**Chapter 1: Introduction to Pharmacology and the History of Drugs**

**Multiple Choice Questions**

1. Correct Answer: c

Question Feedback: Pharmacology is the study of drugs and their interactions with living organisms.

2. Correct Answer: b

Question Feedback: The word pharmacology comes from the Greek word *pharmakon,* which means medicine or drug, and the suffix *–logy*, which means *the study of*.

3. Correct Answer: d

Question Feedback: While some drugs have side effects that can cause conditions or diseases, causing conditions or diseases is not one of three desired medical uses for drugs.

4. Correct Answer: b

Question Feedback: Diagnostic use. Drugs are used by themselves or in conjunction with radiological procedures and other types of medical tests to provide evidence of a disease process.

5. Correct Answer: c

Question Feedback: A derivative of the foxglove plant, the drug digoxin (Lanoxin), is still used today.

6. Correct Answer: a

Question Feedback: The drug Premarin and the drug name Premarin are derived from pregnant mares’ urine.

7. Correct Answer: d

Question Feedback: Ground-up pig pancreas is the source of insulin, and the saliva of the Gila monster is the source of the antidiabetic drug Byetta. Processed sheep’s wool is used to make the drug lanolin, a common ingredient in skin drugs.

8. Correct Answer: c

Question Feedback: The drug sulfonamide was tested for flavor and fragrance, but not for safety. A number of children died after taking less than 1 ounce of the drug, and over 350 people were poisoned.

9. Correct Answer: d

Question Feedback: Prior to the national tragedy of sulfonamide the government had to prove fraud before they could remove a drug from the market. But, because of the tragedy, the bill that had not gained support before was easily passed.

10. Correct Answer: c

Question Feedback: The Food and Drug Administration (FDA) Modernization Act of 1997 was approved to allow the FDA to accelerate the approval process for certain types of drugs.

11. Correct Answer: c

Question Feedback: Prescription drugs are defined as those drugs that are not safe to use except under professional medical supervision.

12. Correct Answer: b. Schedule I drugs have the highest potential for abuse and addiction, while Schedule V drugs have the lowest.

Question Feedback: Schedule I: Extremely high potential for abuse and addiction; no currently accepted medical use. Schedule V: Limited potential for abuse.

13. Correct Answer: a

Question Feedback: The Orphan Drug Act was passed to facilitate the development of new drugs to treat rare diseases.

14. Correct Answer: c

Question Feedback: Pharmacodynamics is concerned with the mechanism of action by which drugs produce their effects (desired or undesired) based on time and dose.

15. Correct Answer: a

Question Feedback: Analgesic drugs have a therapeutic use to control the pain and inflammation of arthritis.

16. Correct Answer: c

Question Feedback: The drug galantamine (Razadyne), which is used to treat Alzheimer’s disease, is derived from daffodil bulbs.

17. Correct Answer: a. oak tree

Question Feedback: The chapter does not list the oak tree as the original source of any modern drug.

18. Correct Answer: b

Question Feedback: Lanolin, a common ingredient of topical skin drugs, is obtained from the purified fat of processed sheep’s wool.

19. Correct Answer: d

Question Feedback: Proscar was introduced in 1992, Nicoderm was introduced in 1996, and Viagra was introduced in 1998.

20. Correct Answer: c

Question Feedback: Penicillin (first antibiotic drug) was introduced in 1941.

21. Correct Answer: a

Question Feedback: Aspirin was introduced in 1899.

22. Correct Answer: a

Question Feedback: The medicinal use of the foxglove plant was noted in thirteenth-century writings. A derivative of this plant, the drug digoxin (Lanoxin), is still used today to treat congestive heart failure.

23. Correct Answer: c

Question Feedback: Orthoclone OKT3 (first monoclonal antibody drug) was introduced in 1986.

24. Correct Answer: b

Question Feedback: Morphine was isolated from crude opium in 1803.

25. Correct Answer: a

Question Feedback: The Controlled Substance Act established the Drug Enforcement Administration (DEA) in 1973 to regulate the manufacturing and dispensing of controlled substances.

26. Correct Answer: a

Question Feedback: The Food, Drug, and Cosmetic Act of 1938 shifted the burden of proof to the drug manufacturers who were required to provide data based on scientific experiments to show that their product was safe before they were allowed to market it.

27. Correct Answer: d

Question Feedback: The Controlled Substances Act divided potentially addictive drugs into five categories or schedules based on their potential for physical or psychological dependence.

28. Correct Answer: c

Question Feedback: Schedule I drugs include heroin, LSD, marijuana, methaqualone, peyote, and psilocybin.

29. Correct Answer: c

Question Feedback: The Controlled Substances Act also divided potentially addictive drugs into five categories or schedules.

30. Correct Answer: d

Question Feedback: In 1997, then-President Clinton signed the Food and Drug Administration Modernization Act. It gave the FDA the authority to accelerate the approval process for certain types of drugs. Critically needed drugs (as well as those for which the manufacturer pays a special fee) can be approved in as little as six months.

31. Correct Answer: b

Question Feedback: In the late 1950s, the drug thalidomide was developed in West Germany and was used extensively during early pregnancy to treat morning sickness in women. Over 8,000 babies in Europe were born with deformed limbs (“seal limbs,” or phocomelia). This tragedy resulted in the passage of the 1962Kefauver-Harris Amendment.

32. Correct Answer: d

Question Feedback: One of these two legends (inscriptions) are added to the drug package and to the filled prescription bottle: “Caution: Federal law prohibits dispensing without a prescription” or “Rx only.”

33. Correct Answer: c

Question Feedback: The belladonna plant was the original source of two drugs that are still in use today—atropine and scopolamine.

34. Correct Answer: b

Question Feedback: Powdered rose hips are still the source of natural vitamin C in some over-the-counter vitamin C dietary supplements.

35. Correct Answer: d

Question Feedback: Minerals, such as calcium and iron, are available as individual dietary supplements, and trace minerals, such as copper, magnesium, selenium, and zinc, are included in many multivitamin supplements. Vitamin C is in multivitamin supplements, but it is not a mineral; it is derived from plant sources or produced synthetically.

36. Correct Answer: a.

Question Feedback: Preventive use of drugs. Dramamine is an over-the-counter drug that is taken to prevent motion sickness and vomiting.

37. Correct Answer: c

Question Feedback: Under the federal regulations of HIPAA, the Health Insurance Portability and Accountability Act of 1996, all healthcare settings must provide patients with a statement that verifies that their health record information, including all drug information, is kept secure.

38. Correct Answer: d

Question Feedback: The majority of drugs are used therapeutically to control, improve, or cure symptoms, conditions, or diseases of a physiological or psychological nature.

39. Correct Answer: d

Question Feedback: Prescription drugs can only be obtained with a written prescription or voice order from the physician, dentist, nurse practitioner, or other healthcare provider whose license permits this.

40. Correct Answer: d

Question Feedback: Ancient peoples such as the Sumerians and Egyptians recorded the use of drugs on clay tablets, on wall paintings in tombs, and on papyrus. The ancient Chinese practiced healing arts that emphasized the use of herbs and some minerals. Native Americans of North America and the Aztec Indians of Mexico grew many herbs with medicinal properties.

41. Correct Answer: d

Question Feedback: Drugs often contained one of the addicting ingredients of opium, morphine, or cocaine without its presence being listed on the label. It is estimated that in the early 1900s one out of every 200 Americans was addicted. Even when a drug included the name of the addictive ingredient in its title or on its label, consumers were often not aware of its addictive qualities.

42. Correct Answer: d

Question Feedback: Laws were passed in the early 1900s to protect the public from unscrupulous drug sellers, as well as from worthless, mislabeled, and dangerous drugs that were then on the market.

43. Question Feedback: The drug manufacturers strongly opposed drug laws, but public outrage resulted in the passage of the Food and Drugs Act of 1906, the first federal drug law.

44. Correct Answer: b

Question Feedback: In 1951, the Durham-Humphrey Amendment to the Food, Drug, and Cosmetic Act defined prescription drugs as those drugs that could only be given to patients under the care of a physician.

45. Correct Answer: b

Question Feedback: The FDA approves a prescription drug being reclassified as an OTC drug if the following criteria are met: (1) the indication for the drug’s OTC use is similar to its use as a prescription drug, (2) the patient can easily diagnose and monitor his or her own condition when using the OTC drug, (3) the OTC drug has a low rate of side effects/toxicity and a low potential for abuse, and (4) use of the OTC drug does not require the patient to have any special monitoring or ongoing tests.

46. Correct Answer: c

Question Feedback: Supporters of the reclassification of some prescription drugs to an OTC status claim that this will lower drug prices and allow better access to treatment and fewer visits to the doctor. Opponents to reclassification have these arguments: (1) consumers may actually pay more because health insurance plans will not reimburse for OTC drug purchases, and (2) excessive use of OTC drugs may increase the number of adverse drug-drug interactions.

47. Correct Answer: b

Question Feedback: It was the Harrison Narcotics Act of 1914 that introduced the word narcotic, not the Controlled Substance Act of 1970.

48. Correct Answer: c

Question Feedback: In 1843 Dr. Alexander Wood of Scotland created the syringe and injected patients with morphine.

**True/False Questions**

49. Correct Answer: True

Question Feedback: Pharmacology is a fascinating and multifaceted discipline that impacts not only our chosen career in health care, but also our personal lives.

50. Correct Answer: True

Question Feedback: The study of pharmacology covers a broad spectrum of diverse, yet interrelated, topics: botany, molecular chemistry, research, toxicology, legislation, and patient education.

51. Correct Answer: False

Question Feedback: The word *drug* can be used interchangeably with the word *medicine*.

52. Correct Answer: True

Question Feedback: The Egyptians did apply moldy bread to abrasions, a practice that actually had some therapeutic basis, as many years later, penicillin was extracted from mold.

53. Correct Answer: True

Question Feedback: The opium poppy has been used for centuries as a painkiller and also as a recreational drug to induce euphoria and a trance-like state.

54. Correct Answer: True

Question Feedback: Some estrogen hormone replacement therapy drugs are derived from yams.

55. Correct Answer: False

Question Feedback: Thyroid supplement drugs are composed of dried (desiccated) thyroid gland tissue taken from animals.

56. Correct Answer: False

Question Feedback: The isolation of morphine in 1803 by a German pharmacist marked the beginning of modern drug therapy using chemically pure ingredients.

57. Correct Answer: True

Question Feedback: Pharmacists at that time actually prepared the drugs they dispensed. Daily, they made milk of magnesia, paregoric, and syrup bases for liquid medicines. In addition, they hand-rolled cocoa butter suppositories.

58. Correct Answer: False

Question Feedback: During the 1700s and 1800s, drugs were commonly sold without regulation and were accompanied by extravagant claims of cures. Drugs often contained one of the addicting ingredients of opium, morphine, or cocaine.

59. Correct Answer: False

Question Feedback: In 1994, the Dietary Supplement Health and Education Act was passed. This legislation allowed the FDA to set up guidelines for the manufacturers of herbal products and dietary supplements, although the FDA could not regulate these products.

60. Correct Answer: False

Question Feedback: The Food and Drug Administration (FDA) regulates both prescription drugs and over-the-counter drugs.

61. Correct Answer: True

Question Feedback: Prescription drugs can only be obtained with a written prescription or voice order from the physician, dentist, nurse practitioner, or other healthcare provider whose license permits this.

62. Correct Answer: True

Question Feedback: An OTC drug is defined as one that can be purchased without a prescription and is generally considered safe for consumers to use if the label’s directions and warnings are followed carefully and all warnings are heeded.

63. Correct Answer: False

Question Feedback: The Food and Drug Administration (FDA) regulates prescription drugs and over-the-counter drugs. The Controlled Substance Act established the Drug Enforcement Administration (DEA) in 1973 to regulate the manufacturing and dispensing of controlled substances.

64. Correct Answer: False

Question Feedback: The FDA does allow physicians to prescribe some investigational drugs even before they are officially approved for marketing. These drugs are for life-threatening diseases for which no other alternative therapy exists. The first drug for HIV was prescribed for patients before its approval in 1987.

65. Correct Answer: True

Question Feedback: The American Academy of Pediatrics issues an annual immunization schedule to prevent childhood diseases. All children must receive certain immunizations before they are permitted to enroll in school.

66. Correct Answer: True

Question Feedback: A drug or a medicine can be thought of as any nonfood chemical substance that affects the mind or the body.

67. Correct Answer: True

Question Feedback: The word *drug* can be used interchangeably with the word *medicine*, but *drug* can also refer specifically to chemical substances that do not have a preventative, diagnostic, or therapeutic use (e.g., illicit or street drugs).

68. Correct Answer: False

Question Feedback: In 1994, the Dietary Supplement Health and Education Act was passed. This legislation allowed the FDA to set up guidelines for the manufacturers of herbal products and dietary supplements, although the FDA could not regulate these products.

69. Correct Answer: True

Question Feedback: The provider's DEA number must be clearly written on any prescription for a schedule drug.

70. Correct Answer: False

Question Feedback: The pharmacist no longer prepares drugs, but dispenses them and provides patient information and education.

71. Correct Answer: False

Question Feedback: Schedule I drugs such as heroin, LSD, marijuana are not legal. It is the main active ingredient in marijuana (not marijuana itself) that is available as the prescription drug dronabinol (Marinol), which is a Schedule III drug.

72. Correct Answer: False

Question Feedback: Prescription drugs are also known as “legend drugs” because the drug manufacturer and pharmacist add one of these two legends (inscriptions) to the drug package and to the filled prescription bottle: “Caution: Federal law prohibits dispensing without a prescription” or “Rx only.”

73. Correct Answer: False

Question Feedback: In 1970, the Chinese Academy of Medical Science compiled a collection of traditional herbal remedies. American pharmacists evaluated those remedies and found that 45 percent of them were therapeutic, according to Western standards of medicine.

74. Correct Answer: True

Question Feedback: Schedule II drugs have accepted medical uses.

75. Correct Answer: True

Question Feedback: The manufacturing, storage, dispensing, and disposal of controlled substances are strictly regulated by both federal and state laws.

76. Correct Answer: True

Question Feedback: Pharmacology is one of the oldest branches of medicine.

77. Correct Answer: True

Question Feedback: The drugs known as *schedule drugs* are also called *controlled substances*.

78. Correct Answer: True

Question Feedback: For each new drug, the FDA must weigh the inherent risks of the drug against its potential benefits.

79. Correct Answer: False

Question Feedback: In 1983, The Orphan Drug Act was passed. Its purpose was to facilitate the development of new drugs to treat rare diseases.

80. Correct Answer: True

Question Feedback: The OTC drug is the same as the original prescription drug, but the recommended dose is usually just a fraction (often half) of the dose of the prescription drug.

**Short Answer**

81. Correct Answer: drug

Question Feedback: The word drug is derived from the Dutch word *droog*, which means *dry*.

82. Correct Answer: prophylaxis

Question Feedback: The administration of a preventive drug is known as prophylaxis. Prophylaxis is from a Greek word meaning *to* *keep guard before*.

83. Correct Answer: recipe

Question Feedback: The symbol Rx, which comes from the Latin word *recipe* meaning *take*, indicates a prescription, the combining of ingredients to form a drug.

84. Correct Answer: schedules

Question Feedback: The Controlled Substance Act divided potentially addictive drugs into five categories or schedules based on their potential for physical or psychological dependence.

85. Correct Answer: molecular

Question Feedback: The study of the chemical structures of drugs and the actions of drugs at the molecular level within cells is known as molecular pharmacology.

86. Correct Answer: medicine

Question Feedback: The word medicine refers to a drug that is deliberately administered for its medicinal value as a preventive, diagnostic, or therapeutic agent.

87. Correct Answer: Food and Drug Administration

Question Feedback: The abbreviation FDA stands for the Food and Drug Administration.

88. Correct Answer: Investigational New Drug

Feedback: The abbreviation IND, as used in the Emergency Treatment IND or Compassionate Use IND stands for Investigational New Drug.

89. Correct Answer: hydrocortisone

Question Feedback: For many years, there was a clear distinction between prescription drugs and OTC drugs. Then, in 1983, the topical prescription drug hydrocortisone was approved for over-the-counter sales and many other drugs followed.

90. Question Feedback: DEA (Drug Enforcement Administration, IND (Investigational New Drug), FDA (Food and Drug Administration), OTC (over-the-counter)

**Matching Questions**

91. Correct Answer: 1:D; 2:A; 3:E; 4:B; 5:C

92. Correct Answer: 1:A; 2:B; 3:C; 4:C; 5:A

**Essay Questions**

93. Question Feedback: (1) the indication for the drug’s OTC use is similar to its use as a prescription drug, (2) the patient can easily diagnose and monitor his or her own condition when using the OTC drug, (3) the OTC drug has a low rate of side effects/toxicity and a low potential for abuse, and (4) use of the OTC drug does not require the patient to have any special monitoring or ongoing tests.

94. Question Feedback: The incentives include grants to offset drug development costs, a tax credit that allows the manufacturer to deduct up to 75 percent of the cost of clinical trials, a streamlined process for obtaining FDA approval, and exclusive marketing rights for seven years.

95. Question Feedback: Drugs can include any kind of substance that is used for either medical or illegal purposes. Medicines are those substances that are used for medical reasons, and the word *medicine* is often used interchangeably with the word *drug*. A prescription drug is a drug is given by a written or verbal order from a physician, dentist, nurse practitioner, or other healthcare provider whose license permits this.

96. Question Feedback: In May 2001, the Supreme Court issued a decision that federal drug laws banning the manufacture and distribution of marijuana allow for no exceptions, even for medical necessity.