Student name:_____

Which of these is NOT one of the four general categories of cells that make up the human body?

Epithelial cells

Collagen cells

Connective-tissue cells

Neurons

Muscle cells

Physiology is the study of

how two organisms interact.

how organisms function.

the spread of diseases.

the structure of the body.

two of the choices are correct.

The study of disease states in the body is called

pathophysiology.

anatomy.

homeostasis.

differentiation.

histology.

Which is NOT a connective tissue cell?

Bone cell

Skeletal muscle cell

Blood cell

Fat cell

Cartilage cell

What is the principal function performed by epithelial cells?

Fat storage

Anchoring body structures

Forming boundaries between body compartments

Generating movement

Transmitting electrical signals

The types of cells that are specialized to communicate with other cells and control their activities are

epithelial cells.

muscle cells.

connective tissue cells.

neurons.

Two of the choices are correct.

What is the term for the developmental process that leads to specialized cell types?

Genomics

Differentiation

Homeostasis

Positive feedback

Acclimatization

Which best describes the extracellular matrix?

It is found just inside the cell membrane in all tissues, it sends branching collagen fibers between cells to connect them, and it transmits chemical information from the interior of one cell to the interior of adjacent cells.

It is a tissue having more than the four general cell types, it transports proteins and polysaccharides between body compartments, and it is the route by which chemical signals like hormones reach all parts of the body.

It covers the body's surface, it contains connective and muscle tissue, and it helps generate movement.

It surrounds cells; it contains proteins, polysaccharides, and minerals; it provides a scaffold for cell attachment; and it transmits chemical messengers to cells.

If a person begins to sweat upon entering a hot room but continued sweating is able to keep the body temperature stable, which of these best describes their condition?

They are in an equilibrium state.

They are not using energy to maintain a constant temperature.

They are in a steady state.

They are using a positive feedback mechanism.

Which concept is the defining feature of the discipline of physiology?

Descent with modification

Homeostasis

Evolution

Equilibrium

Differentiation

Describing a physiological variable as "homeostatic" means that it

has varied from the normal value, and will remain constant at the new value.

never varies from an exact set point value.

is in an equilibrium state that requires no energy input to stay at the normal value.

is in a state of dynamic constancy that is regulated to remain near a stable set point value.

has no normal range, but will instead change to match the outside environmental conditions.

Which of the following situations best represents a homeostatic mechanism?

A person who becomes nervous begins to sweat profusely.

After going outside on a hot day, the core body temperature increases.

Increasing the size of fast-food restaurant portions causes body weight to increase.

After eating a large batch of salty popcorn, levels of salt in the urine increase to rid it from the body.

As age increases, the amount of calcium in bones decreases.

What term is used to describe the steady-state value for any variable that the body attempts to maintain?

Set point

Equilibrium potential

Error signal

Reflex arc

Median value

Which of components of a general reflex arc are listed in the order information typically flows through them following a stimulus?

Effector, afferent pathway, integrating center, efferent pathway, receptor

Effector, efferent pathway, integrating center, afferent pathway, receptor

Integrating center, receptor, afferent pathway, efferent pathway, effector

Receptor, efferent pathway, integrating center, afferent pathway, effector

Receptor, afferent pathway, integrating center, efferent pathway, effector

Feedforward regulatory processes

work in anticipation of changes in regulated variables.

are identical to positive feedback processes.

lead to instability of the regulated variable.

maximize fluctuations in the regulated variable.

tend to force physiological variables away from their set point.

Which situation is an example of feedforward regulation?

Blood glucose returns toward normal an hour after a meal.

The smell of rotten food on a plate triggers the vomit reflex.

A drop in core body temperature triggers shivering.

An increase in core body temperature stimulates sweating.

Food in the stomach triggers the production of stomach acid.

What is the general purpose of positive feedback mechanisms?

To maintain a constant internal environment

To anticipate changes in the environment

To return a variable toward the set point

To bring about a rapid change in the body

To detect changes in the external environment

Shivering in response to a cold draft is an example of

a homeostatic mechanism.

positive feedback.

feedforward regulation.

acclimatization.

If the amount of sodium in the blood decreases, what would a negative feedback control mechanism be expected to do?

Decrease the amount of sodium in the blood

Increase the amount of sodium in the blood

Leave the amount of sodium unchanged

Change the set point for sodium

Inhibit the ingestion of more sodium

What is the best description of the efferent pathway of a reflex arc?

Signals from the integrating center to receptors

The route by which receptors send signals to effectors

Signaling pathway for receptors to influence the integrating center

The route by which effector organs send signals to receptors

The route by which signals from an integrating center reach effector organs

Which one of the following is the correct sequence for a regulatory reflex arc?

Stimulus, effector, efferent pathway, integrating center, afferent pathway, receptor

Stimulus, receptor, efferent pathway, integrating center, afferent pathway, effector

Stimulus, receptor, afferent pathway, integrating center, efferent pathway, effector

Stimulus, effector, afferent pathway, integrating center, efferent pathway, receptor

Effector, efferent pathway, integrating center, afferent pathway, receptor, stimulus

Identify the effectors in this homeostatic reflex: Eating a salt-rich meal increases blood volume and pressure, stretching blood vessel walls. Nerve signals sent to the brainstem stimulate changes in hormonal and neural signaling. The heart rate is slowed, blood vessel walls are relaxed, and the kidneys increase salt excreted in the urine. As a result, blood pressure returns toward normal.

Brainstem and blood vessels

Blood vessels, hormones, and nerves

Heart, blood vessels, and kidneys

Brainstem, blood vessels, and kidneys

Hormones and nerves

The hormone insulin enhances the transport of glucose out of the blood and into body cells. Its secretion is controlled by a negative feedback system where blood glucose concentration is the stimulus and pancreatic cells that secrete insulin as the effector. Which of the following statements is most likely to be correct?

A decrease in blood glucose concentration will stimulate insulin secretion, which will in turn lower the blood glucose concentration still further.

An increase in blood glucose concentration will stimulate insulin secretion, which will in turn lower the blood glucose concentration.

A decrease in blood glucose concentration will stimulate insulin secretion, which will in turn increase the blood glucose concentration.

An increase in blood glucose concentration will stimulate insulin secretion, which will in turn increase the blood glucose concentration still further.

How are endocrine glands and hormones involved in homeostatic reflexes?

Endocrine gland cells can be receptors, and hormones can be effectors.

Endocrine glands can be efferent pathways, and hormones can be effectors.

Endocrine glands are not part of reflex mechanisms, but hormones can be afferent or efferent pathways.

They are not involved; reflexes only involve actions of the nervous system.

What is a hormone?

A chemical released from a nerve cell that affects nearby cells across a synapse

A chemical released from an endocrine gland that affects target cells without entering the bloodstream

A chemical found in the blood that catalyzes the destruction of ingested toxins and foreign substances

A chemical found in the sweat that signals other individuals about the physiological status of the body

A chemical regulator secreted from an endocrine gland that travels through the bloodstream to affect target cells

Some neurons in the vagus nerve have synaptic connections to sinoatrial cells (pacemaker) in the heart. These neurons secrete the neurotransmitter acetylcholine, which ultimately results in a decreased heart rate. This is an example of

endocrine control.

exocrine control.

hormonal control.

neural control.

paracrine control.

Heart rate is increased by the release of epinephrine by the adrenal medulla into the bloodstream. This is an example of

endocrine control.

exocrine control.

paracrine control.

direct neural control.

positive feedback.

How is autocrine regulation best described?

Chemical regulators are released directly into blood vessels.

Chemical regulators released by cells affect the functional status of different kinds of cells in the vicinity of the secretory cell.

Chemical regulators affect the same cells that produce them.

Chemical regulators reach their site of action through a duct.

Chemical regulators are continuously released in constant amounts by the cell.

A body shape that helps to dissipate heat in people native to equatorial regions is an example of

an adaptation.

acclimatization.

set point resetting.

homeostasis.

phase shift.

After spending several days at a high altitude, where oxygen pressure is low, a person will begin to produce more red blood cells, which enhances the ability of blood to carry oxygen to the tissues. What term best describes this type of response?

Developmental acclimatization

Positive feedback

Physiological acclimatization

Feedforward regulation

Evolution

Circadian rhythms are biological rhythms with what the main characteristic?

They are cyclical, like the 28-day menstrual cycle.

They are cyclical, like the rhythmic beating of the heart.

They are voluntary rhythms, like the time you decide to eat lunch each day.

They cease to occur when a person is in a dark environment.

They repeat approximately every 24 hours, like daily spikes in hormone secretion.

What is the location of the internal pacemaker that sets biological rhythms?

Suprachiasmatic nucleus of the brain

Ventricles of the heart

Endocrine gland in the gonads

Photoreceptors of the eye

The adrenal glands

A protein is found in blood that is produced by the pancreas and acts on receptors of cells in the liver. What type of physiological regulator is it most likely to be?

A hormone

An autocrine signal

A paracrine signal

A neurotransmitter

An enzyme

Which best describes how the total body balance of any chemical substance is determined?

The rate the body produces the substance

The rate the substance is secreted from the body

The rate the substance is metabolized by the body

The difference between the amount of substance lost from the body and the amount gained the body

The amount produced by the body minus the amount metabolized by the body

A burn patient ingests 100 grams of protein per day and loses 110 grams of protein per day due to the injury. What is the overall protein state of the patient?

Positive protein balance

Negative protein balance

Stable protein balance

A state that can't be determined

Eating a bag of salty potato chips without increasing sodium excretion would result in what state?

Positive sodium balance

Negative sodium balance

Stable sodium balance

It can't be determined without knowing the size of the sodium pool

An experimental subject is isolated in an underground room with no windows, no clocks, and no contact with the outside world. Researchers monitoring behavior observe that the individual eats breakfast a little bit later each day. What term best describes the subject's biological activity?

Circadian rhythm

Free-running rhythm

Jet lag

Adaptation

Entrainment

Which equation is accurate?

Extracellular fluid volume + interstitial fluid volume = whole body fluid volume

Intracellular fluid volume + interstitial fluid volume = extracellular fluid volume

Extracellular fluid volume - interstitial fluid volume = plasma volume

Plasma volume + intracellular fluid volume = extracellular fluid volume

Total body fluid volume - intracellular fluid volume = interstitial fluid volume

The internal environment of the body refers to

the plasma.

the interstitial fluid.

the intracellular fluid.

the interstitial fluid and the intracellular fluid combined.

the plasma, the interstitial fluid, and the intracellular fluid combined.

The interstitial fluid refers to

the fluid within the cells.

the plasma.

the fluid between the cells.

the plasma and fluid between the cells.

the fluid between the cells and the fluid within the cells.

Neglecting protein differences, which of the following fluids has a virtually identical solute concentration?

The interstitial fluid and the intracellular fluid

The interstitial fluid and the plasma

The extracellular fluid and the plasma

The interstitial fluid, the extracellular fluid, and the plasma

None of these choices

When a blood vessel is injured, it releases chemicals that activate platelets and cause them to stick to the injury site. The activated platelets in turn release more chemicals and attract more platelets to the injury site until the wound is fully sealed. This process of blood clotting is an example of

negative feedback.

positive feedback.

feedforward regulation.

adaptation.

acclimatization.

During childbirth, as a baby's head is pressed against the mother's cervix, signals are relayed via nerves from cervix to the mother's brain. The brain initiates the secretion of oxytocin (a hormone) from the mother's pituitary gland. Oxytocin stimulates further uterine contractions. As the uterus contracts even harder in response to oxytocin, the baby's head is pushed harder against the cervix; this stimulates yet more nerve signals to the mother's brain, resulting in yet more oxytocin secretion until finally the baby is pushed through the cervix. This process of childbirth is an example of

negative feedback.

positive feedback.

feedforward regulation.

adaptation.

acclimatization.

During childbirth, as a baby's head is pressed against the mother's cervix, signals are relayed via nerves from cervix to the mother's brain. The brain initiates the secretion of oxytocin (a hormone) from the mother's pituitary gland. Oxytocin stimulates further uterine contractions. As the uterus contracts even harder in response to oxytocin, the baby's head is pushed harder against the cervix; this stimulates yet more nerve signals to the mother's brain, resulting in yet more oxytocin secretion until finally the baby is pushed through the cervix. The integrating center in this process of childbirth is

the mother's brain.

the mother's cervix.

the nerve signals to the mother's brain.

oxytocin.

the mother's pituitary gland.

During breastfeeding, as the baby suckles, nerve signals are relayed from the mother's nipple to the mother's brain. The brain initiates the mother's pituitary gland to produce more prolactin (a hormone), which causes more milk to be ejected. This process of breastfeeding is an example of

negative feedback.

positive feedback.

feedforward regulation.

adaptation.

acclimatization.

Some adults have the ability to digest lactose in milk. This is an example of

negative feedback.

positive feedback.

feedforward regulation.

adaptation.

None of the choices are correct.

As soon as a person sees a cup of lemon juice, they start to salivate. This is an example of

negative feedback.

positive feedback.

feedforward regulation.

adaptation.

None of the choices are correct.

Differentiation is necessary before a cell can exchange material with its environment.

true

false

The number of distinct cell types in the human body is about twenty.

true

false

One function of epithelial cells is to form selective barriers regulating exchange of materials across them.

true

false

Organs are generally composed of only one kind of tissue.

true

false

The respiratory system is primarily responsible for transporting blood to the body's tissues.

true

false

Homeostasis refers to the relative constancy of the external environment.

true

false

The composition of the fluid surrounding body cells is the same as that within the cells.

true

false

The extracellular fluid compartment includes the interstitial fluid and plasma.

true

false

Homeostatic control systems and acclimatization are examples of biological adaptations.

true

false

A person who is acclimated to a hot environment will begin to react physiologically to a decreased environmental temperature faster than a person who is not.

true

false

When loss of a substance from the body exceeds gain, the body is said to be in positive balance for that substance.

true

false

The negative feedback system is much more common than the positive feedback system.

true

false

_____is the general term for a chemical released by the endings of neurons onto other neurons, muscle cells, or gland cells.

_____regulation describes regulation of cellular activity by messengers from nearby cells.

_____is the term describing regulation of cellular activity by chemical mediators produced by that same cell.

Answer Key

Test name: Ch1_Vander's Human Physiology_16

B

B

A

B

C

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TRUE

Neurotransmitter

Paracrine

Autocrine