug or medical device once a manufacturer presents sufficient scientific evidence of the product's safety, efficacy, and quality as required by the Food and Drugs Act and Regulations.

Rationale 4: Herbal supplements are approved through the Natural & Non-prescription Health Products Directorate.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 1–7: Discuss the role of Health Canada and the Health Products and Food Branch (HPFB) of Health Canada and its Therapeutic Products Directorate in the drug approval process.

Question 14

Type: MCMA

Which statements regarding the 4 phases of clinical research of drug development are true?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. 90 % of drugs do not proceed past the 2nd phase because they are found to be ineffective.
2. In the second phase, clients with the disease or condition that the drug will treat are given the drug to determine doses and side effects
3. The clinical stage of research involves extensive testing on animals in the laboratory to determine if the drug will cause harm to humans.
4. Absorption, metabolism and excretion of a drug is determined in the first phase of clinical trials
5. A clinical trial will not be suspended until 2000-3000 people with the affected disease or condition have trialled the drug .

Correct Answer: 1,2,4

Rationale 1: Most drugs do not reach the third phase of clinical trials if there is concern that the drug is ineffective, worsens the condition it is intended to treat, or affects one type of client more than others.

Rationale 2: The second phase of clinical trials involves testing the drug on individuals who have the disease or condition that the drug will treat. At this phase, dosage is determined and side effects monitored.

Rationale 3: Preclinical, *not* clinical involves extensive testing on human, microbial cells, and animals to determine drug action and to predict whether the drug will cause harm to humans.

Rationale 4: A small population of healthy individuals (20-100) is given the drug to determine the drug's absorption, metabolism and excretion.

Rationale 5: This is incorrect. A clinical trial can be abandoned at any time that there is sufficient evidence that a drug is causing harm.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 1–6: Identify key Canadian drug regulations that help to ensure the safety and efficacy of medications.

Chapter 2

Drug Classes and Schedules in Canada

Question 1**Type:** MCMA

The client asks the charge nurse how the health care provider will decide which medication to prescribe. The nurse bases her response on which characteristics of the “ideal drug?”

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Effectively treats, prevents, or cures the client’s condition
2. Is slowly eliminated by the body so that it can produce its effects over a prolonged period of time
3. Produces minimal adverse effects
4. Produces a rapid and predictable response
5. Is inexpensive and easily accessible

Correct Answer: 1,4,5

Rationale 1: The goal of pharmacology is to select a drug that will effectively treat, prevent, or cure a condition.

Rationale 2: The goal of pharmacology is to select a drug that will be quickly eliminated by the body after it produces its effects.

Rationale 3: The goal of pharmacology is to select a drug that will produce no short-term or long-term adverse effects.

Rationale 4: The goal of pharmacology is to select a drug that will produce a rapid, predictable response at relatively low doses.

Rationale 5: The ideal drug is affordable and easily accessible.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-1 Explain what characterizes an ideal drug and how drugs are classified.

Question 2**Type:** MCSA

The nurse is creating a teaching plan for a client on the cardiac unit and is researching the medications the client is currently taking to understand how each drug produces its effects in the body. To find this information, the nurse looks up which classification for each medication?

1. Therapeutic
2. Cardiac
3. Disease
4. Pharmacologic

Correct Answer: 4

Rationale 1: The therapeutic classification describes what condition is being treated by a drug, not how the drug works in the body.

Rationale 2: There is no cardiac category.

Rationale 3: There is no disease category.

Rationale 4: The nurse researches the pharmacologic classification to discover how a drug works in the body.

Cognitive Level: Analyzing

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 2-1 explain what characterizes an ideal drug and how drugs are classified?

Question 3.

Type: MCMA

A client tells the nurse that the health care provider has prescribed a new medication that “has just come on the market.” The nurse has not heard of this particular medication but is able to give the client important information based on its prototype drug because of which principles?

Note : Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Knowing the prototype drug allows the nurse to predict the mechanism of action of the new medication.
2. The information regarding the prototype drug can be extended to any drug in the same class.
3. The prototype drug is the drug to which all drugs in a class are compared.
4. Knowing the prototype drug’s therapeutic or pharmacologic classification can reveal important information about other drugs in the same class.
5. This is a new drug on the market. It may not have a prototype drug yet and its properties cannot be predicted.

Correct Answer: 1,2,3,4

Rationale 1: Knowledge about the prototype drug can help the nurse predict important information such as actions, side effects, mechanism of action, and contraindications for other drugs in the same class.

Rationale 2: Knowledge about the prototype drug can help the nurse predict important information such as actions, side effects, mechanism of action, and contraindications for other drugs in the same class.

Rationale 3: The prototype drug is chosen to be the representative medication in a particular classification.

Rationale 4: Just knowing a drug's therapeutic or pharmacologic classification can reveal important information about the drug.

Rationale 5: Knowledge about the prototype drug can help the nurse predict important information such as actions, side effects, mechanism of action, and contraindications for other drugs in the same class.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-4 Discuss the prototype approach to drug classification.

Question 4

Type: MCMA

Chemical names are assigned for each drug. What are the major reasons for why nurses usually do not use the chemical name of the drugs?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. They are usually not brief or easy to remember.
2. They are often difficult to pronounce.
3. There is no standard for assigning names.
4. They do not explain the nature of the drug.
5. There is only one chemical name for each drug.

Correct Answer: 1,2

Rationale 1: Chemical names are usually not brief or easy to remember.

Rationale 2: Chemical names are often difficult to pronounce.

Rationale 3: Chemical names are assigned by a standard nomenclature.

Rationale 4: Chemical names do explain the nature of the drug.

Rationale 5: While it is true each drug has only one chemical name, this is not one of the reasons nurses do not use the chemical name.

Cognitive Level: Remembering

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-5 Distinguish between a drug's chemical name, generic name and trade name.

Question 5

Type: MCSA

The trade name for a drug is usually selected to be short and easy to remember. What is the reason the nurse does not use the trade name for a drug?

1. There are no trade names for combination drugs.
2. A drug can have more than one trade name.
3. The trade name will expire and no longer be used.
4. A company might change the trade name for a drug.

Correct Answer: 2

Rationale 1: There are trade names for combination drugs.

Rationale 2: A drug can have more than one trade name.

Rationale 3: The trade name does not expire and will continue to be used.

Rationale 4: Companies usually do not change the trade name of a drug.

Cognitive Level: Remembering

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-6 Explain why the use of generic names is preferred to trade names when referring to drugs.

Question 6

Type: MCSA

Before administering a drug, what pertinent information must the nurse obtain from the client?

1. Physical assessment, medical history, previous medications, and learning capabilities
2. Medical history, growth and development level of client, and ability to pay for the medication
3. Medical history, client's growth and development level, and potential adverse effects of the medication
4. Medical history, physical assessment, disease process, and learning needs

Correct Answer: 1

Rationale 1: Physical assessment, medical history, previous medications, and learning capabilities are all important pieces of information the nurse should have prior to administering drugs to clients.

Rationale 2: Medical history and growth and development are important pieces of information. However, while the client's ability to pay for the drug is important prescription information, it is not necessary for the nurse to know this prior to administering a drug.

Rationale 3: The medical history and growth and development information are important but the nurse would not obtain information regarding potential adverse effects of the medication from the client.

Rationale 4: The medical history, physical assessment, disease process, and learning needs are all important information the nurse needs. However, the nurse would not obtain information about the disease process from the client.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-12 Connect pharmacotherapy to nursing practice.

Question 7

Type: MCSA

The Clinical Nurse educator is preparing a class on cardiac medications with the student nurse to teach to her cardiac rehab group. The student asks why she categorizes them according to their therapeutic classification. What is the best response of the nurse?

1. "Therapeutic classification clearly states what a drug does , its simple description may be easier for laypersons to understand".
2. "There is only one cardiac pharmacological classification, the therapeutic classification allows us to explore its subcategories with the group".
3. "A pharmacological classification is less specific than the therapeutic and does not provide enough information to the clients"
4. "Therapeutic classification states how a drug exerts its effect on the body and is a simpler description compared with the pharmacological".

Correct Answer :1

Rationale 1: This is correct, therapeutic provides information on what the drug is intended to treat, and is usually expressed in simpler explanations.

Rationale 2: There are many pharmacological classifications of cardiac drugs, therapeutics do not represent a subcategory of them. is a more complex.

Rationale 3: A pharmacological classification is more specific, not less.

Rationale 4: A pharmacological classification states how a drug exerts its effect on the body, not a therapeutic. It is a more complex description, not less.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-2 :Explain the basis for placing drugs into therapeutic and pharmacological classifications..

Question 8

Type: MCMA

In her first class in pharmacology, a student nurse asks why it is important to study drug prototypes. What is the best response?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

1. It is not always the most commonly ordered drug in its class.
2. It predicts actions of other drugs in the same therapeutic classification.
3. It may predict similar adverse effects of drugs in the same therapeutic classification.
4. It is a well-understood drug model with which other drugs in a pharmacological class are compared.

Correct Answer: 1,4

Rationale 1: This is true, the original drug prototype is not always the most widely used drug in its class. Newer drugs in the same class may be more effective and have a more favourable safety profile,

Rationale 2:It does predict the actions of other drugs but in a pharmacological classification, not therapeutic.

Rationale 3: It does predict similar adverse effects but in a pharmacological classification, not therapeutic.

Rationale 4: This is true, it is common practice to select a single drug from a class and compare all other medications to this representative drug.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-3 :Discuss the prototype approach to drug classification.

Question 9

Type MCSA

Which of the following is true about a drug's generic name?

- 1 It is the proprietary name of the drug

- 2 It describes the pharmacological properties of a drug.
3. A drug can have more than one generic name
4. It is assigned by the manufacturer of the drug

Correct Answer 2

Rationale 1: The proprietary name is the trade name

Rationale 2: This is correct, the generic name describes the chemical substance or pharmacological properties of a drug

Rationale 3: A drug has only one generic name, but may have many trade names

Rationale 4: The trade name is assigned by the manufacturer marketing the drug.

Cognitive Level: Remembering

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-5 :Distinguish between a drug's chemical, generic and trade name.

Question 10

Type: MCSA

The client says to the nurse, "I wonder if I am considered a drug addict. I went to pick up my medication from the drug store and the pharmacist told me that the drug was a controlled substance." What does that mean? Which response by the nurse is the most accurate?

1. "If you continue on this medication for a long time, you will become addicted to it."
2. "You are not an addict, but the Controlled Drugs and Substances Act requires that your prescription drug habits be monitored."
3. "Any drug that has a potential for abuse is considered a controlled substance and is restricted. The pharmacist is responsible for sharing this information with you."
4. "Do you think that you are addicted to your medication?"

Correct Answer: 3

Rationale 1: Clients can be on controlled substances for various lengths of time without becoming addicted.

Rationale 2: The Controlled Drugs and Substances Act does not require monitoring of prescription drug use by clients who are ordered controlled substances.

Rationale 3: The pharmacist recognizes all drugs with the potential for abuse are considered controlled substances and carry restrictions.

Rationale 4: Asking the client if he thinks he is addicted does not answer his question about controlled substances.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2- 8: Explain the meaning of controlled substance.

Question 11

Type: MCSA

Mr Maris goes to the pharmacy to pick up his prescriptions following his surgery. The pharmacist tells him that one of his medications is a controlled substance. How does the pharmacist explain to Mr Maris how this medication is different from his other prescriptions?

1. Controlled drugs may only be dispensed at hospital pharmacies where high security measures are in place
2. The Narcotic Control Regulation controls which patients physicians can order narcotics for.
3. The pharmacist can control the amount and dose of drug prescribed according to the Narcotic Control Regulations
4. These drugs are regulated under the Controlled Substances and Drugs Act to reduce the availability of drugs that may be harmful if misused.

Correct Answer 4

Rationale 1 Any pharmacy can dispense controlled substances, they must all must provide the required physical security measures for controlled substances in their possession and maintain records of all movements of controlled substances into and out of their inventory.

Rationale 2. The Narcotic Control Regulation does not control which patients can receive narcotic prescriptions.

Rationale 3. The physician is responsible for determining the amount of and dosage of narcotic ordered.

Rationale 4. This is correct. Controlled substances are controlled by a number of agencies within Health Canada. They are responsible for controlling the import, production, export distribution and possession of narcotics.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-9: Explain the Controlled Drugs and Substances Act of 1997 and the role of the Drug Strategy and Controlled Substances Programme in controlling drug abuse and misuse.

Question 12

Type: MCSA

The student nurse has attended a class on the various drug schedules, and how drugs are categorized for distribution in Canada. Which of the following statements by the student indicates her understanding of drug schedules?

1. All prescription drugs are categorized under Schedule II.
2. Controlled substances are in a subcategory Schedule F
3. Factors influencing which schedule a drug belongs include potential abuse and adverse reactions
4. Schedule I drugs are only available only from a pharmacist; must be retained in an area with no public access

Correct Answer: 3

Rationale 1 Prescription drugs are categorized under Schedule I

Rationale 2 Controlled substances are within Schedule I in a subcategory of G

Rationale 3 A set of factors is used to determine the schedule under which a drug can be sold. These factors include potential for dependency and abuse, adverse reactions, and interaction with other drugs.

Rationale 4 Drugs that must be retained in an area with no public access are in Schedule II.

Cognitive Level: Remembering

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-10: Explain how drugs are scheduled according to Canada's Food and Drug Act, the CDSA, and the Narcotic Control Regulations.

Question 13

Type MCMA

As students were learning about drug schedules, they were asked to explore their neighbourhood pharmacy to help them understand the different criteria for each drug schedule. Which of the following drugs would the students accurately identify belong in Schedule I?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

1. Cough medicines
2. Anti-hypertensives
3. Vaccines
4. Narcotics
5. Extra strength Tylenol

Correct Answer: 2,4

Rationale 1 Cough medicines would be categorized under Schedule III, OTC.

Rationale 2. All prescription medications would be included in Schedule I

Rationale 3. Vaccines would be included in Schedule II, only available from a pharmacist; must be retained in an area with no public access.

Rationale 4. Narcotics are included in Schedule I

Rationale 5. Extra Strength Tylenol would be included in Schedule III, OTC

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-11: Identify the drug schedules and give examples at each level.

Question 14

Type: MCMA

A client is admitted to the hospital with high blood pressure. He is being cared for by a student nurse. The health care provider orders a diuretic and tells the student this medication will lower the client's blood pressure by decreasing intravascular fluid volume. What does this description address?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. The drug's mechanism of action
2. The drug's pharmacologic classification
3. How the drug produces its effects in the body
4. The drug's therapeutic classification
5. What condition is being treated by the drug

Correct Answer: 1,2,3

Rationale 1: Mechanism of action describes how a drug produces its effects in the body—in this case, how it lowers blood pressure.

Rationale 2: The pharmacologic classification describes how a drug produces its effects in the body—in this case, how it lowers blood pressure.

Rationale 3: The diuretic lowers blood pressure by lowering fluid volume in the vasculature.

Rationale 4: The therapeutic classification states what condition the drug is used to treat.

Rationale 5: A drug's therapeutic classification states what condition the drug is used to treat.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-12: Connect pharmacotherapy to nursing practice.

Question 15

Type: MCMA

When a drug is ordered for a client, what is the nurse responsible for knowing and understanding about the drug?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

1. Trade name

2. Contraindications
3. Intended use
4. Adverse effects
5. Gender considerations

Correct Answer: 2,3,4

Rationale 1: There can be many trade names for a particular drug, therefore knowing the generic name would be more appropriate in most situations.

Rationale 2: Contraindications for drugs are important for the nurse to know.

Rationale 3: Intended use gives the nurse important information needed to administer medications safely.

Rationale 4: Adverse effects are important to know so the nurse can monitor and evaluate the effects of the drug.

Rationale 5: Gender considerations may not be necessary to know and understand in all situations

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 2-12: Connect pharmacotherapy to nursing practice.

Chapter 3

Pharmacokinetics

Question 1**Type:** MCSA

What are the four phases of pharmacokinetics that a drug goes through?

1. Absorption, passive transport, ionization, and metabolism
2. Diffusion, bioavailability, metabolism, and excretion
3. Absorption, distribution, metabolism, and excretion
4. Active transport, ionization, diffusion, and excretion

Correct Answer: 3

Rationale 1: Passive transport explains one way a drug travels across plasma membranes.

Rationale 2: Diffusion describes a type of passive transport. Bioavailability refers to the amount of active drug available to body tissues.

Rationale 3: A drug undergoes the pharmacokinetics of absorption, distribution, metabolism, and excretion.

Rationale 4: Active transport describes one way a drug moves across plasma membranes, Ionization is the chemical property of a drug where it takes on positive or negative charges.

Cognitive Level: Remembering

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-2 Identify the four components of pharmacokinetics.

Question 2**Type:** MCMA

The nurse is teaching a client the importance of taking the medication as prescribed. Client teaching is guided by the nurse's knowledge of which principles of pharmacokinetics?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. A medication taken by injection must cross the membranes of the gastrointestinal tract to get to the blood stream before it can be distributed throughout the body.
2. A drug may be exposed to several physiological processes while en route to target cells.
3. Liver enzymes may chemically change the drug.
4. Excretion organs such as kidneys and intestines must be healthy enough to eliminate the drug.

5. Many processes to which drugs are exposed are destructive, thereby facilitating the drug's movement throughout the body.

Correct Answer: 2,3,4,5

Rationale 1: Medications taken by mouth must cross the membranes of the GI tracts to get to the blood stream in order to be distributed throughout the body. This is not the case for medications administered by injection.

Rationale 2: Drugs taken orally are often exposed to physiological processes such as stomach acid and digestive enzymes.

Rationale 3: Enzymes in the liver may chemically change some drugs.

Rationale 4: Drugs will continue to act on the body until they are either metabolized to an inactive form or are excreted. Pathologic states such as kidney disease can increase the drug's action on the body.

Rationale 5: Many destructive processes, such as when stomach acid breaks down food, can break down the drug molecule before it can reach the target cells. This will facilitate the drug's movement throughout the body.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-2 Identify the four components of pharmacokinetics

Question 3

Type: MCSA

When the nurse administers a drug that must move from an area of low concentration to an area of high concentration, what mechanism will the drug require?

1. Simple diffusion
2. Active transport
3. An intravenous route
4. A transdermal delivery system

Correct Answer: 2

Rationale 1: The movement from high to low concentration involves simple diffusion.

Rationale 2: The movement from low to high concentration is against a gradient, and will require energy, via the process of active transport.

Rationale 3: Drugs can be given via any route, and need to move from an area of low to high concentration; they do not need to be given via IV.

Rationale 4: Drugs do not need to be given transdermally.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-3 Explain how substances travel across the plasma membrane.

Question 4

Type: MCMA

The nurse is reviewing the role of diffusion in the distribution of medications. Drugs that cannot be distributed by simple diffusion include those with which characteristics?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Large molecules
2. Ionization
3. Water-soluble agents
4. Alcohol
5. Urea

Correct Answer: 1,2,3

Rationale 1: Large molecules have difficulty crossing plasma membranes by simple diffusion. These molecules may require carrier, or transport, proteins to cross membranes.

Rationale 2: Ionized drugs have difficulty crossing plasma membranes by simple diffusion. These drugs may require carrier, or transport, proteins to cross membranes.

Rationale 3: Water-soluble agents have difficulty crossing plasma membranes by simple diffusion. These agents may require carrier, or transport, proteins to cross membranes.

Rationale 4: Diffusion assumes that the chemical is able to freely cross the plasma membrane. Drugs may also enter through open channels in the plasma membrane; however, the molecule must be very small, such as alcohol.

Rationale 5: Diffusion assumes that the chemical is able to freely cross the plasma membrane. Drugs may also enter through open channels in the plasma membrane; however, the molecule must be very small, such as urea.

Cognitive Level: Analyzing

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Evaluation

Learning Outcome: 3-3 Explain how substances travel across the plasma membrane.

Question 5

Type: MCSA

The nurse has just administered a client's morning dose of medications following a high-fat breakfast. How will the absorption of the medication be affected?

1. It will be blocked.
2. It will be slowed.
3. It will be accelerated.
4. It will not be affected.

Correct Answer: 2

Rationale 1: Fatty foods will not block absorption of medications.

Rationale 2: Fatty foods in the stomach almost always slow drug absorption.

Rationale 3: Absorption rate will increase if the stomach is empty.

Rationale 4: Most medications are affected by a full or empty stomach.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-4 Discuss factors affecting drug absorption.

Question 6

Type: MCSA

The nurse recognizes that adding a vasoconstrictor to a local anesthetic agent will have which effect on absorption of the anesthetic agent?

1. It will increase blood flow to the area.
2. It will help to eliminate the drug sooner.
3. It will produce a more localized effect.
4. It will slow absorption of the agent.

Correct Answer: 4

Rationale 1: Vasoconstriction will reduce blood flow to the area.

Rationale 2: Vasoconstrictors will not alter the anesthetic agent's rate of elimination.

Rationale 3: It will not produce a more localized effect.

Rationale 4: Vasoconstriction reduces blood flow to the site and slows absorption of the agent.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-4 Discuss factors affecting drug absorption.

Question 7

Type: MCSA

The student nurse is administering an antibiotic for her patient with a wound abscess. She asks her instructor what requirements are necessary for the antibiotic to reach it's target cells. What is the instructors best response?

1. "The drug needs to be lipid soluble."
2. "There needs to be adequate blood perfusion to the area."
3. "The drug to be bio-available in an acidic environment."
4. "The drug needs to be administered in topical form."

Correct Answer: 2

Rationale 1: Lipid-soluble medications have a high affinity for adipose tissue and may not stay in the vascular compartment long enough to reach the abscess.

Rationale 2: Antibiotics can have difficulty reaching areas of necrotic or abscessed tissues, unless they have an adequate blood supply available.

Rationale 3: Ionization of a drug in an acidic environment affects absorption, not distribution, of the drug.

Rationale 4: A topical antibiotic might be indicated for external wounds, but abscesses are often internal and require medication to be delivered via blood vessels, unless they have been incised and drained.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-6 Discuss how drugs are distributed throughout the body.

Question 8

Type: MCSA

The nurse recognizes that when a client is receiving a lipid-soluble medication, higher concentrations will accumulate in which tissues?

1. Cardiac muscle
2. Liver
3. Bone marrow

4. Skeletal muscle**Correct Answer:** 3**Rationale 1:** Lipid-soluble drugs do not have greater affinity for cardiac muscle tissue.**Rationale 2:** Lipid-soluble drugs do not have greater affinity for the liver.**Rationale 3:** Lipid-soluble drugs have a higher affinity for bone marrow, teeth, the eye, and adipose tissue.**Rationale 4:** Lipid-soluble drugs do not have greater affinity for skeletal muscle tissue.**Cognitive Level:** Applying**Client Need:** Physiological Integrity**Client Need Sub:** Pharmacological and Parenteral Therapies**Nursing/Integrated Concepts:** Nursing Process: Implementation**Learning Outcome:** 3-6 Discuss how drugs are distributed throughout the body.**Question 9****Type:** MCMA

A client is admitted to the burn unit with 75% body surface area burns. Which orders would be appropriate for this client to control pain?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Morphine 10 mg IV every 2 to 4 hours as needed for pain
2. Morphine 10 mg IM every 2 to 4 hours as needed for pain
3. Morphine 10 mg transdermal patch every 2 to 4 hours as needed for pain
4. Morphine 10 mg sublingual every 2 to 4 hours as needed for pain
5. Morphine 10 mg subcutaneous every 2 to 4 hours as need for pain

Correct Answer: 1,4**Rationale 1:** Pain medication given by the intravenous (IV) route will be rapidly and completely absorbed.**Rationale 2:** The client has 75% surface area burns; there may not be an area available for intramuscular injections of morphine.**Rationale 3:** The client has 75% surface area burns; there may not be an area available to place a transdermal patch.**Rationale 4:** Sublingual morphine can be used as a rescue drug.**Rationale 5:** The client has 75% surface area burns; there may not be an area available for subcutaneous injections.

Cognitive Level: Analyzing

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-6 Discuss how drugs are distributed throughout the body.

Question 10

Type: MCSA

During pharmacology class, a student asks her instructor how protein binding affects the pharmacokinetics of a drug. What is the instructor's best response?

1. "The duration of action will be prolonged."
2. "Drug excretion will be accelerated."
3. "Metabolism of the drug will be delayed."
4. "The onset of drug action will be prolonged."

Correct Answer: 1

Rationale 1: The portion of the drug that is protein bound is not available to the tissues, but as it is released, it becomes a free drug; a drug that is highly protein-bound has a high percentage of bound or unavailable drug that will produce a longer duration of action.

Rationale 2: Drug excretion will not be accelerated.

Rationale 3: Metabolism of the drug will occur as the free drug portion becomes available.

Rationale 4: Onset of action of the drug will not be affected.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-7 Describe how plasma proteins affect drug distribution.

Question 11

Type: MCSA

The nurse checks a newly ordered medication and finds it to be 92% protein bound. How much of the medication is *not* readily available for distribution?

1. 100%.
2. 8%.
3. 50%.
4. 92%.

Correct Answer: 4

Rationale 1: If 100% of the drug were available to the client, none of it would be protein bound.

Rationale 2: This is the portion of drug that is unbound and is free and able to reach target tissue.

Rationale 3: If 50% of the drug is available to the client, then 50% is protein bound.

Rationale 4: Any part of the drug that is protein bound is not available for distribution.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-7 Describe how plasma proteins affect drug distribution.

Question 12

Type: FIB

A client who was recently started on the anticoagulant warfarin (Coumadin) asks about adverse reactions. The nurse explains that adverse effects may occur because the drug is highly bound with only ____% available to reach the target cells.

Standard Text: Record your answer rounding to the nearest whole number.

Correct Answer: 1

Rationale: When giving a medication that is highly bound, the nurse should carefully monitor for adverse effects. The anticoagulant warfarin (Coumadin) is highly bound; 99% of the drug in the plasma exists in drug-protein complexes and only 1% exists as a free drug available to reach target cells.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 3-7 Describe how plasma proteins affect drug distribution.

Question 13

Type: MCSA

A client has been started on diltiazem (Cardizem), a substrate of the cytochrome CYP3A4 isoenzyme system. The client also takes phenobarbital, an inducer of the CYP3A4 isoenzyme system, for seizures. What does the nurse recognize about diltiazem?

1. It will not be able to cross the blood brain barrier (BBB).
2. It will be metabolized by the kidneys.

3. It might be inactivated at a faster rate than normal.

4. It might be excreted at a slower rate.

Correct Answer: 3

Rationale 1: The cytochrome P460 enzyme system does not affect ability to cross the BBB. Lipid solubility of a drug determines the ability to cross the BBB.

Rationale 2: The drug will still be metabolized by the liver, not the kidneys.

Rationale 3: When one drug induces an enzyme system, it accelerates the metabolism of other drugs using the same isoenzyme substrate—in this case, the CYP3A4 system, which causes early inactivation of the drug.

Rationale 4: The drug will be metabolized faster and therefore excreted more quickly, not more slowly.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-5 Explain the metabolism of drugs and its applications to pharmacotherapy.

Question 14

Type: MCSA

A client receiving metoprolol (Lopressor), a substrate of the CYP2D6 system, is started on amiodarone (Cordarone), an inhibitor of the CYP2D6 system. What should the nurse plan to do?

1. Monitor for signs of amiodarone toxicity.
2. Administer both drugs on an empty stomach.
3. Monitor for prolonged effects of the Lopressor.
4. Administer the medications at least two hours apart.

Correct Answer: 3

Rationale 1: Lopressor, not amiodarone, is more likely to be toxic, as it will take longer to be inactivated.

Rationale 2: It is not necessary to administer the drugs on an empty stomach; this will not alter the metabolism by the CYP enzyme system.

Rationale 3: The CYP enzyme system determines the speed at which most drugs are metabolized in the liver. When one drug inhibits the action of the same isoenzyme system, other drugs being metabolized by this same system might not be inactivated as quickly, leading to prolonged effects of the drug.

Rationale 4: It would not be necessary to administer the drugs two hours apart; this would not alter their metabolism by the CYP enzyme system.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 3-5 Explain the metabolism of drugs and its applications to pharmacotherapy.

Question 15

Type: MCSA

What does the nurse anticipate about the medications ordered for a client with liver disease?

1. They will be in lower doses than normal.
2. They will be administered by the parenteral route.
3. They will need to be divided evenly throughout the day.
4. They will need to be given with an antacid.

Correct Answer: 1

Rationale 1: Liver function is decreased in cirrhosis, leading to a reduction in drug metabolism. Drugs given at normal doses could lead to toxicity.

Rationale 2: Drugs can still be administered by the oral route; the parenteral route would be indicated if the drug is altered by gastric juices or needs to avoid the first pass effect.

Rationale 3: The doses do not need to be evenly divided throughout the day.

Rationale 4: The medications do not need to be given with antacids. Most medications should not be given with antacids, since this alters the pH, and could interfere with adequate absorption.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 3-5 Explain the metabolism of drugs and its applications to pharmacotherapy.

Question 16

Type: FIB

The nurse has administered a dose of codeine to a client for the management of postoperative pain. The nurse monitors for respiratory depression because _____ % of codeine is metabolized and converted to morphine, which can cause respiratory depression in the clients.

Standard Text: Record your answer rounding to the nearest whole number.

Correct Answer: 10

Rationale: Chemical changes to drugs always result in functional changes. The products of drug metabolism, or metabolites, usually have less pharmacologic activity than the original molecule.

On rare occasions a metabolite may have greater activity than the original drug. This is the case for codeine. Although 90% of codeine is changed to inactive metabolites by the liver, 10% is converted to morphine, which has significantly greater ability to relieve severe pain and has the potential to cause respiratory depression in clients.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-5 Explain the metabolism of drugs and its applications to pharmacotherapy.

Question 17

Type: MCSA

The nurse is teaching a young woman about taking medications while breast feeding. Which statement by the woman indicates that she understood the instructions?

1. "I will be sure to take medications just before breast-feeding."
2. "I know it is safe to take over-the-counter meds, but not prescription meds."
3. "I will check with my health care provider before taking any medication."
4. "I will only use herbal supplements while breast-feeding."

Correct Answer: 3

Rationale 1: Although drug levels might be lower if the drug is taken just prior to feeding, the mother needs to determine that the drug is safe for the infant.

Rationale 2: OTC meds might be unsafe to use during pregnancy.

Rationale 3: This reflects the safest way to determine if a drug can be taken while breast-feeding.

Rationale 4: It is not safe to assume herbal medications are safe; they can be secreted in breast milk and might be unsafe for the infant.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-8 Identify major processes by which drugs are excreted.

Question 18

Type: MCMA

Which of the following routes are drugs eliminated from the body?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Fecal
2. Gastric
3. Glandular
4. Pulmonary
5. Renal

Correct Answer: 1,3,4,5

Rationale 1: Drugs can be excreted via feces.

Rationale 2: Drugs are not excreted through the gastric system.

Rationale 3: Drugs can be secreted glandularly.

Rationale 4: Drugs can be secreted via the lungs.

Rationale 5: Drugs can be excreted by the renal route.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-8 Identify major processes by which drugs are excreted.

Question 19

Type: MCSA

The nurse reads that a drug undergoes enterohepatic recirculation. How would the nurse explain this process to a colleague?

1. This drug must be given several times a day.
2. The drug will have a very low therapeutic effect.
3. The drug will be concentrated in the liver.
4. The drug might have a prolonged activity in the body.

Correct Answer: 4

Rationale 1: The drug will not need to be given several times a day.

Rationale 2: Enterohepatic recycling will not necessarily lower the therapeutic effect.

Rationale 3: The drugs are recirculated through the liver but are not concentrated in the liver.

Rationale 4: Drugs secreted into the bile are sent back to the liver through enterohepatic recirculation and can be recirculated several times, thus prolonging their activity.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-9 Explain how enterohepatic recirculation affects drug activity.

Question 20

Type: MCSA

A health care provider has discontinued the client's medication, digoxin (Lanoxin). Recalling that this drug undergoes enterohepatic recirculation, which statement does the nurse make to the client?

1. "You might continue to have effects of the drug for a few weeks."
2. "You might experience some toxic effects from the drug in the next few days."
3. "Expect to experience some side effects until the drug is totally eliminated."
4. "The drug will be totally out of your system in the next 48 hours."

Correct Answer: 1

Rationale 1: Since the drug is recirculated several times through enterohepatic recirculation, continued effects of the drug may be expected.

Rationale 2: The client should expect to continue experiencing some effects of the drug, but not toxic effects.

Rationale 3: The client might have some side effects of the drug if she has been having them all along, but she should not be told to expect side effects.

Rationale 4: The drug might take several weeks to be totally eliminated from the body.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Physiological Adaptation

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-9 Explain how enterohepatic recirculation affects drug activity.

Question 21

Type: MCMA

The nurse is caring for a client who is receiving medications from several different classifications for the treatment of multiple health problems. Which of the following medications or classifications does the nurse anticipate prolonged activity due to enterohepatic recirculation?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Mebendazole (Vermox)

2. Digoxin (Lanoxin)
3. Phenothiazines
4. Topical steroids
5. Topical anti-infectives

Correct Answer: 2,3

Rationale 1: Certain oral drugs travel through the GI tract without being absorbed and are excreted in the feces. Mebendazole (Vermox), a drug used to kill intestinal worms, is such a drug.

Rationale 2: Some drugs may be recirculated numerous times with the bile, thus extending their stay in the body; biliary excretion is influential in prolonging the activity of digoxin (Lanoxin).

Rationale 3: Some drugs may be recirculated numerous times with the bile, thus extending their stay in the body; biliary excretion is influential in prolonging the activity of phenothiazines.

Rationale 4: Topical steroids are not subject to enterohepatic recirculation.

Rationale 5: Topical anti-infectives are not subject to enterohepatic recirculation.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-9 Explain how enterohepatic recirculation affects drug activity.

Question 22

Type: MCSA

A client has been started on a medication for postoperative pain. When does the nurse anticipate the client will receive optimal pain relief?

1. When the drug concentrates in the muscle tissue
2. When the drug reaches a therapeutic range
3. When the drug achieves a minimal effective concentration
4. When the drug approaches a toxic concentration

Correct Answer: 2

Rationale 1: The drug does not have to concentrate in muscle tissue in order to relieve pain.

Rationale 2: The goal of therapy is to reach and maintain a plasma level in the therapeutic range.

Rationale 3: The client might experience some pain relief at a minimum effective concentration but probably not optimal pain relief.

Rationale 4: A toxic concentration does not need to be reached in order to achieve pain relief; in fact, it should be avoided.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-11 Explain how a drug reaches and maintains its therapeutic range in the plasma.

Question 23

Type: MCSA

A client is receiving an antibiotic with the potential for nephrotoxicity. Which item should the nurse should plan to monitor?

1. Urinary concentration of the drug
2. Route of drug administration
3. Plasma levels of the drug
4. Rate of intravenous administration

Correct Answer: 3

Rationale 1: The urinary concentration of a drug will not provide an accurate measurement of nephrotoxicity.

Rationale 2: The route of administration will not determine nephrotoxicity.

Rationale 3: Plasma levels of a drug are an indicator of whether a drug is at a therapeutic or toxic level, and provide information as to whether a drug dosage needs adjustment.

Rationale 4: Although the rate at which a drug is administered intravenously can affect plasma levels and irritation to the vein, it would not provide the best measure of nephrotoxicity.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 3-11 Explain how a drug reaches and maintains its therapeutic range in the plasma.

Question 24

Type: MCSA

The nurse is preparing to medicate a client for a migraine headache. The nurse should choose the drug with which half-life?

1. 10 to 20 hours
2. 5 to 10 days

3. 2 to 3 hours

4. 1 to 3 minutes

Correct Answer: 3

Rationale 1: A half-life of 10 to 20 hours is longer than would be needed to provide migraine pain relief.

Rationale 2: A half-life of 5 to 10 days is longer than would be needed to provide migraine pain relief.

Rationale 3: A drug with a half-life of 2 to 3 hours will be reduced by 50% in 2 to 3 hours, providing adequate time for the client to obtain pain relief.

Rationale 4: A drug with a half-life of 1 to 3 minutes would be eliminated in a very short time period and would not provide adequate pain relief.

Cognitive Level: Analyzing

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-10 Explain the applications of a drug's plasma half-life ($t_{1/2}$) to pharmacotherapy.

Question 25

Type: MCSA

The nurse is reviewing the concept of a drug's half-life for a student nurse. What is the nurses's best explanation?

1. It is the time it takes for one-half of the drug to be absorbed
2. It describes when one-half of the drug is eliminated by the body
3. It is the time it takes for the drug to elicit a therapeutic response
4. The time it takes the drug to reach the target tissue

Correct Answer: 2

Rationale 1: A drug's half-life is the time it takes for one-half of the original dose to be eliminated by the body.

Rationale 2: A drug's half-life is the time it takes for one-half of the original dose to be eliminated by the body.

Rationale 3: A therapeutic response can be reached before the half-life occurs.

Rationale 4: Target tissue is reached on the onset of action, not at half-life.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-10 Explain the applications of a drug's plasma half-life ($t_{1/2}$) to pharmacotherapy.

Question 26

Type: MCSA

The nurse is administering a drug with a half-life of 6 hours. The nurse understands the client will eliminate most of the drug in how many hours?

1. 36
2. 24
3. 6
4. 12

Correct Answer: 2

Rationale 1: After four half-lives, 94% of the drug has been eliminated by the body.

Rationale 2: After four half-lives, 94% of the drug has been eliminated by the body. A drug with a half-life of 6 hours will go through four half-lives in 24 hours.

Rationale 3: After four half-lives, 94% of the drug has been eliminated by the body.

Rationale 4: After four half-lives, 94% of the drug has been eliminated by the body.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-10 Explain the applications of a drug's plasma half-life ($t_{1/2}$) to pharmacotherapy.

Question 27

Type: MCMA

The nurse is preparing to administer felodipine to a hospitalized client. The nurse assesses the client for which disorders that may cause an increased risk for adverse effects associated with this medication due to its extended half-life?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. Renal disease
2. Liver disease
3. Gastrointestinal disease
4. Cardiac disease
5. Pulmonary disease

Correct Answer: 1,2

Rationale 1: As drugs stay in the body for prolonged periods, the risk for long-term adverse effects increases. This can become particularly serious for clients with significant renal impairment; diminished metabolism and excretion will cause the plasma half-life of a drug to increase, and the concentration may reach toxic levels.

Rationale 2: As drugs stay in the body for prolonged periods, the risk for long-term adverse effects increases. This can become particularly serious for clients with significant hepatic impairment; diminished metabolism and excretion will cause the plasma half-life of a drug to increase, and the concentration may reach toxic levels.

Rationale 3: Gastrointestinal disease does not increase the risk of adverse drug effects.

Rationale 4: Cardiac disease does not increase the risk of adverse drugs effects.

Rationale 5: Pulmonary disease does not increase the risk of adverse drug effects.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Reduction of Risk Potential

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 3-10 Explain the applications of a drug's plasma half-life ($t_{1/2}$) to pharmacotherapy.

Question 28

Type: MCSA

A client is prescribed a loading dose of a cardiac glycoside for an exacerbation of heart failure. When the client comments, "I usually take a much lower dose." Which response by the nurse is the most appropriate?

1. "Giving a large dose will reduce the incidence of side effects."
2. "You are being given a large dose in order to increase blood levels of the drug quickly."
3. "The health care provider ordered this dose, so I need to administer it."
4. "Your usual dose is no longer effective, you need to be on a higher dose now."

Correct Answer: 2

Rationale 1: Giving a larger dose actually could increase the incidence of side effects.

Rationale 2: Loading doses of medications are used to provide a more rapid increase in the blood level of the drug, resulting in a quicker therapeutic response.

Rationale 3: Although this is an accurate statement, it does not provide an explanation to the client as to why a larger dose is being administered.

Rationale 4: A loading dose is usually only given once, and the client will then be put back on the average daily dose.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 3-12 Differentiate between loading and maintenance doses.

Question 29

Type: MCSA

Following the administration of a loading dose of an antibiotic, which dosing schedule does the nurse anticipate will follow?

1. A second loading dose
2. Regularly intermittent doses of the antibiotic
3. Alternating high and low doses of the antibiotic
4. Daily bolus injections

Correct Answer: 2

Rationale 1: A loading dose of a medication is usually only given once. Repeating the loading dose could cause toxicity.

Rationale 2: Following a loading dose, the usual maintenance dose of a drug is given in order to maintain a therapeutic blood level of the drug.

Rationale 3: Alternating high and low doses would not allow for a plateau of the drug level to be reached, which is needed for a therapeutic response.

Rationale 4: Bolus injections are usually only given once, not daily.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 3-12 Differentiate between loading and maintenance doses.

Question 30

Type: FIB

The nurse is teaching a student about the loading dose of antibiotic that will be administered later in the day. The student demonstrates understanding by stating that the medication will reach a therapeutic dose in ____ hour(s) versus the 48 hours that would be required for the routine medication dose.

Standard Text: Record your answer rounding to the nearest whole number.

Correct Answer: 12

Rationale: It takes almost five doses (48 hours) before a therapeutic level is reached using a routine dosing schedule. With a loading dose, a therapeutic level is reached within 12 hours.

Cognitive Level: Analyzing

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Evaluation

Learning Outcome: 3-12 Differentiate between loading and maintenance doses.

Question 32

Type MCMA

A student nurse asks her instructor why is it so important that we learn pharmacokinetics, isn't it enough to just learn the actions and side effects of the drugs we give? What is the instructor's best response?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply

1. "Pharmacokinetics gives us important information about how different routes affect absorption."
2. "Pharmacokinetics offers us with information on how the body's response to drugs are affected by different disease processes"
3. "Pharmacokinetics provides nurses with specific information on what may impact how long a drug stays in the system."
4. "Pharmacokinetics provides us with information on adverse effects and how these can be prevented."
5. "Pharmacokinetics provides the nurse with information on how plasma membranes change in order to move different forms of drugs throughout the body."

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Correct Answer 1,2,3

Rationale 1 This is correct. Absorption is the primary pharmacokinetic factor that determines length of time it takes a drug to exert its desired effect.

Rationale 2. This is correct, for example, we understand that metabolism of a drug can be affected by liver disease.

Rationale 3. This is correct, delay in excretion can be due to both liver and renal disease.

Rationale 4. Pharmacokinetics does not provide us with specific information on adverse effects of drugs.

Rationale 5. Plasma membranes do not change with different forms of drugs, but the mechanism which is used (active versus passive transport) may.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 3-1 Explain the application of pharmacokinetics to clinical practice.

Question 33
Type MCMA

Which of the following factors affect a drugs absorption rate?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply

1. Route
2. Drug Form
3. Liver function
4. Food
5. Renal Function

Correct Answer: 1,2,4

Rationale. 1 The route that the drug is administered will affect its absorption with Intravenous being the quickest.

Rationale. 2 The form of a drug affects its absorption, elixirs and syrups being quicker than pill form

Rationale 3. Liver function affects metabolism and excretion not absorption.

Ratioanle 4. Food can delay the absorption of some drugs

Rationale 5. Renal function will impact excretion not absorption

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 3-4: Discuss factors affecting drug absorption.

Chapter 4

Pharmacodynamics

Question 1

Type: MCSA

The client and his wife receive the same medication for hypertension. The wife asks the nurse why she is receiving a higher dose of the medication. Which response by the nurse is the most appropriate?

1. "You have a greater percentage of body fat, so you need more medication."
2. "Females have a higher metabolism, so you need more medication."
3. "Your hormones are different from your husband's, so you need more medication."
4. "Everyone is unique and responds differently to medication."

Correct Answer: 4

Rationale 1: The percentage of body fat is only one of the variables involved in a client's response to medication.

Rationale 2: Females do not necessarily have higher metabolic rates than males.

Rationale 3: Hormones are only one of the variables involved in a client's response to medication.

Rationale 4: Many variables influence how clients respond to medications; each client must be evaluated for response.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-2 Discuss how frequency response curves may be used to explain how clients respond differently to medications.

Question 2

Type: MCSA

A client asks the nurse why his dose of an antihypertensive medication is different from his neighbour's dose, stating, "We both take the exact same drug, but I take 60 mg and he takes only 25 mg." Which response by the nurse is the most appropriate?

1. "If your neighbour is a lot younger than you, his dose might be a lot lower."
2. "Individuals often have widely different responses to the same medications and need different doses of the same medication."

3. "If your neighbour takes other medications, he might need to take a lower dose of the medication than you."
4. "If you are taking a generic brand of the medication, you will need a higher dose than you would of a brand name of the same medication."

Correct Answer: 2

Rationale 1: Age can be a factor in dosing of medications, but this is not the best explanation of why different doses are needed to for two different people.

Rationale 2: Genetic makeup and metabolism vary widely and account for the differences in response to drugs and the need for individualized doses.

Rationale 3: Taking other medications could be part of the reason why the dose is different, but this is not the best explanation.

Rationale 4: Generic and brand name drugs usually have the same dose equivalency.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-1 Discuss how frequency response curves may be used to explain how clients respond differently to medications.

Question 3

Type: MCSA

The nursing instructor is teaching student nurses about how the median effective dose of a medication is related to clinical practice. Which statement reflects understanding by the student?

1. "About 50% of clients will experience severe side effects from the drug."
2. "About 50% of clients will not experience any effect from the drug."
3. "Some clients will respond differently, depending on their ethnic background."
4. "Some clients will require more or less than the average dose of the drug."

Correct Answer: 4

Rationale 1: The median effective dose does not predict how many clients will experience severe side effects from the drug.

Rationale 2: The median effective dose does not predict that 50% of clients will not experience an effect of the drug.

Rationale 3: The median effective dose is not related to ethnicity.

Rationale 4: The median effective dose is the dose required to produce a specific therapeutic response in 50% of a group of clients.

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Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Planning

Learning Outcome: 4-3: Explain the importance of the median effective dose (ED₅₀) to clinical practice.

Question 4

Type: MCSA

A client looks up the drug he is taking in a drug guide and asks the nurse why the health care provider prescribed a medication that has a lethal dose measure. Which response by the nurse is the most appropriate?

1. "Lethal dose just refers to what is done in research; it is not used by doctors to prescribe drugs."
2. "The lethal dose is a value determined in research that helps to establish the safe dose."
3. "All drugs have the capacity to be lethal, the effects will be monitored by your physician."
4. "Don't worry about that. I will have your doctor explain it to you."

Correct Answer: 2

Rationale 1: The lethal dose is considered by health care providers when prescribing medications.

Rationale 2: The difference between the median effective dose and the median lethal dose is measured to determine the drug's safety margin as well as the safe effective dose.

Rationale 3: All drugs have the potential to be lethal, but telling this to the client might be frightening.

Rationale 4: Telling the client not to worry is condescending and does not answer his question.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-4 Compare and contrast median lethal dose (LD₅₀) and median toxicity dose (TD₅₀).

Question 5

Type: MCMA

The nurse explains to a student nurse that the median lethal dose of drugs is often determined in laboratory preclinical trials. Which rationales best support why this is done?

Note: Credit will be given only if all correct choices and no incorrect choices are selected.

Standard Text: Select all that apply.

1. It would be unethical to determine these values in human subjects.
2. The safety of the medication must be determined prior to clinical trials.
3. It is difficult to obtain sufficient participants for clinical trials.
4. Clinical trials determine only the effective dose of a drug.
5. It is too costly to conduct the studies during clinical trials.

Correct Answer: 1,2

Rationale 1: Laboratory animals are used in clinical trials to determine the LD₅₀, or the dose that kills 50% of the subjects. It would be unethical to kill human subjects.

Rationale 2: Before a drug is released for trials in human subjects, its safety must be determined.

Rationale 3: It can be challenging to obtain sufficient subjects at times, but this is not the reason for doing lethal studies during preclinical trials.

Rationale 4: Clinical trials determine not only the effectiveness of a drug, but also its adverse and toxic effects.

Rationale 5: The cost of the trials is the reason they are conducted with animal subjects.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-4 Compare and contrast median lethal dose (LD₅₀) and median toxicity dose (TD₅₀).

Question 6

Type: FIB

The nurse is educating a client who is participating in a drug study and describes the median toxicity dose as the dose that will produce toxicity in ____ % of a group of clients.

Standard Text: Record your answer rounding to the nearest whole number.

Correct Answer: 50

Rationale: The median toxicity dose (TD₅₀) is the dose that will produce a given toxicity in 50% of a group of clients.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4- Compare and contrast median lethal dose (LD₅₀) and median toxicity dose (TD₅₀).

Question 7**Type:** MCSA

The nurse is researching a drug recently released on the market to determine what the median lethal dose (LD₅₀) was in preclinical trials. The nurse recognizes that this number reflects which fact?

1. The dose at which 50% of the research animals died
2. A measurement of the potency of the drug
3. The value of relative safety of the drug
4. The dose that produced signs of toxicity in 50% of lab animals

Correct Answer: 1

Rationale 1: The dose at which 50% of animals in the preclinical trials are killed is the median LD₅₀ dose.

Rationale 2: A comparison of two drugs is done when defining the potency of a drug.

Rationale 3: Relative safety of dose is reflected in the therapeutic index.

Rationale 4: The dose at which signs of toxicity are seen in 50% of laboratory subjects is the median toxicity dose.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Assessment

Learning Outcome: 4-4 Compare and contrast median lethal dose (LD₅₀) and median toxicity dose (TD₅₀).

Question 8**Type:** MCSA

Prior to administering medications, the nurse notes that a drug has a narrow therapeutic index. What is the significance of this information?

1. It determines whether the health care provider has prescribed the best drug for the client
2. It can predict when a client will begin to experience toxic drug effects
3. It can determine interactions among the drugs the client is receiving
4. It will determine clients who will need to have serum blood levels monitored

Correct Answer: 4

Rationale 1: The therapeutic index does not help to determine whether the best drug has been prescribed for the client.

Rationale 2: The therapeutic index does not determine toxic doses of a drug, and clients differ in their response to drugs.

Rationale 3: The therapeutic index does not help to identify interactions among drugs.

Rationale 4: Drugs with a narrow therapeutic index have low margins of safety and need to be monitored through serum drug levels.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-5 Correlate a drug's therapeutic index to its margin of safety.

Question 9

Type: FIB

The nurse checks the margin of safety (MOS) for a drug that will be administered to a client, knowing that the MOS is the amount of drug that is lethal to ____ % of animals divided by the amount that produces a therapeutic effect in ____ % of animals.

Standard Text: Record your answer rounding to the nearest whole number.

Correct Answers: 1, 99

Rationale: The MOS is calculated as the amount of drug that is lethal to 1% of animals (LD_1) divided by the amount of drug that produces a therapeutic effect in 99% of the animals (ED_{99}).

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

NLN Competencies: Knowledge and Science: Relationships between knowledge/science and quality and safe patient care

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-5 Correlate a drug's therapeutic index to its margin of safety.

Question 10

Type: MCSA

The nurse is researching a drug that has a median effective dose (ED_{50}) of 5 mg and a median lethal dose (LD_{50}) of 20 mg. Which therapeutic index (TI) calculated by the nurse is correct?

1. 5
2. 4
3. 1
4. 10

Correct Answer: 2

Rationale 1: The TI is calculated by dividing the median LD by the median ED. Twenty divided by 5 does not equal 5.

Rationale 2: The TI is calculated by dividing the median LD by the median ED. Twenty divided by 5 equals 4.

Rationale 3: The TI is calculated by dividing the median LD by the median ED. Twenty divided by 5 does not equal 1.

Rationale 4: The TI is calculated by dividing the median LD by the median ED. Twenty divided by 5 does not equal 10.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Evaluation

Learning Outcome: 4-6 Identify the significance of the graded dose–response relationship to clinical practice.

Question 11

Type: FIB

The nurse is preparing to administer a medication to a client on a medical-surgical unit. The median lethal dose of the drug is 40 mg, and the median effective dose is 10 mg. The nurse calculates the therapeutic index to be _____.

Standard Text:

Correct Answer: 4

Rationale : The therapeutic index is calculated by dividing the median lethal dose (LD_{50}) by the median effective dose (ED_{50}).

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-6 Identify the significance of the graded dose-response relationship to clinical practice.

Question 12

Type: MCSA

A client receiving antibiotics for a serious infection asks the nurse, "Why don't you just give me more of that drug to cure the infection faster?" Which response by the nurse is the most appropriate?

1. "I will check with the doctor to see if it is time to increase the medication."

2. "You are at maximum dose; taking more will not help."
3. "You are at a maximum dose; taking more will cause interactions with other medications."
4. "You must stay on this drug for two more weeks before the dosage can be increased."

Correct Answer: 2

Rationale 1: The drug plateau has been reached; the nurse can provide this explanation to the client.

Rationale 2: When the plateau of a drug has been reached, administering more of the drug will not produce additional benefit.

Rationale 3: An increase in dosage could cause interactions with other medications, but this is not the best answer.

Rationale 4: Once the plateau of a drug has been reached, there is no time frame for an increase in dosage because an increase will not produce a greater effect.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-6 Identify the significance of the dose–response relationship to clinical practice.

Question 13

Type: MCSA

What does the nurse responsible for administering narcotics to post-operative patients understand is true about the potency of narcotics?

1. Codeine is less potent than morphine; it will not produce an allergic reaction.
2. Codeine is less potent than morphine; it will not relieve pain as well.
3. Morphine is more potent than codeine; it will produce more adverse effects.
4. Morphine is more potent than codeine; a lesser dose will be required.

Correct Answer: 4

Rationale 1: The potency of a drug is not related to its ability to cause an allergic reaction.

Rationale 2: Although codeine is less potent than morphine, less potent narcotics can be very effective with pain relief.

Rationale 3: Morphine is more potent than codeine, but greater potency does not imply the drug will produce more adverse effects.

Rationale 4: A drug that is more potent will produce a therapeutic effect at a lower dose.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-7 Compare and contrast the terms *potency* and *efficacy*.

Question 14

Type: MCSA

The nurse is discussing the difference between potency and efficacy with a client who has just received a prescription to treat congestive heart failure. Which statement by the client indicates that learning has occurred?

1. "The best drug for me is the one with the greatest efficacy."
2. "A drug with the greatest efficacy will produce the least side effects."
3. "Low-potency drugs have efficacy and do not produce side effects."
4. "The best drug for me is the one with the highest potency."

Correct Answer: 1

Rationale 1: Efficacy refers to the magnitude of maximal response that can be produced by a particular drug.

Rationale 2: Even though a drug is effective in treating a condition, it can still have side effects.

Rationale 3: Low potency does not guarantee a drug will not produce side effects.

Rationale 4: High-potency drugs do not necessarily provide the best response in the patient.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

NLN Competencies: Knowledge and Science: Relationships between knowledge/science and quality and safe patient care

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-6 Compare and contrast the terms *potency* and *efficacy*.

Question 15

Type: MCSA

The nurse administers a medication that binds to a beta receptor on the cardiac muscle, resulting in stimulation of the receptor. Which effect does the nurse anticipate when assessing the client?

1. A decrease in chest pain
2. An increase in heart rate
3. An increase in blood pressure
4. A decrease in electrical conduction

Correct Answer: 2

Rationale 1: Since stimulation of the beta receptors increases heart rate and workload, an increase in chest pain could occur.

Rationale 2: Stimulation of the beta receptors will cause an increase of sympathetic nervous system activity, resulting in an increased heart rate.

Rationale 3: Stimulation of the beta receptors is more likely to cause a decrease in blood pressure.

Rationale 4: Electrical conduction will be increased by beta stimulation.

Cognitive Level: Analyzing

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Evaluation

Learning Outcome: 4-9 Explain the relationship between receptors and drug action.

Question 16

Type: MCSA

The nurse is administering a medication that will bind to histamine-2 receptors in the stomach and block their action. The nurse explains to the client that this drug will cause which action?

1. A reduction in abdominal cramping
2. A decrease in stomach acidity
3. A reduction in nausea
4. An increase in stomach motility

Correct Answer: 2

Rationale 1: Histamine-2 stimulates the production of gastric acid; it will not affect abdominal cramping.

Rationale 2: Blocking the histamine-2 receptors will help to reduce the stimulation of gastric acid.

Rationale 3: Histamine-2 stimulates the production of gastric acid; it will not reduce nausea.

Rationale 4: Histamine-2 stimulates the production of gastric acid; it does not affect stomach motility.

Cognitive Level: Applying

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-9 Explain the relationship between receptors and drug action.

Question 17

Type: MCSA

The nurse has taught a group of clients how their medications work in their bodies. Which comment by a client reflects correct understanding of the teaching?

1. "The normal function of a cell is enhanced or blocked by medications."

2. "Medications help the body produce new enzymes."
3. "Body tissue functions are changed by medications."
4. "Medications change the function of cells in the body."

Correct Answer: 1

Rationale 1: Many medications work by stimulating or enhancing the normal function of a cell or by blocking the normal function.

Rationale 2: Medications can stimulate enzyme reactions or even provide enzymes that are missing, but they do not help the body produce new ones.

Rationale 3: Body tissue functions are not changed.

Rationale 4: Functions of the cell can be enhanced or blocked, but they are not changed.

Cognitive Level: Understanding

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Evaluation

Learning Outcome: 4-9 Explain the relationship between receptors and drug action.

Question 18

Type: MCSA

Morphine is a drug that mimics the actions of endorphins at the opioid receptors. Which of the following term best describes this action?

1. Idiosyncratic response
2. Receptor ligands
- 3 Antagonist
4. Agonist

Correct Answer: 3

Rationale 1: This is a response to a drug that is unpredictable and unexplained.

Rationale 2: Receptor ligands is an intracellular molecule that can activate or inhibit receptors

Rationale 3: An antagonist produces a response that may prevent the endogenous substance from its normal actions.

Rationale 4: An agonist is a drug that produces a similar response as the endogenous substance.

Cognitive Level: Analyzing

Client Need: Physiological Integrity

Client Need Sub: Pharmacological and Parenteral Therapies

Nursing/Integrated Concepts: Nursing Process: Implementation

Learning Outcome: 4-8 Distinguish between an agonist, partial agonist, and antagonist.

Question 19**Type:** MCSA

The student nurse has been reading about the Human Genome Project, and asks the nursing instructor how it will affect future pharmacological therapies. Which response by the nurse is the most appropriate?

1. "It will help prevent disease through gene manipulation, but will not impact drugs."
2. "We will be able to alter genes, so we will not need drugs,"
3. "We will be able to standardize drug doses to make prescribing easier."
4. "It will help to individualize drug therapy for people in a more effective way."

Correct Answer: 4**Rationale 1:** Medications will be impacted greatly by this research.**Rationale 2:** Altering genes to prevent illness is a possibility, but we will always need medications.**Rationale 3:** Individuals will still respond differently to medications; not all drugs will have standardized doses.**Rationale 4:** The goal of pharmacogenetics is to help individualize drug therapy for people in a more effective way.**Cognitive Level:** Understanding**Client Need:** Physiological Integrity**Client Need Sub:** Pharmacological and Parenteral Therapies**Nursing/Integrated Concepts:** Nursing Process: Implementation**Learning Outcome:** 4-10 Explain possible future developments in the field of pharmacogenetics.