

Chapter 1

- 1) The smallest living units capable of carrying out their own basic life functions are called
- A) cells.
 - B) organelles.
 - C) organs.
 - D) organ systems.
 - E) tissues.

Answer: A

- 2) Cells are classified into which of the following four broad categories?
- A) squamous, cuboidal, columnar, and basement membranes
 - B) endocrine, nervous, integumentary, and reproductive
 - C) atoms, tissues, organs, and organ systems
 - D) neurons, muscle, epithelial, and connective tissue
 - E) skeletal, cardiac, endocrine, and nervous

Answer: D

- 3) Epithelial cells are associated with a noncellular material called a(n)
- A) muscle fiber.
 - B) endocrine gland.
 - C) basement membrane.
 - D) connective tissue.
 - E) fibroblast.

Answer: C

- 4) _____ are found in the linings of hollow organs where they separate fluids in the interior cavity from the surrounding body fluids. The interior cavity of a hollow organ or vessel is known as a _____.
- A) Epithelial : lumen
 - B) Endocrine cells : lumen
 - C) Elastin cells : cavity
 - D) Smooth muscle cells : cavity
 - E) Connective tissues : basement membrane

Answer: A

- 5) The tissue type that generates mechanical force and movement, and whose activity is controlled both on a voluntary and involuntary level, is _____ tissue.
- A) nervous
 - B) epithelial
 - C) skeletal
 - D) muscle
 - E) connective

Answer: D

- 6) Glands are derived from what type of tissue?
- A) connective
 - B) reticular
 - C) nerve
 - D) muscle
 - E) epithelial

Answer: E

7) The cell types blood, bone, fat, and lymph would be categorized into which of the following major cell classes?

- A) muscle cells
- B) epithelial cells
- C) endocrine cells
- D) neurons
- E) connective tissue cells

Answer: E

8) Which tissue type includes cells contained in an extracellular matrix composed of collagen and elastin?

- A) muscle tissue
- B) nervous tissue
- C) endocrine tissue
- D) epithelial tissue
- E) connective tissue

Answer: E

9) What is a general name for the noncellular material that holds the widely scattered cells of connective tissue together?

- A) intracellular matrix
- B) extracellular matrix
- C) basement membrane
- D) elastin
- E) collagen

Answer: B

10) Which of the following is a protein found in connective tissue that provides the tensile strength to resist stretching?

- A) erythropoietin
- B) elastin
- C) vimentin
- D) collagen
- E) basement membrane

Answer: D

11) What are the structures that attach bone to muscle?

- A) aponeuroses
- B) intracellular matrix proteins
- C) ligaments
- D) extracellular matrix proteins
- E) tendons

Answer: E

12) Organs of the body are defined as

- A) a collection of cells that function independently of one another.
- B) a collection of cells that perform similar functions.
- C) a collection of tissues that function independently of one another.
- D) two or more tissues combined to form a structure that allows each tissue to function independently.
- E) a combination of two or more tissues that make up a structure which performs a specific function.

Answer: E

- 13) Which of the following accurately represents the order of complexity for the components of the body, from least to most complex?
- A) cells, tissues, organ systems, organs
 - B) cells, tissues, organs, organ systems
 - C) organ systems, organs, tissues, cells
 - D) tissues, cells, organs, organ systems
 - E) organ systems, cells, tissues, organs

Answer: B

- 14) The uptake of nutrients across the epithelial cells of the gastrointestinal tract and into the bloodstream is called
- A) secretion.
 - B) filtration.
 - C) reabsorption.
 - D) absorption.
 - E) excretion.

Answer: D

- 15) What organ system includes the pituitary gland, adrenal gland, and thyroid gland?
- A) nervous
 - B) immune
 - C) endocrine
 - D) integumentary
 - E) cardiovascular

Answer: C

- 16) The lumen of which of the following systems is part of the internal environment?
- A) respiratory system
 - B) gastrointestinal system
 - C) urinary system
 - D) cardiovascular system
 - E) gastrointestinal and urinary systems

Answer: D

- 17) The process whereby fluid from the bloodstream enters the tubules of the kidneys is called
- A) excretion.
 - B) absorption.
 - C) filtration.
 - D) secretion.
 - E) reabsorption.

Answer: C

- 18) The process whereby fluid in the kidneys is transported from the tubules back into the bloodstream is called
- A) absorption.
 - B) reabsorption.
 - C) secretion.
 - D) excretion.
 - E) filtration.

Answer: B

- 19) Referring to a membrane as "selectively permeable" describes its ability to
- A) allow the movement of particular molecules across a membrane.
 - B) restrict only the movement of sodium across a membrane.
 - C) restrict only the movement of potassium across the membrane.
 - D) provide a barrier that restricts the movement of all molecules across a membrane.
 - E) provide a minimal barrier that allows almost any molecule to move across a membrane.

Answer: A

- 20) Extracellular fluid is composed of
- A) plasma and intracellular fluid.
 - B) intracellular fluid only.
 - C) interstitial fluid and plasma.
 - D) plasma only.
 - E) interstitial fluid only.

Answer: C

- 21) Total body water is composed of
- A) extracellular fluid only.
 - B) intracellular and interstitial fluid.
 - C) intracellular and extracellular fluid.
 - D) intracellular fluid only.
 - E) plasma and intracellular fluid.

Answer: C

- 22) Where is most of our total body water located?
- A) in the lumen of the kidneys
 - B) surrounding the cells
 - C) in blood
 - D) inside cells
 - E) in the lumen of the gastrointestinal tract

Answer: D

- 23) Which of the following compartments contain most of the water found in the human body?
- A) plasma
 - B) intracellular fluid
 - C) interstitial fluid
 - D) lumen of the intestinal tract
 - E) extracellular fluid

Answer: B

- 24) What are the two extracellular fluid compartments of the body?
- A) intracellular fluid and blood
 - B) intracellular fluid and interstitial fluid
 - C) intracellular fluid and plasma
 - D) interstitial fluid and blood
 - E) interstitial fluid and plasma

Answer: E

- 25) The portion of body water outside of cells that bathes most cells of the body is called
- A) interstitial fluid.
 - B) extracellular fluid.
 - C) intracellular fluid.
 - D) plasma.
 - E) intercellular fluid.

Answer: A

- 26) The fluid compartment with a high sodium and protein concentration is called
- A) intracellular and extracellular fluids.
 - B) intracellular fluid.
 - C) extracellular fluid.
 - D) interstitial fluid.
 - E) plasma.

Answer: E

- 27) Which of the following best describes intracellular fluid?
- A) rich in sodium, potassium, and chloride
 - B) rich in potassium and chloride
 - C) rich in proteins and chloride
 - D) rich in proteins and potassium
 - E) rich in sodium and chloride

Answer: D

- 28) The fluid compartment with a high sodium concentration that contains only trace amounts of protein is called
- A) interstitial fluid.
 - B) intracellular and extracellular fluids.
 - C) extracellular fluid.
 - D) plasma.
 - E) intracellular fluid.

Answer: A

- 29) For a person weighing 150 pounds, how many liters of water are contained in all of the body's compartments?

A) 11 B) 42 C) 50 D) 14 E) 70

Answer: B

- 30) Homeostasis is a term which describes the process whereby the body
- A) maintains a variable internal environment.
 - B) affects the external environment.
 - C) maintains a constant external environment.
 - D) maintains a constant internal and external environment.
 - E) maintains a constant internal environment.

Answer: E

- 31) Of the following conditions associated with excess heat, which is the most serious condition?
- A) excessive sweating
 - B) dehydration
 - C) dizziness
 - D) heat exhaustion
 - E) heat stroke

Answer: E

- 32) The maintenance of a stable internal environment compatible for life is called
- A) biochemistry.
 - B) anatomy.
 - C) microbiology.
 - D) physiology.
 - E) homeostasis.

Answer: E

- 33) What is the primary mechanism for maintaining homeostasis?
- A) intrinsic control
 - B) extrinsic control
 - C) inherent control
 - D) negative feedback
 - E) positive feedback

Answer: D

- 34) Which of the following statements about homeostasis is FALSE?
- A) Homeostasis is the maintenance of the internal environment.
 - B) The organ systems work together to maintain homeostasis.
 - C) The extracellular fluid is maintained in a state compatible for life.
 - D) The primary mechanism to maintain homeostasis is positive feedback.
 - E) Illness can result if homeostasis is disrupted.

Answer: D

- 35) Changes in the external environment alter the _____, which is detected by the _____, and that information is sent to the integrator.
- A) sensor : regulated variable
 - B) set point : regulated variable
 - C) error signal : regulated variable
 - D) regulated variable : set point
 - E) regulated variable : sensor

Answer: E

- 36) Lisinopril is a medication that lowers high blood pressure back to within a desired range of function. The action of this medication is similar to that of a(n) _____ in the human body.
- A) negative feedback response
 - B) regulated variable
 - C) positive feedback response
 - D) set point
 - E) integrating center

Answer: A

- 37) If you were to take the temperature of everyone in class, assuming no one is sick, you would find that not everyone has a temperature of 98.6°F. Which statement below best explains your findings?
- A) If the subject is not at 98.6°F then he or she is in a disease state
 - B) An error signal has occurred and a positive feedback response has put the persons in question out of the normal range of function.
 - C) The measuring instrument is not working properly; everyone has a set point of 98.6°F.
 - D) Their temperature is no doubt higher than 98.6°F because a positive feedback loop has increased the subjects' metabolism.
 - E) Most regulated variables, such as temperature, fluctuate continuously and oscillate about the set point due to negative feedback control.

Answer: E

- 38) When people cut themselves, they have clotting factors in their blood that will be released continuously in a cascade until their blood clots and terminates the bleeding. What mechanism caused their blood to clot?
- A) secretion
 - B) reabsorption
 - C) negative feedback control
 - D) positive feedback control
 - E) homeostasis

Answer: D

- 39) A _____ detects a change in a regulated variable and sends that information to a(n) _____ which relays signals to a(n) _____, usually a muscle or a gland.
- A) receptor : stimulus : regulated variable
 - B) stimulus : receptor : organ system
 - C) sensor : integrating center : effector
 - D) sensor : effector : integrating center
 - E) receptor : integrating center : negative feedback control

Answer: C

- 40) Vinnie has high blood glucose and must take insulin shots to control his blood sugar. Why must he override his normal homeostatic mechanisms by taking medication?
- A) Vinnie's set point has changed telling him he needs more sugar.
 - B) Vinnie's positive feedback controls are not functioning properly.
 - C) Vinnie's negative feedback controls are not functioning properly.
 - D) Vinnie's sensors are detecting high levels of glucose and therefore are not secreting insulin due to positive feedback control.
 - E) An error signal has been sent to Vinnie's integrating center, which is not functioning properly.

Answer: C

- 41) A patient has a high salt or sodium intake which draws fluid out of his cells to dilute the sodium. This process occurs as a result of
- A) excretion.
 - B) negative feedback control.
 - C) absorption.
 - D) positive feedback control.
 - E) reabsorption.

Answer: B

- 42) The process of maintaining the internal environment in a state compatible for life is called _____, and it occurs primarily through _____.
- A) homeostasis : negative feedback
 - B) negative feedback : intrinsic control
 - C) positive feedback : intrinsic control
 - D) intrinsic control : negative feedback
 - E) intrinsic control : homeostasis

Answer: A

- 43) Which of the following is an example of negative feedback?
- A) At the time of birth, uterine contractions push the baby toward the cervix. Receptors in the cervix detect the pressure caused by the baby and cause the release of a hormone called oxytocin. This hormone stimulates stronger uterine contractions, which push more on the baby, causing an increase in pressure and another increase in oxytocin. The cycle continues until the baby is delivered from the mother.
 - B) During a blood clot, platelets release ADP, which stimulates platelet aggregation, causing platelets to release more ADP.
 - C) During an infection, the body temperature set point is increased. The hypothalamus communicates to skeletal muscles to shiver and to blood vessels to decrease blood flow to the skin, causing a rise in body temperature.
 - D) Consumption of caffeine increases urine output, causing dehydration.
 - E) If blood pressure increases above normal, baroreceptors in major arteries detect the change and send signals to the brain. Certain areas of the brain then send signals to the nerves that control the heart and blood vessels to make the heart beat slower and the blood vessels increase in diameter, which in turn reduce the blood pressure.

Answer: E

- 44) Luteinizing hormone-mediated regulation of estrogen during ovulation in women is an example of
- A) a quasi-positive feedback loop.
 - B) a quasi-negative feedback loop.
 - C) both a positive and a negative feedback loop.
 - D) a negative feedback loop.
 - E) a positive feedback loop.

Answer: E

- 45) The feedback loop involving luteinizing hormone and estrogen is terminated by
- A) ovulation, which directly inhibits luteinizing hormone secretion.
 - B) ovulation, which decreases estrogen secretion.
 - C) pregnancy.
 - D) nothing; the cycle cannot be terminated.
 - E) birth.

Answer: B

- 46) Which of the following is a normal blood glucose level?
- A) 100 mg/dL
 - B) 200 mmolar
 - C) 50 mg/dL
 - D) 50 mmolar
 - E) 100 gm/mL

Answer: A

- 47) What is the difference between diabetes mellitus and diabetes insipidus?
- A) One is a lack of insulin secretion; the other a resistance to insulin.
 - B) One causes diarrhea; the other causes diuresis.
 - C) One is a deficit in insulin activity; the other a deficit in ADH activity.
 - D) One causes increased fluid loss; the other causes increased thirst.
 - E) One is a lack of ADH secretion; the other a resistance to ADH.

Answer: C

- 48) What cells secrete insulin?
- A) several cells located throughout the body
 - B) alpha cells of the pancreas
 - C) beta cells of the pancreas
 - D) I cells of the adrenal cortex
 - E) G cells of the adrenal cortex

Answer: C

- 49) Approximately what percentage of people living in the United States suffers from diabetes mellitus?
- A) 0.1%
 - B) 8%
 - C) 0.5%
 - D) 15%
 - E) 1%

Answer: B

- 50) Which of the following people would be more prone to develop diabetes mellitus type II?
- A) an obese Hispanic adult
 - B) an obese white adult
 - C) a thin white adult
 - D) a thin, malnourished, African American child
 - E) an obese Hispanic child

Answer: A

- 51) What percentage of adults in the United States is obese?
- A) 15%
 - B) 35%
 - C) 25%
 - D) 10%
 - E) 20%

Answer: B

- 52) Which of the following types of diabetes mellitus was formerly referred to as insulin-dependent or juvenile-onset diabetes mellitus?
- A) type 1
 - B) prediabetes
 - C) type 2
 - D) gestational diabetes
 - E) diabetes insipidus

Answer: A

- 53) What are the two major consequences for those who suffer from diabetes mellitus?
- A) high blood glucose and excessive urination
 - B) low blood sugar and fainting
 - C) high blood glucose and glucose in the urine
 - D) high blood glucose and cells that cannot utilize that glucose for energy
 - E) high blood glucose and excessive thirst

Answer: D

- 54) Although diabetes mellitus has many symptoms, the primary diagnostic symptoms of the disease are _____ and _____.
- A) dizziness : dehydration
 - B) lethargy : dizziness
 - C) elevated blood glucose : glucose in the urine
 - D) elevated blood glucose : lethargy
 - E) elevated blood glucose : poor healing

Answer: C

- 55) What lab test, often deemed the "lie detector test" by health care workers, measures the average blood glucose levels for the past 2-3 months?
- A) fasting blood glucose test
 - B) random blood glucose test
 - C) siphon test
 - D) hemoglobin A_{1c} test
 - E) glucose tolerance test

Answer: D

- 56) Obesity is identified using what measurement?
- A) body mass index (BMI)
 - B) body type index
 - C) ethnicity scale
 - D) CDC disease scale
 - E) waist circumference scale

Answer: A

- 57) What percentage of women will develop type 2 diabetes after developing gestational diabetes?
- A) 5-10% B) 1-2% C) 25-30% D) 3-4% E) 12-15%

Answer: A

- 58) What is the primary reason the prevalence of diabetes is increasing in the U.S. population?
- A) the U.S. diet
 - B) an aging population
 - C) sedentary lifestyles
 - D) lack of physical activity
 - E) obesity

Answer: B

- 59) Prediabetics have a fasting blood glucose level of _____ and, according to the Centers for Disease Control (CDC), approximately _____ million Americans are prediabetic.
- A) 100-125 mg/dL : 80
 - B) 500-1000 mg/dL : 300
 - C) 70-100 mg/dL : 10
 - D) 300-400 mg/dL : 100
 - E) 200-250 mg/dL : 50

Answer: A

- 60) John has type 2 diabetes. He has a sedentary lifestyle, is overweight, and recently went to the doctor who gave him a hemoglobin A_{1c} test which came back at 7%. What is the best course of treatment for John?
- A) a strict diet, frequent monitoring of his blood glucose, exercise, and oral glucose medication
 - B) frequent monitoring of his blood glucose levels with insulin shots
 - C) measure his BMI, continued monitoring of his blood glucose levels with a hemoglobin A_{1c} test, and changes in lifestyle
 - D) insulin shots and exercise
 - E) insulin shots and a healthy diet

Answer: A

- 61) Which tissue below is specialized for lining the lumen of vessels material?
- A) epithelial tissue
 - B) connective tissue
 - C) nervous tissue
 - D) muscle tissue
 - E) reticular tissue

Answer: A

- 62) Which tissue below conducts signals primarily via electrical impulses?
- A) epithelial tissue
 - B) connective tissue
 - C) nervous tissue
 - D) muscle tissue
 - E) reticular tissue

Answer: C

- 63) Which tissue below provides structural support?
- A) epithelial tissue
 - B) connective tissue
 - C) nervous tissue
 - D) muscle tissue
 - E) reticular tissue

Answer: B

- 64) Which tissue below contracts to generate force?
- A) epithelial tissue
 - B) connective tissue
 - C) nervous tissue
 - D) muscle tissue
 - E) reticular tissue

Answer: D

- 65) The elimination of unabsorbed materials from the body refers to which of the processes below?
- A) filtration
 - B) secretion
 - C) excretion
 - D) reabsorption
 - E) absorption

Answer: C

66) Movement from the lumen of the gastrointestinal tract to the blood would represent which of the following processes?

- A) absorption
- B) reabsorption
- C) excretion
- D) filtration
- E) secretion

Answer: A

67) Movement from the blood into the kidney tubules would represent which of the following processes?

- A) excretion
- B) absorption
- C) secretion
- D) reabsorption
- E) filtration

Answer: E

68) Which of the following is/are associated with the endocrine system?

- A) bronchi
- B) adrenal gland
- C) blood vessels
- D) pancreas
- E) esophagus

Answer: B

69) Which of the following is/are associated with the nervous system?

- A) bronchi
- B) brain
- C) esophagus
- D) adrenal cortex
- E) blood vessels

Answer: B

70) Which of the following is/are a component of the cardiovascular system?

- A) esophagus
- B) adrenal gland
- C) brain
- D) bronchi
- E) blood vessels

Answer: E

71) Which of the following is/are associated with the respiratory system?

- A) adrenal gland
- B) brain
- C) bronchi
- D) blood vessels
- E) esophagus

Answer: C

72) Which of the following is/are associated with the gastrointestinal system?

- A) esophagus
- B) adrenal gland
- C) bronchi
- D) brain
- E) blood vessels

Answer: A

73) The smallest living units, capable of carrying out their own basic life processes, are

- A) organs.
- B) atoms.
- C) tissues.
- D) cells.
- E) molecules.

Answer: D

74) Cells that carry oxygen in the bloodstream are called

- A) hemoglobin.
- B) leukocytes.
- C) karyocytes.
- D) lymphocytes.
- E) erythrocytes.

Answer: E

75) What tissue is specialized for separating fluids?

- A) epithelial
- B) connective
- C) nervous
- D) muscle
- E) endocrine

Answer: A

76) What tissue is a major component of bone, ligaments, and blood?

- A) epithelial
- B) connective
- C) nervous
- D) muscle
- E) endocrine

Answer: B

77) What tissue is specialized for generating electrical signals?

- A) epithelial
- B) connective
- C) nervous
- D) muscle
- E) endocrine

Answer: C

78) What tissue is specialized to contract?

- A) epithelial
- B) connective
- C) nervous
- D) muscle
- E) endocrine

Answer: D

79) The specific structures that attach bone to bone are called

- A) sheathing.
- B) skeletal muscle.
- C) tendons.
- D) smooth muscle.
- E) ligaments.

Answer: E

80) The _____ is the interior compartment of a hollow organ or vessel.

- A) lumen
- B) epithelium
- C) cavity
- D) intracellular matrix
- E) basement membrane

Answer: A

81) The process whereby enzymes are moved into the gastrointestinal tract to digest nutrients is called

- A) filtration.
- B) excretion.
- C) reabsorption.
- D) absorption.
- E) secretion.

Answer: E

82) The process whereby fluid and ions that have not been reabsorbed by the kidneys exit the body as urine is called

- A) filtration.
- B) secretion.
- C) reabsorption.
- D) excretion.
- E) absorption.

Answer: D

83) The fluid (non-cellular) portion of blood is called

- A) plasma.
- B) the internal environment.
- C) intracellular matrix.
- D) intracellular fluid.
- E) interstitial fluid.

Answer: A

84) The fluid compartment with a high protein and potassium concentration is called

- A) interstitial fluid.
- B) intracellular fluid.
- C) the internal environment.
- D) total body water.
- E) extracellular fluid.

Answer: B

85) Where is most of the water in the body found?

- A) in the lumen of the stomach
- B) in the plasma
- C) in the extracellular fluid
- D) in the intracellular fluid
- E) in the interstitial fluid

Answer: D

- 86) Insulin is a hormone that regulates blood glucose levels. It is released when glucose levels increase above normal. Based on the concept of negative feedback, what effect will insulin have on blood glucose levels?
- A) It will increase them.
 - B) Insulin does not regulate blood glucose levels.
 - C) It will decrease them.
 - D) Insulin will not affect glucose levels.
 - E) It makes them go both up and down.

Answer: C

- 87) What cells secrete insulin?
- A) collagen cells
 - B) exocrine cells
 - C) neurons
 - D) beta cells
 - E) alpha cells

Answer: D

- 88) Body mass index is a measure of weight in kilograms relative to
- A) gender.
 - B) weight (in kilograms in water).
 - C) arm length.
 - D) waste circumference.
 - E) height in meters (squared).

Answer: E

- 89) Pre-diabetics have fasting blood glucose levels of
- A) 100–125 mg/dL
 - B) 150–200 mg/dL
 - C) 70–100 mg/dL
 - D) 200–210 mg/dL
 - E) 90–100 mg/dL

Answer: A

- 90) What type of ductless gland secretes hormones into the bloodstream?
- A) endocrine
 - B) exocrine
 - C) sweat
 - D) matrix
 - E) salivary

Answer: A

- 91) Which statement below best defines homeostasis?
- A) Homeostasis is the process whereby the body maintains the internal environment in a state compatible for life.
 - B) Homeostasis is maintained through positive feedback loops.
 - C) Homeostasis refers to the regulation of temperature in the human body.
 - D) Homeostasis means all regulated variables are at the set point.
 - E) Homeostasis is the process whereby the body changes with the external environment.

Answer: A

- 92) Which statement below lists the essential components of a feedback loop and describes their function?
- A) Integrator interprets the information; set point is the value of the regulated variable; effector alters the regulated variable.
 - B) Set point is the value of the regulated variable; integrator interprets the information and sends it to the appropriate effector; effector alters the regulated variable; set point is the point the variable must always return to.
 - C) Set point detects the regulated variable; integrator interprets the information and sends it to the appropriate effector; effector decides if it will react or not to the signal.
 - D) Sensor detects a regulated variable; integrator interprets the information and sends it to the appropriate effector; effector alters the regulated variable; organ system returns the body back to normal
 - E) Sensor detects a regulated variable; set point is the value of the regulated variable; integrator interprets the information and sends it to the appropriate effector; effector alters the regulated variable.

Answer: E

- 93) Physiology is the study of function and can come in many forms, including plant physiology.

Answer: True False

- 94) Pathophysiology is what happens when normal body functions are disrupted.

Answer: True False

- 95) Connective tissue forms both endocrine and exocrine glands.

Answer: True False

- 96) Exocrine glands secrete hormones.

Answer: True False

- 97) The immune system protects the body from invading microorganisms.

Answer: True False

- 98) Most of the cells of the body are able to directly exchange materials with the external environment.

Answer: True False

- 99) The internal and external environments are separated by the selectively permeable membranes of epithelial cells.

Answer: True False

- 100) The most abundant substance in the body is carbon.

Answer: True False

- 101) Intracellular fluid and extracellular fluid are of the same ion composition.

Answer: True False

- 102) The homeostatic mechanisms of the body are unlimited in their ability to respond to changes in the external environment.

Answer: True False

- 103) Blood glucose is a regulated variable.

Answer: True False

104) Effectors bring about a final response in a negative feedback loop.

Answer: True False

105) Positive feedback loops are impossible to stop once they have begun.

Answer: True False

106) All forms of diabetes involve a decrease in plasma levels of insulin.

Answer: True False

107) Diabetes mellitus requires insulin injections for maintenance.

Answer: True False

108) Once a woman develops gestational diabetes, she will have diabetes for life.

Answer: True False

109) People with a body mass index (BMI) less than 25 are most prone to develop type 2 diabetes mellitus.

Answer: True False

110) Cases of diabetes mellitus are increasing throughout the world, not just in the United States.

Answer: True False

111) Obesity predisposes a person to develop type 1 diabetes mellitus.

Answer: True False

112) Diabetes mellitus causes hyperglycemia.

Answer: True False

113) Describe the four general groups of cells (tissues) that are found in the body, outlining the important characteristics of each group and their functions.

Answer: Nervous tissue – Neurons are specialized for the transmission of information in the form of electrical signals. They typically possess a number of branches that function to receive or transmit those electrical signals. Some are even capable of detecting sensory information.

Muscle tissue – Muscle cells are involved in force development and movement. They tend to be elongated in shape and can be under either voluntary or involuntary control.

Epithelial tissue – Epithelial cells are arranged as a sheet-like layer of cells connected to a thin, non-cellular basement membrane. These cells are found in many shapes, sizes, and layer thicknesses. They are closely associated with their neighbors, providing a barrier separating body fluids from the external environment. Certain epithelial cells are specialized to transport specific molecules from one compartment to another.

Connective tissue – This tissue encompasses many cell types including blood cells, bone cells, and many others. In a narrow sense, these cells provide physical support for other structures like tendons and ligaments. In a broader sense, the term connective tissue encompasses fluids like blood and lymph that "connect" parts of the body by providing an avenue for communication.

114) Water is the most abundant molecule in the human body. Identify both the amount of water and its location within the body.

Answer: TBW represents the total volume of fluid within the body and is approximately 42 liters for an ideal human subject of 150 pounds. Most of the water in the body (28 liters) is found in intracellular fluid or the fluid found inside of cells. Extracellular fluid (14 liters of TBW), the fluid outside of cells, is composed of two compartments. One is the fluid component of blood (plasma), which is approximately 3 liters. The second is the fluid that bathes cells (interstitial fluid), which makes up 11 liters of TBW.

115) Blood glucose is a regulated variable controlled by a negative feedback loop. Explain what is meant by the term negative feedback and discuss how this mechanism would work in the case of high blood glucose.

Answer: Negative feedback systems reverse the response of an increasing variable back to the set point for that variable. In this case, the rising blood glucose levels are detected by the sensors or beta cells within the pancreas. The beta cells also act as the integrating center and release the hormone insulin into the blood stream. Insulin causes glucose to move from the plasma of the blood into the cells of the body or effectors therefore driving down the levels of glucose back to within normal ranges.

116) Compare and contrast the different forms of diabetes.

Answer: There are several types of diabetes, including diabetes mellitus type 1, diabetes mellitus type 2, diabetes insipidus, and gestational diabetes. Diabetes mellitus types 1 and 2 are associated with insufficient actions of insulin causing hyperglycemia and a number of other symptoms. Diabetes mellitus type 1 is caused by decreased secretion of insulin. Without sufficient insulin, cells do not uptake glucose to meet their metabolic needs. Liver and muscle cells do not uptake insulin to store energy for later needs. Thus hyperglycemia and fatigue are common symptoms. In diabetes mellitus type 2, beta cells of the pancreas secrete insulin, but effector cells do not respond to the insulin. Thus symptoms are similar to that of diabetes mellitus type 1. Diabetes insipidus is a disease affecting the release of antidiuretic hormone (ADH). ADH promotes water reabsorption from the kidneys, and in its absence (or a decrease in tissue responsiveness to it), excessive water is lost in the urine causing dehydration. Gestational diabetes develops in some pregnant women. It is similar to type 2 diabetes mellitus, with hormones of pregnancy thought to induce the insulin resistance. Gestational diabetes often reverses following delivery of the baby.