Understanding Pharmacology for Health Professionals 6th edition Turley Test Bank

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Understanding Pharmacology for Health Professionals, 6e **(Turley)**
Chapter 2 Drug Testing, Drug Forms, and Drug Measurements

2.1 Multiple Choice Questions

1) A solid drug form that contains the active drug (as a dried powder) plus inert ingredients to provide bulk and a standardized size is known as a/an _____.
A) capsule
B) ointment
C) tablet
D) emulsion
Answer: C
Explanation:
A) A capsule comes in two forms, either a gelatin shell or a two-piece, hard shell, not a solid drug form.
B) An ointment is a semisolid emulsion of oil and water, not a solid drug form
C) Correct.
D) An emulsion is a type of solution, not a solid drug form.

2) What type of tablet has an indented line running across it so that it can be easily broken into equal pieces?
A) caplet
B) enteric
C) scored
D) troche
Answer: C
Explanation:
A) Caplets are coated tablets in the form of an elongated capsule. They do not have an indented line running across them.
B) An enteric tablet is covered with a special coating that resists stomach acid. An enteric tablet does not have an indented line running across it.
C) Correct.
D) A troche is an elongated tablet that disintegrates to release the drug topically in the mouth. It does not have an indented line running across it.

3) A drug's trade name will often include abbreviations such as CR, LA, SR, or XL. These abbreviations indicate which type of tablet?
A) caplets
B) enteric
C) slow-release
D) troche
Answer: C
Explanation:
A) These abbreviations do not indicate that the drug is a caplet.
B) These abbreviations do not indicate that the drug is enteric.
C) Correct.
D) These abbreviations do not indicate that the drug is a troche.

4) Which drug form comes in two different varieties: a soft gelatin shell and a two-piece hard shell?
A) capsule
B) cream
C) ointment
D) tablet
Answer: A
Explanation:
A) Correct.
B) A cream is a semisolid emulsion of oil and water. It does not have a shell.
C) An ointment is a semisolid emulsion of oil and water. It does not have a shell.
D) A tablet is a solid drug form that contains the active drug. There are several types of tablets, but none have a shell.

5) The powder form of a drug can be administered in several different ways. Which of the following is NOT one of the routes of administration used for a powdered drug form?
A) inhaled into the lungs
B) inserted into a body cavity
C) sprayed on skin
D) sprinkled topically
Answer: B
Explanation:
A) Powdered drugs do come in a canister that is activated and the powder is inhaled into the lungs.
B) Correct. This is not a route of administration used for a powdered drug form.
C) Powdered drugs can be sprayed onto the skin.
D) Powdered drugs can be sprinkled topically onto the skin.

6) Which of the following is NOT a type of solution?
A) syrup
B) elixir
C) foam
D) suspension
Answer: D
Explanation:
A) A syrup is a type of solution.
B) An elixir is a type of solution.
C) A foam is a type of solution.
D) Correct. Suspensions are not a type of solution.

7) Which of the following statements is NOT a description of one of the forms of solutions?
A) The drug is in fat globules dispersed uniformly throughout a water base.
B) The drug is in a thickened water base with added sugar and flavoring.
C) The drug is fine, undissolved particles that settle to the bottom upon standing.
D) The drug is in a water and alcohol base.
Answer: C
Explanation:
A) This describes an emulsion, which is a solution.
B) This describes a syrup, which is a solution.
C) Correct. This describes a suspension, which is NOT a solution.
D) This describes a tincture, which is a solution.

8) Syrups are _____.
A) sour and more viscous than elixirs
B) sour and thinner than elixirs
C) sweeter and more viscous than elixirs
D) sweeter and thinner than elixirs
Answer: C
Explanation:
A) Syrups are not sour.
B) Syrups are sweet and they are thicker than elixirs.
C) Correct.
D) Syrups are sweet, but they are not thinner than elixirs.

9) Foams are _____.
A) solutions that contain a drug in a water base
B) expanded by tiny aerosol bubbles
C) expelled from a container when they are used
D) All of the above
Answer: D
Explanation:
A) This is true, but it is not the only correct answer.
B) This is true, but it is not the only correct answer.
C) This is true, but it is not the only correct answer.
D) Correct.

10) A drug in the form of a suppository is used to treat patients with _____.
A) diarrhea
B) eye infections
C) heart disease
D) vomiting
Answer: D
Explanation:
A) Patients with diarrhea are not treated with suppositories.
B) Eye infections are treated with special topical ophthalmic drops or oral drugs, not suppositories.
C) Suppositories are not used to treat heart disease.
D) Correct.

11) Which of the following is NOT a specialized type of tablet?
A) caplet
B) effervescent
C) lozenge
D) elixir
Answer: D
Explanation:
A) Caplets are a specialized type of tablet.
B) Effervescent tablets are a specialized type of tablet.
C) A lozenge is a specialized form of tablet.
D) Correct.

12) The word *viscous* is used to describe a liquid drug. The word *viscous* means _____.
A) clear or transparent
B) thick or nonwatery
C) powdered
D) watery or thin
Answer: B
Explanation:
A) *Viscous* does not mean "clear or transparent."
B) Correct.
C) *Viscous* does not mean *powdered*.
D) *Aqueous*, not *viscous*, means "watery or thin."

13) Some over-the-counter drugs used to treat coughs are in the drug form of a/an _____ that coats the mucous membranes.
A) elixir
B) ampule
C) syrup
D) tincture
Answer: C
Explanation:
A) Elixirs are not specifically used to treat coughs.
B) An ampule is a drug container, not a drug form.
C) Correct.
D) Tinctures are never taken internally.

14) When a tablet is scored across its top surface, that indicates _____.
A) that it contains a Schedule drug
B) the mark of a particular drug company
C) that it contains a double-strength dose
D) that it can be broken into two or more doses
Answer: D
Explanation:
A) Schedule drugs are not all scored across their tops.
B) A scored tablet is not the mark of a particular drug company.
C) A double-strength tablet is not scored across its top.
D) Correct.

15) Enteric-coated tablets _____.
A) provide a slow release of the drug
B) are made to dissolve in the stomach
C) are made to dissolve in the small intestine
D) are coated so they are easy to swallow
Answer: C
Explanation:
A) Slow-release tablets, not enteric-coated tablets, provide a slow release of the drug.
B) Enteric-coated tablets are specifically made not to dissolve in the stomach.
C) Correct.
D) Enteric-coated tablets are coated, but the reason is not so that they are easy to swallow.

16) A solution containing fine, undissolved particles of a drug that settle to the bottom of the container is called a/an _____.
A) suspension
B) elixir
C) spray
D) liquid
Answer: A
Explanation:
A) Correct.
B) An elixir is a solution that has no particles in it. .
C) A spray is a solution that has no particles in it.
D) A liquid is a solution that has no particles in it.

17) Monica Thompson's antacid drug bottle has this printed on the label: "Shake Well Before Using." That is because this drug is a/an _____.
A) suspension
B) emulsion
C) syrup
D) troche
Answer: A
Explanation:
A) Correct. A drug in the form of a suspension must be shaken before using.
B) An emulsion does not need to be shaken before use.
C) A syrup does not need to be shaken before use.
D) A troche does not need to be shaken before use.

18) An emulsifying agent is added to the drug form of a cream _____.
A) in order to keep the oil and water mixed together
B) in order to create an new drug form of an ointment
C) so that the cream can be used topically in the eye
D) so that it will exert a systemic effect
Answer: A
Explanation:
A) Correct.
B) Ointments are not created from creams.
C) Only specially formulated ointments, not creams, can be used in the eye.
D) Creams exert only a local, not a systemic, effect.

19) The powdered form of a drug can be found in these drug forms, EXCEPT in a/an _____.
A) canister
B) ampule
C) capsule
D) vial
Answer: B
Explanation:
A) Powdered drugs do come in canisters.
B) Correct. An ampule always contains a liquid, not a powered, drug.
C) Powdered drugs do come in capsules.
D) Vials contain either solutions or powdered drugs.

20) The word *aqueous* means _____, while the word *viscous* means _____.
A) topical; skin
B) liquid; solid
C) intravenous; oral
D) watery; thick
Answer: D
Explanation:
A) These two words are not related to the words *aqueous* and *viscous*.
B) These two drug forms are not related to the words *aqueous* and *viscous*.
C) These two routes of administration are not related to the words *aqueous* and *viscous*.
D) Correct.

21) Your friend asks you if you can identify the name of the drug he is taking. He shows you a purple capsule with 3 gold bands around the end. You tell him that this is the trade name drug _____.
A) Fosamax
B) Valium
C) Cialis
D) Nexium
Answer: D
Explanation:
A) Fosamax has a bone-shaped imprint on the tablet.
B) Valium has a cut-out "V" in its center.
C) Cialis is a mustard-colored teardrop-shaped tablet with a "C" on it.
D) Correct.

22) Which of the following drug trade names is NOT in the form of a pellet, wafer, or insert?
A) Muse
B) Nexium
C) Gliadel
D) Mirena
Answer: B
Explanation:
A) Muse is in the form of a pellet.
B) Correct. Nexium is in the form of a purple capsule with gold bands around one end.
C) Gliadel is in the form of a wafer.
D) Mirena is in the form of a T-shaped insert.

23) What trade name drug used to treat severe pain comes in the drug form of a lozenge?
A) Actiq lollipop
B) Cepacol lozenge
C) Alka-Seltzer
D) Adderall XR
Answer: A
Explanation:
A) Correct.
B) Cepacol is a lozenge for a sore throat, not severe pain.
C) Alka-Seltzer is an effervescent tablet, not a lozenge.
D) Adderall XR is an extended-release capsule, not a lozenge.

24) Diltiazem (Cardizem) for angina comes in a capsule form that is _____.
A) swallowed whole
B) crushed and the vapors inhaled
C) sprinkled on applesauce and swallowed
D) A and C
Answer: D
Explanation:
A) This is true, but it is not the only correct answer.
B) This is not true for diltiazem (Cardizem).
C) This is true, but it is not the only correct answer.
D) Correct.

25) A film is a thin, dissolvable drug form about the size of a postage stamp that is given by the _____ route of administration.
A) buccal
B) topical
C) sublingual
D) A and C
Answer: D
Explanation:
A) This is true, but it is not the only correct answer.
B) A film is not applied topically.
C) This is true, but it is not the only correct answer.
D) Correct.

26) Transdermal patches are used for all of the following, EXCEPT _____.
A) treat a vaginal yeast infection
B) treat chronic pain
C) help a person stop smoking
D) prevent vomiting after chemotherapy
Answer: A
Explanation:
A) Correct. Transdermal patches are NOT used to treat vaginal yeast infections.
B) Transdermal patches are used to do this.
C) Transdermal patches are used to do this.
D) Transdermal patches are used to do this.

27) Which of the following drug forms is inhaled?
A) an anesthetic gas
B) a buccal film
C) liquids to treat asthma
D) A and C
Answer: D
Explanation:
A) This is true, but it is not the only correct answer.
B) A buccal film is placed between the teeth and the cheek.
C) This is true, but it is not the only correct answer.
D) Correct.

28) Solutions include _____.
A) elixirs and syrups
B) foams
C) tinctures
D) All of the above.
Answer: D
Explanation:
A) Elixirs and syrups are solutions.
B) Foams are solutions.
C) Tinctures are solutions.
D) Correct.

29) Solutions never need to be _____ because the drug concentration is the same in every part of the solution, even after prolonged standing.
A) refrigerated
B) inspected
C) mixed or shaken
D) tested
Answer: C
Explanation:
A) This is not true of a solution.
B) This is not true of a solution.
C) Correct.
D) This is not true of a solution.

30) All of the following are drug forms, EXCEPT _____.
A) pellets
B) wafers and films
C) inserts and gases
D) binders and fillers
Answer: D
Explanation:
A) These are drug forms.
B) These are drug forms.
C) These are drug forms.
D) Correct. These are inert ingredients in a tablet, not drug forms.

31) All of the following relate to a drug being placed in the mouth, EXCEPT _____.
A) oral
B) systemic
C) buccal
D) sublingual
Answer: B
Explanation:
A) This is true.
B) Correct. Systemic refers to where the drug acts (throughout the body), not where it is placed.
C) This is true.
D) This is true.

32) As a result of a national tragedy, Congress passed The Food, Drug, and Cosmetic Act of 1938. One important part of this Act _____.
A) required manufacturers to list their drugs in the *United States Pharmacopeia* or *National Formulary*
B) made it mandatory that drugs had a pleasing taste and odor
C) required accurate labeling of drugs to prevent substitutions or mislabeling of ingredients
D) required drug manufacturer to prove the drug was safe
Answer: D
Explanation:
A) This is not true.
B) This was part of the reason for the national tragedy, not a result. The makers of the drug sulfonamide tested the taste and odor, but this is not what the Act said.
C) This is not true.
D) Correct.

33) Currently, the burden of proof for showing that a drug is safe before it can be marketed is the responsibility of the _____.
A) drug manufacturer
B) consumer
C) healthcare provider
D) Food and Drug Administration (FDA)
Answer: A
Explanation:
A) Correct.
B) The consumer cannot prove that a drug is safe before it is marketed.
C) The healthcare provider cannot prove that a drug is safe before it is marketed.
D) The FDA approves a drug for marketing only after it has been proven safe.

34) Drug legislation was passed in the early 1900s to protect the public from _____.
A) drug companies
B) prescription drugs
C) worthless or dangerous drugs
D) the government
Answer: C
Explanation:
A) This is not true.
B) It was not until the Durham-Humphrey Amendment of 1951 that prescription drugs were defined.
C) Correct.
D) The government was the one who passed this protective legislation.

35) The first federal drug law was the _____.
A) Food, Drug, and Cosmetic Act
B) Dietary Supplements and Health and Education Act
C) Pure Food and Drug Act
D) Food and Drug Administration Modernization Act
Answer: C
Explanation:
A) This was not the first federal drug law.
B) This was not the first federal drug law.
C) Correct.
D) This was not the first federal law.

36) The 1951 Durham-Humphrey Amendment to the Food, Drug, and Cosmetic Act defined _____ drugs as those drugs that could only be given to patients under the care of a physician.
A) dangerous
B) prescription
C) Schedule
D) All of the above
Answer: B
Explanation:
A) The Durham-Humphrey Amendment did not mention dangerous drugs.
B) Correct.
C) Schedule drugs were defined by the Controlled Substances Act, not the Durham-Humphrey Amendment.
D) The Durham-Humphrey Amendment did not mention dangerous or Schedule drugs.

37) Which of the following involves using a drug on several hundred or several thousand ill patients in exactly the same way as it will be used once it is on the market?
A) clinical trials, phase I
B) clinical trials, phase II
C) clinical trials, phase III
D) *in vivo* testing
Answer: C
Explanation:
A) During phase I, only 10 to 100 healthy volunteers are used to study a drug.
B) In phase II, the drug is only given to 50 to 500 patients who actually have the disease that the drug is intended to treat.
C) Correct.
D) *In vivo* testing is a general designation for any testing done on animals and humans.

38) Each drug is assigned a 10-digit identification number with three segments separated by hyphens. Which of the following is NOT information that can be obtained from this 10-digit identification number?
A) the name of the drug manufacturer
B) the drug category
C) the drug's specific strength/dose
D) the package size and type
Answer: B
Explanation:
A) The first segment of the 10-digit code does identify the drug manufacturer.
B) Correct.
C) The second segment of the 10-digit code does identify the drug's specific strength/dose.
D) The third segment of the 10-digit code does identify the drug's package size and type.

39) In clinical trials, the control group receives the _____.
A) trade name drug
B) placebo
C) chemical name drug
D) generic name drug
Answer: B
Explanation:
A) The control group does not receive the trade name drug.
B) Correct.
C) The control group does not receive the chemical name drug.
D) The control group does not receive the generic name drug.

40) The patent on a new drug is in effect for _____ years.
A) 5
B) 12
C) 17
D) 23
Answer: C
Explanation:
A) A drug patent is not in effect for five years.
B) A drug patent is not in effect for 12 years.
C) Correct.
D) A drug patent is not in effect for 23 years.

41) There are _____ phases of human testing in clinical drug trials for new drugs.
A) two
B) three
C) five
D) seven
Answer: B
Explanation:
A) This is not true.
B) Correct.
C) This is not true.
D) This is not true.

42) *In vivo* testing is _____.
A) testing that is done in test tubes
B) similar to *in vitro* testing
C) done prior to *in vitro* testing
D) None of the above
Answer: D
Explanation:
A) *In vivo* testing is not done in test tubes.
B) *In vivo* testing is not similar to *in vitro* testing.
C) *In vivo* testing is not done prior to *in vitro* testing.
D) Correct. *In vivo* testing is done in live animals or humans.

43) Inert ingredients in a drug _____.
A) include binders and fillers
B) can affect drug bioavailability
C) include preservatives and antioxidants
D) All of the above
Answer: D
Explanation:
A) This is true, but it is not the only correct answer.
B) This is true, but it is not the only correct answer.
C) This is true, but it is not the only correct answer.
D) Correct.

44) What does the therapeutic index indicate?
A) the therapeutic potential of a new drug
B) the margin of safety between the therapeutic and toxic doses
C) the drug's effectiveness and likely approval by the FDA
D) the bioavailability of the drug
Answer: B
Explanation:
A) The therapeutic potential for the drug is evaluated by the drug company and the FDA; it is not related to the therapeutic index.
B) Correct.
C) The drug's effectiveness likely approval by the FDA is only partly related to the therapeutic index.
D) The therapeutic index relates to the drug's margin of safety, not its bioavailability.

45) What incentive does the FDA give to drug companies that agree to do clinical trials of their drugs on children?
A) a cash-back refund
B) speeding up the process for getting a trademark for the drug
C) a six-month extension on the new drug patent
D) allowing the drug companies to market the drug to children
Answer: C
Explanation:
A) The FDA does not give a cash-back refund to drug companies.
B) A trademark is issued by the U.S. Patent Office, not the FDA.
C) Correct.
D) Drugs are not marketed to children.

46) An example of a placebo is _____.
A) an injection of sterile normal saline
B) a genetically engineered drug
C) a sugar pill
D) A and C
Answer: D
Explanation:
A) This is true, but it is not the only correct answer.
B) A placebo is not a genetically engineered drug.
C) This is true, but it is not the only correct answer.
D) Correct.

47) Which of the following statements is FALSE?
A) Double-blind clinical trials always use a placebo.
B) The researcher, but not the patient, knows who receives the placebo.
C) A placebo exerts no pharmacologic effect.
D) A placebo has no therapeutic effect.
Answer: B
Explanation:
A) This is a true statement.
B) Correct. Even the researcher does not know which patients receive the placebo.
C) This is a true statement.
D) This is a true statement.

48) The FDA evaluates a drug before approving it. This evaluation includes a review of all of the following EXCEPT _____.
A) the drug company's documentation
B) consumer comments about the drug
C) risks associated with the drug
D) the benefits of the drug
Answer: B
Explanation:
A) The FDA reviews the drug company's documentation.
B) Correct. The FDA does not review consumer comments; the drug has not yet been marketed to consumers.
C) The FDA reviews the drug's risks.
D) The FDA reviews the drug's benefits.

49) Why would a healthcare provider give the patient a free sample of a drug?
A) to give away what the drug representatives gave them
B) to help patients save money
C) to allow the patient to try a limited supply to see if it worked
D) to fulfill FDA requirements
Answer: C
Explanation:
A) This is not the reason.
B) This is not the reason.
C) Correct.
D) There are no FDA requirements about free drug samples.

50) A moisture-absorbing packet of silica gel, known as _____, is added to a drug container to keep tablets or capsules from deteriorating or losing strength.
A) the half-life
B) a placebo
C) a blister pack
D) a desiccant
Answer: D
Explanation:
A) The half-life is a period of time, not a substance.
B) A placebo does not keep tablets from deteriorating.
C) A blister pack only protects one tablet from moisture, not the entire drug container.
D) Correct.

51) The half-life of a drug can be increased because of _____.
A) liver or kidney disease
B) particulate matter
C) animal studies
D) the presence of desiccant
Answer: A
Explanation:
A) Correct.
B) Particulate matter does not affect the half-life.
C) Animal studies help determine the half-life but do not increase it.
D) Desiccant absorbs moisture from the drug; it does not increase its half-life.

52) A drug tablet may include all of the following, EXCEPT _____.
A) binders and fillers
B) desiccant
C) preservatives
D) antioxidants and buffers
Answer: B
Explanation:
A) A tablet can contain binders and fillers.
B) Correct. Desiccant is NOT part of the tablet; it is placed in the drug bottle.
C) A tablet can contain preservatives.
D) A tablet can contain antioxidants and buffers.

2.2 True/False Questions

1) Foam is expanded by tiny aerosol bubbles when it is expelled from the container.
Answer: TRUE

2) The main purpose of a scored tablet is so that the tablet can be easily broken into pieces to produce an accurate, increased dose.
Answer: FALSE
Explanation: The pieces provide an accurate, REDUCED dose.

3) An enteric-coated tablet is covered with a special coating that resists the alkaline environment of the stomach acid but dissolves in the acid environment of the small intestine.
Answer: FALSE
Explanation: The stomach has an acid environment, not an alkaline one.

4) Both ointments and creams are semisolid emulsions of oil and water. In ointments, the main ingredient is water; in creams, the main ingredient is oil.
Answer: FALSE
Explanation: The main ingredient in ointments is oil. The main ingredient in creams is water.

5) Both ointments and creams can be applied topically to either the skin or the eyes.
Answer: FALSE
Explanation: Only specially formulated ointments can be applied to the eyes.

6) A lotion is a suspension of a drug in an oil base.
Answer: FALSE
Explanation: It is in a water base, not an oil base.

7) Creams are absorbed into the skin and exert a local, not systemic, drug effect.
Answer: TRUE

8) Solutions don't ever need to be mixed or shaken, as the drug concentration is always the same in every part of the solution, even after prolonged standing.
Answer: TRUE

9) Syrups are solutions that contain the drug in a thickened water base with added sugar and flavorings, but they do not contain alcohol.
Answer: TRUE

10) Gels are solutions that contain fine, undissolved particles dispersed uniformly throughout a thickened water base.
Answer: TRUE

11) The drugs in transdermal patches are designed to have only a topical, local effect on the skin in that area.
Answer: FALSE
Explanation: The drug in a transdermal patch is designed to exert a systemic effect throughout the body.

12) Before a drug can receive final approval by the FDA, the drug company must clearly state in what form or forms the drug will be manufactured.
Answer: TRUE

13) Some drugs are ineffective if they are given in a particular drug form or they can seriously injure the patient if administered in the wrong drug form.
Answer: TRUE

14) Regardless of what drug company manufactures a drug in tablet form, all tablets must be either round or oval shaped.
Answer: FALSE
Explanation: Tablets are round, oval, square, oblong, or even triangular or baseball-diamond shaped.

15) Ointments used in the eye must be specially formulated so that they do not cause irritation when applied to the eye.
Answer: TRUE

16) Lotions are absorbed into the skin and exert a system effect on the body, and not just a localized effect.
Answer: FALSE
Explanation: Lotions only a exert a local effect.

17) A powder is a finely ground form of a drug that can be found within capsules.
Answer: TRUE

18) Intralipid intravenous fat solution is an example of an emulsion.
Answer: TRUE

19) A transdermal patch consists of a drug reservoir, a porous membrane through which the drug can pass, and an adhesive layer to hold it to the skin.
Answer: TRUE

20) Suppositories can be given by the oral, vaginal, inhalation, or rectal routes.
Answer: FALSE
Explanation: Suppositories are given by the vaginal or rectal routes.

21) Because it is easy to confuse different drugs, the Food and Drug Administration (FDA) advises patients who take more than one drug to be able to tell them apart by size, shape, color, imprint, or drug form.
Answer: TRUE

22) A vial can be used only once, and the unused drug must be discarded, because it contains no preservative.
Answer: FALSE
Explanation: It is an ampule, not a vial, that can be used only once.

23) Patients often take a drug out of its original packaging and then have to ask the pharmacist to identify the tablets or capsules for them.
Answer: TRUE

24) A scored tablet can be easily and accurately divided into equal doses, depending on the number of score marks on the tablet.
Answer: TRUE

25) Once a drug has received its final approval from the FDA, its ingredients, doses, manufacturing process, labeling, and packaging cannot be changed.
Answer: TRUE

26) The advertising of both prescription and OTC drugs is regulated by the FDA.
Answer: FALSE
Explanation: The FDA regulates prescription drug advertising. The marketing and advertising of over-the-counter drugs are regulated by the Federal Trade Commission.

27) Before approving a new drug, the FDA must weigh the inherent risks of the drug against its potential benefits.
Answer: TRUE

28) No matter how a drug was originally discovered or designed, it must be thoroughly tested by the FDA before it can be marketed.
Answer: FALSE
Explanation: It must be thoroughly tested by the drug company; the FDA only reviews the drug company's testing.

29) Generic drugs that are in the same drug form and drug strength–even if they are from different drug companies–must contain exactly the same amount of active ingredient and be administered in the same way that the FDA already approved.
Answer: TRUE

30) The animal phase of drug testing precedes testing on humans.
Answer: TRUE

31) The pharmacodynamics of a drug are determined during the human phase of drug testing.
Answer: FALSE
Explanation: The pharmacodynamics are determined during the animal phase.

32) The higher the number of the therapeutic index, the more desirable it is, because it indicates that the drug has a wide margin of safety.
Answer: TRUE

33) While it is physiologically impossible for a placebo to exert any pharmacological effect, patients often report a decrease in certain types of symptoms after taking a placebo.
Answer: TRUE

34) In a double-blind study, every patient receives both the drug being tested and a placebo.
Answer: FALSE
Explanation: Double-blind means neither the researcher nor the patient knows whether the patient received the drug being tested or a placebo.

35) In a double-blind study, the researcher is the only one who knows which patients are taking a drug and which patients are taking a placebo.
Answer: FALSE
Explanation: Even the researcher does not know.

36) A drug company may evaluate thousands of different chemicals before finding one that moves successfully through all phases of testing and is finally approved by the FDA for release and marketing.
Answer: TRUE

37) It is not uncommon for a patient who is given a therapeutic dose of digoxin (Lanoxin) to exhibit symptoms of toxicity because of the drug's low therapeutic index.
Answer: TRUE

38) Drugs that are successfully tested in animals will always perform well when given to humans.
Answer: FALSE
Explanation: Animal studies do not always show how well a drug will perform in humans. Penicillin is an example.

39) A drug can be approved to treat one thing and then its therapeutic effect or even its side effects can become a new clinical indication for that drug.
Answer: TRUE

40) The label of a drug does not need to contain an expiration date printed on it, because drugs never expire.
Answer: FALSE
Explanation: Drugs do expire, and the expiration date is changes as new batches of the drug are manufactured.

41) Direct-to-consumer advertisements of drugs are heavily weighted toward prescription drugs for chronic diseases that require long-term treatment.
Answer: TRUE

2.3 Short Answer Questions

1) A/an _____ tablet is one that is dissolved in a glass of water before being swallowed (e.g., Alka-Seltzer for a head cold).
Answer: effervescent

2) Some over-the-counter drugs come as a/an _____, a drug form that is never swallowed, but is allowed to slowly disintegrate into a liquid form that releases the drug topically in the mouth and throat.
Answer: lozenge

3) A/An _____ is a solution that contains the drug in a water and alcohol base with added sugar and flavoring. It is commonly used for pediatric and elderly patients who cannot swallow tablets or capsules.
Answer: elixir

4) A/An _____ is a solution that contains the drug in a water and alcohol base, but is never taken internally.
Answer: tincture

5) A/An _____ is composed of a solid base of glycerin or cocoa butter containing the drug. They are administered rectally or vaginally.
Answer: suppository

6) A/An _____ is an oblong tablet that has a base of sugar and disintegrates into a paste to release the drug topically in the mouth.
Answer: troche

7) In written prescriptions, the word *tablet* is sometimes abbreviated as _____ or _____.
Answer: tab, tabs

8) In written prescriptions, the word *capsule* is sometimes abbreviated as _____ or _____.
Answer: cap, caps

9) A/An _____ is a small, slender glass container with a main body and a narrow, indented neck, and an extended top that contains a liquid drug.
Answer: ampule

10) Define these abbreviations and short forms.
LA _____
SR _____
XL _____
ER _____
tab _____
cap _____
Answer: long acting, slow release, extended length, extended release, tablet, capsule

11) The viscosity of a drug form refers to its _____.
Answer: thickness

12) When animal studies are completed, the drug company submits an IND application to the FDA. The abbreviation IND stands for _____ _____ _____.
Answer: Investigational New Drug

13) There are three phases of human testing, which together are known as _____ _____ _____.
Answer: clinical drug trials

14) A/An _____ is a substance that has no pharmacologic effect and is used in double-blind studies during phase III clinical trials.
Answer: placebo

15) Once phase III is completed, the drug company submits all of its documentation on the drug to the FDA in the form of an NDA. The abbreviation NDA stands for _____ _____ _____.
Answer: New Drug Application

16) DTC marketing has become common, with drug advertisements appearing frequently in magazines and on television. The abbreviation DTC stands for _____ _____ _____.
Answer: direct to consumer

17) Sometimes, the inert ingredients of a drug can affect its _____, particularly a drug with a low therapeutic index.
Answer: bioavailability

18) Define these abbreviations.
FDA _____
DTC _____
TI _____
IND _____
NDC _____
Answer: Food and Drug Administration, direct-to-consumer [marketing], therapeutic index, Investigational New Drug, National Drug Code

19) When volunteers answer a newspaper ad for a clinical drug trial, it is mandatory that they sign an informed _____ to participate in the trial.
Answer: consent

20) A single dose of a drug can be placed in an individually sealed _____ _____ that contains a bubble of clear plastic over the capsule or tablet.
Answer: blister pack

21) The marketing and advertising of over-the-counter drugs is regulated by the _____ _____ _____.
Answer: Federal Trade Commission

2.4 Matching Questions

Match the drug name in Column 1 with its drug form in Column 2.

A) enteric-coated tablet
B) insert
C) pellet
D) foam
E) syrup
F) capsule
G) T-shaped insert
H) cream
I) ointment
J) gel

1) Lacrisert

2) Ecotrin

3) hydrocortisone

4) Kenalog

5) Mirena

6) Muse

7) Mirvaso

8) Nexium

9) Robitussin

10) Rogaine

Answers: 1) B 2) A 3) H 4) I 5) G 6) C 7) J 8) F 9) E 10) D

Match the terms with their proper definitions.

A) Relative margin of safety between the dose that produces a therapeutic effect and the dose that produces a toxic effect in animals
B) The time required for drug levels in the blood to decrease from 100 percent to 50 percent.
C) Number of animals who responded or did not respond to a drug at a particular dose.

11) frequency distribution curve

12) half-life

13) therapeutic index (TI)

Answers: 11) C 12) B 13) A

2.5 Essay Questions

1) Briefly explain how a transdermal patch delivers a drug dose to the patient.
Answer: A transdermal patch consists of a multilayered disk containing a drug reservoir, a porous membrane, and an adhesive layer to hold it to the skin. The porous membrane regulates the amount of drug entering the skin, releasing small amounts over time.

2) Drugs that come in the forms of ointments, creams, and lotions have various characteristics. Describe the characteristic feel, appearance, and consistency for just one of these three drug forms.
Answer: (one of the following)
Ointment: Greasy feel, clear appearance, firm consistency
Cream: Nongreasy feel, opaque/milky appearance, semiliquid
Lotion: Nongreasy feel, opaque/milky, liquid

3) Many over-the-counter drugs for pain are not manufactured in capsule form. Explain why.
Answer: After Tylenol capsules were purposely contaminated with cyanide, now drug companies manufacture their over-the-counter drugs for pain in a tablet or caplet form, rather than a capsule, to prevent tampering with the contents.

4) Describe the difference between an emulsion and an emulsifying agent.
Answer: Emulsions are solutions that contain fat globules dispersed uniformly throughout a water base. An emulsifying agent is added to a cream to keep the oil and water ingredients mixed together.

5) Briefly explain the difference between *in vivo* testing and *in vitro* testing.
Answer: Chemical analysis of a drug done in a laboratory in test tubes is known as *in vitro* testing. Testing carried out in animals or humans is known as *in vivo* testing.

6) Briefly explain how a double-blind study is performed using a control group, a placebo, and drug group.
Answer: Double-blind studies with the drug and a **placebo** are performed, in which neither the patients nor the physician-investigators know which patients are receiving the drug and which patients (the **control group**) are receiving the drug.

Chapter 2

Drug Testing, Drug Forms, and Drug Measurements

This section contains the following helpful information for instructors.

1. Teaching Strategies
2. Pharmacology Insights
3. Testing Methods and Materials

1. Teaching Strategies

Read aloud the chapter Table of Contents and the learning objectives (or instruct online students to read them themselves). If you plan to administer a chapter test after students study this chapter, specifically state this as you introduce the chapter. If you plan to administer a chapter spelling test and/or chapter pronunciation test, specifically state this, and tell students how this will be accomplished.

For Chapter 2, you will want to stress these broad concepts at the beginning of the lecture or online presentation.

- Drug testing and legislation
- The process of animal and human testing before a drug is approved
- Drug marketing and benefits and drawbacks of direct-to-consumer drug advertising

2. Pharmacology Insights

Include this additional updated information in your lecture and in your online course for Chapter 2.

In 2013, the FDA began approving "Breakthrough therapies"—drugs used to treat life-threatening conditions.

The DNA molecule is in the shape of a double helix, two chains wound around each other to form a spiral structure. In 1962, Watson and Crick received the Nobel Prize for identifying the double-helix structure of DNA in the nucleus of the cell. In 2000, all 3.2 billion parts of the human genome and all of its genes and the DNA had been mapped through the Human Genome Project.

The following is an excerpt from the article "Pharmaceutical Nomenclature: The Lawless Language," by John H. Dirckx, M.D., *Perspectives on the Medical Transcription Profession* (spring/summer 1991).

> The trade names of drugs are difficult and unpredictable partly because drug manufacturers, who are not held to any particular standards of linguistic decorum, deliberately vary the spelling to make it more phonetic (example: Azmacort, a drug used to treat asthma).

If you want to be a human guinea pig, there's a job for you! Advertisements seeking healthy volunteers for medical research about drugs appear in local newspapers, on fliers in college dormitories, and on the Internet. Many volunteers sign up to help others, but the lure of payment and a free medical examination is particularly strong for low-income people. One study found that low-income people were more likely to sign up for multiple clinical drug trials; nearly one-third had joined 10 or more clinical drug trials. The long-term health effects of repeatedly volunteering for these trials is not known. Some African-Americans refuse to join clinical drug

trials for fear that they will be lied to and harmed by researchers who view them as human guinea pigs. Some clinical drug trials fail to enroll enough black participants, and this means that important biological differences in how people of different races respond to a new drug may not be known. In medical history, there is a sad chapter in the 1800s during which time sick black slaves were sold to doctors for medical experiments. In the Tuskegee study, which ran from 1932 to 1972, white doctors allowed black male patients, most of whom were illiterate, to suffer the long-term consequences of syphilis without being treated to document the effects of syphilis.

During a Phase 1 clinical drug trial, volunteers must be healthy and cannot be on a current medication. They keep a detailed log that describes their appetite, sleep, emotions, and elimination habits during Phase 1. During a Phase 2 clinical drug trial, all volunteers must have the disease that the drug being tested will be used to treat. They are assigned a number and divided into a test group (given the investigational drug) and a control group (given a placebo). During a Phase 3 drug trial, all volunteers must have the disease, but there is no longer any test group or control group.

In 2008, ABC News reported that 80 percent of all individual drug ingredients used in the United States were actually being manufactured in China. A number of deaths were caused by these cheaper but unregulated drug ingredients. In one instance, a contaminated ingredient was used in a drug that was given to both a mother and her son, and both died. This prompted the FDA to open a branch office in China to oversee Chinese drug manufacturers.

In the past, drug companies provided doctors with free concert tickets, restaurant dinners, oil changes for their cars, or payment to attend continuing education courses. The drug companies stopped this practice in 2002 but still continue to give free lunches, pens, clocks, etc. Under pressure from Congress and consumer groups, the drug companies voluntarily revised their mar-

keting guidelines in 2009 to recommend against all of those practices. Some doctors have signs posted at the reception desks in their offices, stating that drug company representatives can only be seen during certain office hours or not seen at all. The drug samples given out by drug company representatives may be for the newest drug on the market, but it may not necessarily be the best drug for a certain disease or the safest drug for that disease.

Some television drug advertisements end with "It's time to see your doctor," or "Ask your doctor if this drug is right for you." One advertisement for Claritin did not actually state what the drug was used for. After seeing this advertisement, patients called their doctors to ask what Claritin was for and if they should be taking it. Some patients even called their gynecologists, because they didn't know that Claritin is used to treat seasonal allergies. By stating a drug's name in the advertisement but not what it is used for, drug companies were exempt from a Food and Drug Administration regulation that required disclosure of the risks as well as the benefits of the drug.

Because of constant advertisements, drugs have become media stars. Their nicknames, such as "the purple pill" (Nexium), have become household words and these drugs have their own websites. The weight loss drug Alli has a full spectrum of advertising gimmicks. Its name is a play on words (pronounced AL-lie) to suggest to the patient that the drug will be a friend and ally in weight loss efforts. The drug's website has this catchy phrase, "If you have the will, we have the power." At the present time, the United States is one of the few countries that allows direct-to-consumer advertising of prescription drugs in newspapers, magazines, and on television. One study found that Americans see up to 16 hours of television advertisements for drugs each week, and 95 percent of these advertisements use emotion to influence viewers to ask for the drug, but only 18 percent suggest making lifestyle changes instead of taking a drug.

A recent clinical drug trial ran this advertisement in a local newspaper:

> "We are recruiting volunteers to participate in a clinical research trial to evaluate a new investigational drug. We are seeking the following populations: healthy nonsmoking men and women, ages 18-65. The study involves two screening visits, four in-house stays of either 8 days7 nights or 5 days/4 nights, and one telephone follow-up call. If you qualify and complete the study, you will receive between $4800 to $5600 in compensation."

Genentech is one of the foremost drug companies that are producing drugs using recombinant DNA technology. The company's street address is 1 DNA Way, in San Francisco, CA.

3. Testing Methods and Materials

Test the Chapter 2 material in some or all of these ways.

- Chapter Review questions and Answer Key
- Discussion questions
- Chapter test
- Spelling test
- Pronunciation test

Chapter Review Questions. The Chapter Review section at the end of each chapter contains three sections that evaluate students' knowledge of the chapter material in three different ways:

1. **Quiz Yourself**. These questions evaluate a student's recall of facts presented in the chapter.
2. **Clinical Applications**. These questions evaluate a student's ability to apply learned facts to clinical situations in the form of photographs of drugs and prescriptions.

3. **Critical Thinking**. These questions evaluate a student's ability to reason from cause to effect and to draw conclusions with higher-level thinking skills.

Chapter Review Questions Answer Key. The answers to all of the different types of Chapter Review questions are located in a separate file in the Resources Page.

Discussion Questions. These open-ended questions require some research on the part of the student to understand and explain several sides of a current or controversial issue in pharmacology. These questions can be printed out and given to students during class. Or the file can be sent to students as an attachment to an e-mail, or it can be uploaded to your course's online site, if your college's learning software program can accommodate this.

Chapter Test. The instructor can construct a chapter test by selecting chapter test questions from the Test Bank. The material contained in each chapter can be tested separately or combined with two or three other chapters at the same time in a combined chapter test.

Spelling Test. Tell students to study the Spelling List for this chapter. The list can be printed out and given to students during class. Or the file that contains this list can be sent to students as an attachment to an e-mail, or it can be uploaded to your course's online site, if your college's learning software program can accommodate this.

Before administering the Spelling Test, use the Drug Reference section at the end of the textbook to verify your pronunciation of each drug name on the list.

To administer the Spelling Test during class, pronounce each drug name or drug word and have students write it. Instruct students to put generic drugs in lowercase letters, capitalize the first letter of trade name drugs, and include internal capitalization, if any is present in the trade name drug. Alternatively, both regular students and online students can take the Spelling Test online if

your college's online learning software supports an audio file of pronounced drug names that you create that your students can listen to and then spell those words by sending an e-mail to you.

Pronunciation Test. Tell students to study the Pronunciation List for this chapter. Each drug name in the list has its own see-and-say pronunciation guide with it. The list can be printed out and given to students during class. Or the file that contains the list can be sent to students as an attachment to an e-mail, or it can be uploaded to your course's online site, if your college's learning software program can accommodate this.

To administer the Pronunciation Test in class, have each student come into a separate room and pronounce each of the words on the list in front of you or record it on your iPhone. This can be done while the rest of the students are taking a chapter test. Alternatively, have students call your office or home phone number and get your answering machine; then they give their name and pronounce each of the words on the list.

CHAPTER 2 SPELLING LIST

1. bioavailability
2. desiccant
3. elixir
4. generic drug name
5. *in vivo* drug testing
6. lozenge
7. pharmacodynamics
8. placebo

9. therapeutic index

10. troche

CHAPTER 2 PRONUNCIATION LIST

1. bioavailability [BY-oh-ah-VAIL-ah-BIL-ih-tee]

2. frequency distribution [FREE-kwen-see DIS-trih-BYOO-shun]

3. generic name [jeh-NAIR-ik NAYM]

4. *in vitro* [in VEE-troh]

5. placebo [plah-SEE-boh]

6. therapeutic index [THAIR-ah-PYOO-tik IN-deks]

CHAPTER 2 DISCUSSION QUESTIONS

1. Continue collecting the names of current drugs by viewing the evening news, sporting events, etc., on TV/cable and watching the commercials that advertise a particular drug. Or, while doing searches on the Internet, look for drug advertisements along the side margin.

   Make a list of at least three drugs that you found this week. Post your list and compare it to the lists of other students to see what drugs they found.

   Also, read through the newspaper or a magazine to see drug ads or actual articles that deal with pharmacology or drugs. Begin collecting these articles for use in future chapters' discussions.

2. For your Discussion post, research the topic of drug marketing and drug advertising. Present a brief summary of how a drug company views drug marketing and advertising from

a positive perspective. Then present a brief summary of how some consumer groups view drug marketing and advertising from a negative perspective. Be sure to include at least two published or Internet references for your topic.

CHAPTER 2 Drug Testing, Drug Forms, and Drug Measurements

Chapter Review Exercises

QUIZ YOURSELF

REVIEW QUESTIONS

1. A drug is tested to determine its effectiveness and safety according to guidelines specified by the Food and Drug Administration (FDA).
2. The chemical analysis of a drug done in a laboratory in test tubes is *in vitro* testing. Testing carried out in animals or humans is *in vivo* testing.
3. Phase I.
4. An enteric-coated tablet is covered with a special coating that resists stomach acid, but dissolves in the alkaline environment of the small intestine. It is manufactured this way to avoid irritating the stomach.
5. (Only 9 are required). Film, ointment, cream, lotion, liquid, suspension, powder, suppository, transdermal patch, pellet, wafer, insert, gas.
6. Elixirs are solutions that contain the drug in a water base with added sugar, flavorings, and alcohol. Syrups are solutions that contain the drug in a thickened water base with added sugar and flavorings, but do not contain alcohol. Syrups are sweeter and more viscous (thicker) than elixirs. Elixirs contain alcohol.
7. (a) Transdermal drug patch (b) A transdermal patch is applied to the skin. The patch contains a drug reservoir that releases a small amount of drug through a rate-limiting membrane over a long period of time, usually for 1 to 2 days. (c) Systemic.
8. (a) Ampule, vial. (b) Ampule: An alcohol swab is placed around the neck of the ampule, and the ampule is quickly snapped into two pieces. A needle and syringe are used to withdraw the liquid drug from the ampule. Vial: The top has an aluminum or plastic cap that protects a rubber stopper beneath until the vial is opened. A needle and syringe are used to withdraw the liquid drug from the vial. c) An ampule can be used only once; the remaining, unused drug must be discarded because it contains no preservative. A vial is a multi-dose container because it contains a preservative.
9. A scored tablet can be divided easily and accurately into two or three equal doses, depending on the number of score marks on the tablet.
10. Shake well before using.

11. An ointment is greasy and firm, a cream is nongreasy and semiliquid, and a lotion is nongreasy and liquid.

12. They indicate a continuous, sustained release of the drug. (b) CR (controlled release), ER (extended release), LA (long acting), SR (slow release), XL (extended length), or XR (extended release).

13. Direct-to-consumer (advertising), Food and Drug Administration, Investigational New Drug, National Drug Code.

True or False

1. F
2. F
3. T
4. T
5. T
6. F

Fill in the Blank

1. placebo
2. compassionate
3. desiccant
4. over-the-counter
5. penicillins, heparins, and insulins

Clinical Applications

1. a. Lab research and animal testing, b. Phase I clinical trials, c. Phase II clinical trials, d. Phase III clinical trials, e. Marketing and release.
2. a. Toprol XL
   b. Tablet
   c. Drug manufacturer
   d. Drug's strength/dose
   e. Package size and type
   f. AstraZeneca Pharmaeutic
3. a. cream
   b. elixir
   c. lozenge
   d. capsule
   e. tablet
   f. solution
   g. scored tablet
   h. capsule
   i. suspension

j. transdermal patch
k. spray
l. syrup
m. extended-release capsule
n. granules
o. delayed-release capsule

4. a. mcg, microgram
b. U, units
c. mg/mL, milligram per milliliter
d. mg, milligram
e. mEq, milliequivalent (and mg milligram)
f. units
g. mcg, microgram (and mg milligram)
h. percentage
i. mg, milligram

Critical-Thinking Questions

1. Because it is a suspension that contains fine, undissolved particles of a drug suspended in a water or oil base. After prolonged standing, these fine particles gradually settle to the bottom of the container. It is always important to shake a suspension well before using.
2. Thick in consistency
3. a. This drug form is a spray powder. b. This drug form is a cream.