CHAPTER 2

Multiple Choice: Select the appropriate answer(s):

1.Which of the following routes of drug administration is used for the placement of Arestin (minocycline)?
   a. transdermal
   b. topical
   c. intramuscular
   d. subcutaneous

2. Which of the following terms describes the actions of a tablet on the body after ingestion and absorption?
   a. pharmacology
   b. pharmacokinetics
   c. pharmacodynamics
   d. toxicology

3. Which of the following terms describes the absorption of lidocaine local anesthetic after it is injected into the tissues?
   a. pharmacokinetics
   b. pharmacodynamics
   c. toxicology
   d. adverse drug event

4. Which of the following dosage forms describes chlorhexidine gluconate oral rinse?
   a. emulsion
   b. solution
   c. suppository
   d. elixir

5. From the following list, select the items associated with enteral drug administration

a. oral

b. sublingual

c. intravenous

d. subcutaneous

e. rectal

d. transdermal

e. subgingival

f. inhalation

g. intramuscular

6. From the following list select the items associated with adverse drug reaction

a. noxious drug response

b. unintended response to a drug

c. reaction occurs to properly prescribed drug (normal dose or amount)

d. medical errors (miscalculation of dose)

e. confusion with name of drug prescribed (sounds similar to other drugs)

7. By which of the following routes of administration is insulin usually taken?
   a. oral
   b. subcutaneous
   c. intramuscular
   d. rectal

8. Which of the following routes of administration should a dental patient use for a nicotine patch?
    a. oral
    b. topical
    c. transdermal
    d. rectal

9. Nitroglycerin tablets are taken
    a. sublingually.
    b. transdermally.
    c. topically.
    d. intramuscularly.

10. Oraqix is a local anesthetic applied subgingivally. Which of the following routes of drug administration is used to deliver the anesthetic?
    a. topical
    b. oral
    c. transdermal
    d. parenteral

11. Pharmacokinetics involves all of the following concepts?
    a. absorption
    b. distribution
    c. metabolism
    d. elimination
    e. binding

12. Which of the following terms is used for metabolism?
    a. biotransformation
    b. excretion
    c. liberation
    d. elimination

13. Which of the following terms describes how much of a drug will be available in the body to produce a pharmacologic response after it is administered?
    a. bioequivalence
    b. bioavailability
    c. biotransformation
    d. liberation

14. Absorption is bypassed if a drug is administered by which route?
    a. topical
    b. inhalation
    c. intravenous
    d. rectal

15. Which of the following drug characteristics will increase the tendency of a drug to cross cell membranes?
    a. ionized and high lipid solubility
    b. nonionized and high lipid solubility
    c. nonionized and low lipid solubility
    d. ionized and low lipid solubility

16. How many half-lives does it take for a drug to be eliminated from the body?
    a. 1–2
    b. 2–3
    c. 4–5
    d. 5–6

17. Sublingual or buccal administered drugs must initially be able to go through the
    a. epithelium of the oral mucosa (tongue or buccal mucosa).

b. connective tissue of the GI tract.
c. tissues of the stomach.
d. tissues of the nasopharynx.

18. Which of the following routes of drug absorption into the bloodstream is most common?
    a. passive diffusion
    b. active transport
    c. facilitated diffusion
    d. protein transport
19. All of the following alter the rate of absorption of drugs except one. Which one is the exception?
    a. fatty foods
    b. blood flow to the target organ
    c. hydrogen ion concentration
    d. surface area of the esophagus
20. Orally administered drugs must pass through the liver (via the hepatic portal vein) prior to reaching general circulation and site of action. This is referred to as
    a. enterohepatic circulation.
    b. first-pass metabolism.
    c. passive diffusion.
    d. distribution.
21. Which of the following terms describes the movement of a drug once it is absorbed throughout the body fluids to organs/tissues, which are the site of drug action?
    a. absorption
    b. liberation
    c. distribution
    d. elimination
22. Which route(s) of drug administration undergoes significant enterohepatic circulation?
    a. oral
    b. intravenous
    c. intramuscular
    d. subcutaneous
23. The primary site of drug biotransformation is the
    a. gallbladder.
    b. small intestine.
    c. large intestine.
    d. liver.
24. Which of the following enzymes found in the liver is primarily responsible for the biotransformation of many dental drugs?
    a. collagenase
    b. cytochrome P450
    c. hyaluronidase
    d. elastase
25. The time it takes for the drug to eliminate 50% of the amount of its concentration in the plasma or body is referred to as its
    a. half-life.
    b. excretion.
    c. zero-order kinetics.
    d. clearance.
26. The capacity of a body to eliminate a drug is referred to as
    a. drug clearance.
    b. half-life.
    c. steady-state.

d. tubular reabsorption.

27. Which of the following terms describes the actions a drug has on the body?
    a. pharmacokinetics
    b. pharmacodynamics
    c. pharmacology
    d. toxicology
28. A drug that rapidly combines with a receptor to initiate a response and rapidly dissociates or releases from the receptor is called a (an)
    a. agonist.
    b. antagonist.
    c. receptor.
    d. ligand.
29. Which of the following terms describes the drug dose that produces 50% of the maximum possible response?
    a. effective dose (ED_{50})
    b. lethal dose
    c. maximum response
    d. half-life ($t_{1/2}$)
30. Tachyphylaxis is a very rapid development of
    a. tolerance.
    b. adaptation.
    c. mutation.
    d. adjustment.
31. The term used to describe a decreased response to repeated administration of a drug is
    a. drug dependence.
    b. drug interaction.
    c. tachyphylaxis.
    d. tolerance.
32. Receptors for drug binding are primarily composed of
    a. protein.
    b. fat.
    c. part of the drug.
    d. cell membrane.
33. When a drug enters the blood, it may bind to molecules such as albumin, which makes the drug inactive. This is termed
    a. protein binding.
    b. protein affinity.
    c. drug action.
    d. drug binding.
34. All of the following are disadvantages of orally administered drugs except one. Which one is the exception?
    a. undergoes first-pass effect
    b. food interferes with absorption
    c. cannot take if patient is vomiting
    d. convenient form to administer
35. A maintenance dose of drug is given to
    a. achieve an initial high drug concentration.
    b. keep blood concentration in the therapeutic range.
    c. allow the drug concentration to drop to 50% of its initial concentration.
    d. achieve a maximal response.

True or False

- 1. After a drug is taken orally, it immediately passes into the bloodstream.
___ 2. Cell membranes are composed of three layers of fat.
___ 3. A drug that is soluble in fat is called hydrophilic.
___ 4. Passive diffusion of drugs across cell membranes/tissue barriers does not require energy.
___ 5. A lipophilic drug is more easily excreted in the urine.
___ 6. Weak acids such as aspirin are more readily absorbed from the stomach than weak bases.
___ 7. Drugs that are weak bases (e.g., erythromycin, codeine, and morphine) are more lipid soluble and have greater absorption in the small intestine.
___ 8. Morphine has to be injected because it has a high first-pass metabolism.
___ 9. Polar drugs that are not metabolized are excreted unchanged in the urine.
___ 10. Drug dose is defined as the quantity of drug administered.
_ 11. A drug that is administered intravenously has 100% bioavailability.
-12. Administration of lidocaine with epinephrine is by intramuscular injection.
- 13. Application of benzocaine 20% is topical.
- 14. Atridox is administered intramuscularly.

Fill in the Blank

1. Once a drug is orally administered into the body, it must be _____ into the bloodstream.
2. _____ refers to how much of a drug is absorbed into the blood after the dose is administered.
3. A drug that is intravenously injected has _____ percent bioavailability.
4. An orally administered drug is better absorbed in the _____ _____ than the stomach.
5. Before a drug is absorbed into the blood, the drug must be absorbed through many _____ _____ on its way from the GI tract into the blood.
6. The barrier membrane between the blood and the tissue is called the _____ barrier.
7. During _____ diffusion the drug penetrates the membrane exclusively by diffusion, in which the rate of transport is solely proportional to the concentration gradient.
8. Unlike enteral-administered drugs, _____ administration of drugs bypasses the gastrointestinal tract.
9. The major barrier to absorption of topical administration of a drug is the top layer of skin called the _____ _____.
10. A drug is eliminated either unchanged or as a _____.
11. To be readily excreted in the urine a drug must be in a _____ soluble form.
12. A _____ is inactive when administered orally but becomes active after metabolism in the liver.
13. The enzymes in the liver are called _____ _____ enzymes.
14. Most drugs undergo _____ _____ of elimination.
15. The purpose of giving a _____ dose is to rapidly establish a therapeutic plasma drug concentration.
16. The site of drug attachment on the tissue is called the _____.
17. A _____ response is the dose of drug that will give the greatest response, and increasing the dose will not increase the response.
18. The _____ of a drug is the dose or amount of drug required to produce a particular or specific biologic effect.

19. _____ is a homeostatic adjustment that may occur during a continued or prolonged presence of a drug.
20. A _____ is a treatment during research that is similar to the active medication except that it does not contain the active drug.
21._____ is the application of drugs to the skin that will be absorbed into the bloodstream.
22. An _____ injection is used when performing the tuberculin skin test for tuberculosis.
23.Oraqix is administered by the _____ route.
24. Arestin is applied in the _____ _____.

EXTENDED MATCHING

1.

For each route of drug administration listed below, select the correct drug that is administered by that route of administration from the list provided

Route of drug administration	Drug
1. transdermal	a. dental anesthetic (e.g., lidocaine)
2. subcutaneous	b. hepatitis B vaccine
3. intramuscular	c. nicotine patch
4. topical	d. Arestin or Atridox
	e. insulin
	f. benozcaine 20%

2.
For each term listed below, select the correct definition from the list provided

1. half-life	a. rate and extent to which a drug is absorbed
2. affinity	b. time taken for the blood concentration of a drug to decrease 50% or one-half its concentration
3. bioavailability	c. binding of a drug to a receptor
4. pharmacokinetics	d. therapeutic response cannot be increased with a higher dose of the drug
5. pharmacodynamics	e. the effects of drugs on the body and mechanisms of drug action
6. ceiling effect	f. absorption of a drug
	g. distribution of a drug through the blood
	h. metabolism of a drug

Case Study

A 75-year-old male patient comes to the dental office for regular maintenance visits. The patient has hypercholesterol levels and is taking simvastatin (Zocor). He presents to the office with an intraoral swelling around the mandibular first molar region. A radiograph was taken and revealed a large radiolucent area. Root canal treatment will have to be started. The patient is given a prescription for penicillin V.

License: 0111111
DEA # AW123445555

John David, DDS
1111 Main Street
New York , NY 11111

(212) 111-1234
Name Mary Smith Age ___35__
Address 1234 South St, NY Date 7/1/06
Penicillin VK 500mg
Disp: # 29 tabs
Sig: Take two tablets orally at once, followed by one tablet four times a day.

_____
This prescription will be filled generically unless prescriber writes “daw” in the box below

label

1. Why is it important to ask this patient if he has any allergies?
2. Why is an initial dose of 1000 mg (2 tablets of 500 mg) given to the patient?
3. What should be reviewed before the prescription is given to the patient?
4. What pharmacokinetic factor should be considered when prescribing this antibiotic to the patient?
5. When the patient swallows the tablet how does it reach the site of action? Also, what is the intended site of action in this patient?