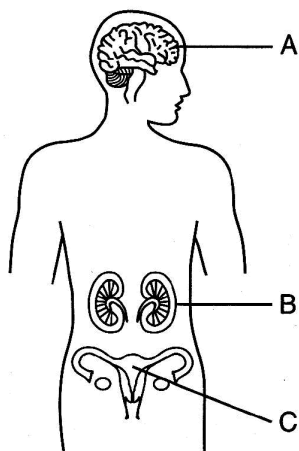


1. Base your answer to the following question on the diagram below and on your knowledge of biology.



Structure *B* represents

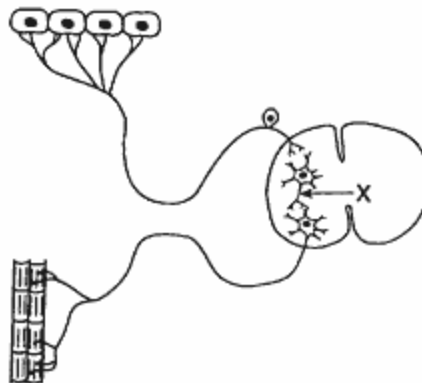
- A) cells, only
 B) cells and tissues, only
 C) an organ with cells and tissues
 D) a complete system with organs, tissues, and cells
2. People who receive organ transplants sometimes produce antibodies in response to foreign proteins present in the organ of the donor. This reaction is an example of
- A) clotting B) deamination
 C) regeneration D) rejection
3. A dead or weakened pathogen used to establish immunity would most likely be found in
- A) an antibiotic B) a toxin
 C) a pesticide D) a vaccine
4. In response to an increasing blood glucose level, the human body will normally
- A) produce a hormone that destroys the glucose
 B) store the glucose in cell nuclei
 C) release a hormone that lowers the blood glucose
 D) use the excess glucose to make proteins
5. Whole blood of type O may safely be given to people with which types of blood?
- A) O and B, only B) AB and A, only
 C) A, B, AB, and O D) A and B, only

6. Which diagram best represents a blood cell from a person with type O blood?

A, B, O Blood Group Key	
	Blood cell
	Antigen 1
	Antigen 2

- A)
- B)
- C)
- D)

7. The diagram below represents a reflex arc.

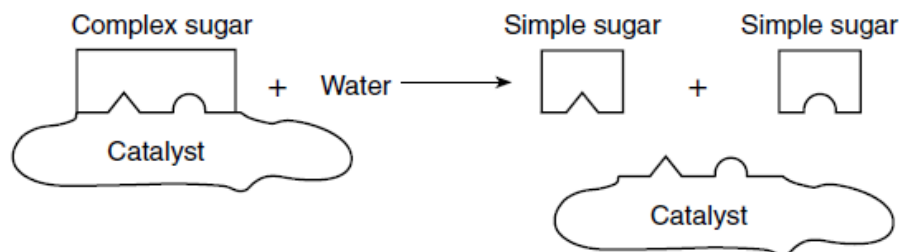


The function of the neuron labeled *X* is to

- A) direct impulses from the receptor to the spinal cord
 B) transmit impulses from a sensory neuron to a motor neuron
 C) initiate responses by stimulating the receptor
 D) transmit impulses from the effector to the brain
8. An individual who has had chicken pox rarely gets this disease again. This situation is an example of
- A) negative feedback B) biological control
 C) passive immunity D) active immunity
9. Which organ system in humans is most directly involved in the transport of oxygen?
- A) digestive B) excretory
 C) circulatory D) nervous

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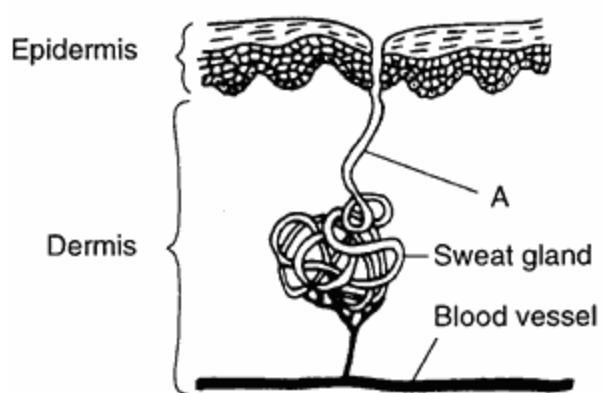
10. The diagram below represents a process that occurs in human systems.



This process is known as

- A) circulation B) excretion C) digestion D) respiration

11. The diagram below illustrates some structures of the skin

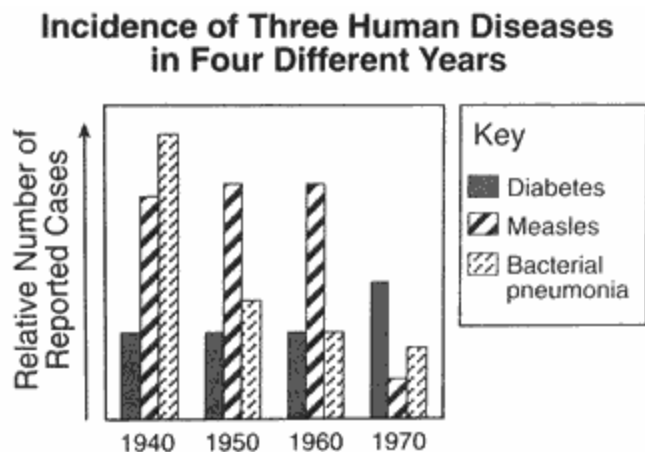


A substance that blocks structure A would directly interfere with

- A) storage of urea
B) dehydration synthesis
C) temperature regulation
D) cellular respiration
12. Which disorder could develop in the human body when the immune system attacks a usually harmless environmental substance?
- A) AIDS B) cancer
C) an infection D) an allergy
13. Enzymes and acidic juices in the stomach, which break proteins down into smaller molecules, is known as
- A) mechanical digestion
B) excretion
C) chemical digestion
D) circulation

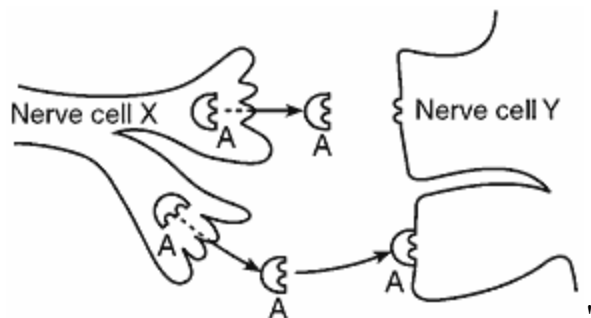
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Base your answers to questions 14 and 15 on "the graph below.



14. Which statement best explains a change in the incidence of disease in 1970?
- A) Children were vaccinated against measles.
 - B) The bacteria that cause pneumonia developed a resistance to drugs.
 - C) New drugs cured diabetes.
 - D) New technology helped to reduce the incidence of all three diseases.
15. Which statement provides the best possible reason for the decrease in number of cases of bacterial pneumonia from 1940 to 1970?
- A) The bacteria did not respond to medical treatments.
 - B) As a result of sexual reproduction, the bacteria evolved into a harmless form.
 - C) Antibiotics were made available for the treatment of bacterial infections.
 - D) As a result of genetic engineering, humans became immune to the bacteria.
16. A series of enzyme-controlled reactions that occur when platelets rupture is known as
- A) anemia
 - B) passive immunity
 - C) blood clotting
 - D) asthma
17. The human immune system fights infection by releasing
- A) antibodies
 - B) antigens
 - C) antibiotics
 - D) ATPs

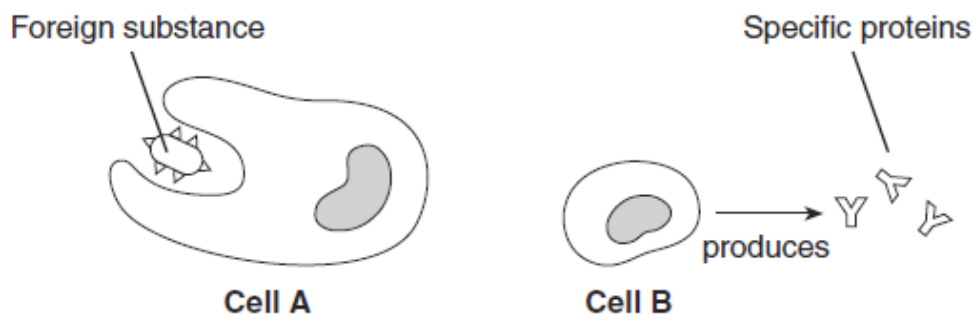
Base your answers to questions 18 through 20 on "the diagram below and on your knowledge of biology.



18. The process represented in the diagram best illustrates
- A) waste disposal
 - B) muscle contraction
 - C) cellular communication
 - D) extraction of energy from nutrients
19. Which statement best describes the diagram?
- A) Nerve cell Y is signaling nerve cell X.
 - B) Nerve cell Y contains receptor molecules for substance A.
 - C) Nerve cell X is releasing receptor molecules.
 - D) Nerve cell X is attaching to nerve cell Y.
20. A drug is developed that, due to its molecular shape, blocks the action of substance A. Which shape would the drug molecule most likely resemble?
- A)
 - B)
 - C)
 - D)
21. Which sequence represents structures organized from most complex to least complex?
- A) chloroplast → guard cell → leaf → oak tree
 - B) guard cell → chloroplast → leaf → oak tree
 - C) oak tree → leaf → guard cell → chloroplast
 - D) oak tree → guard cell → leaf → chloroplast
22. Humans breathe more rapidly during exercise than before it because during exercise the blood contains
- A) a decreased amount of hemoglobin
 - B) an increased level of oxygen
 - C) a decreased number of red blood cells
 - D) an increased level of carbon dioxide

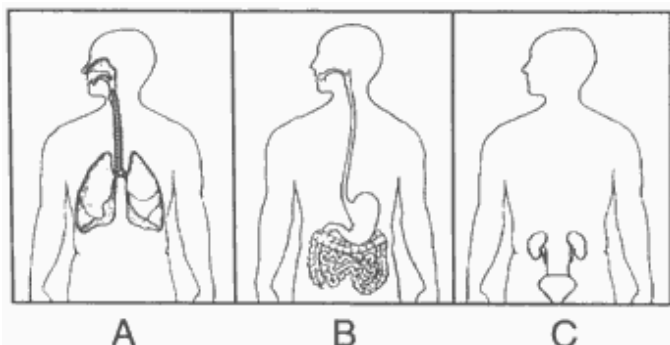
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23. The two reactions illustrated in the diagrams below often occur when a foreign substance enters the body.



The cells labeled *A* and *B* are examples of cells known as

- A) specialized skin cells B) white blood cells
C) guard cells D) reproductive cells
24. The diagram below represents three human body systems.



Which row in the chart below correctly shows what systems A, B, and C provide for the human body?

Row	System A	System B	System C
(1)	blood cells	glucose	hormones
(2)	oxygen	absorption	gametes
(3)	gas exchange	nutrients	waste removal
(4)	immunity	coordination	carbon dioxide

A) (1) B) (2) C) (3) D) (4)

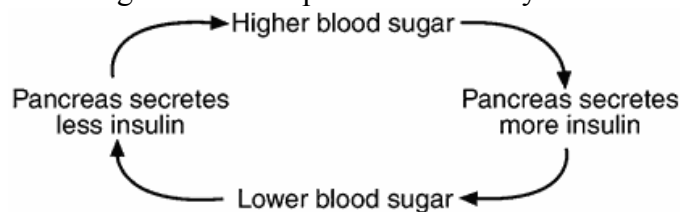
25. Insulin is a molecule, produced by the endocrine system, which regulates sugar concentration in the blood. Most likely, insulin is a

A) cell B) hormone
C) sugar D) DNA

26. Which is a correct route of an impulse in a reflex arc?

A) sensory neuron → effector → motor neuron → receptor → interneuron
B) motor neuron → sensory neuron → interneuron → effector
C) receptor → sensory neuron → interneuron → motor neuron → effector
D) effector → receptor → motor neuron → sensory neuron → interneuron

27. The diagram below shows the interaction between blood sugar levels and pancreatic activity.

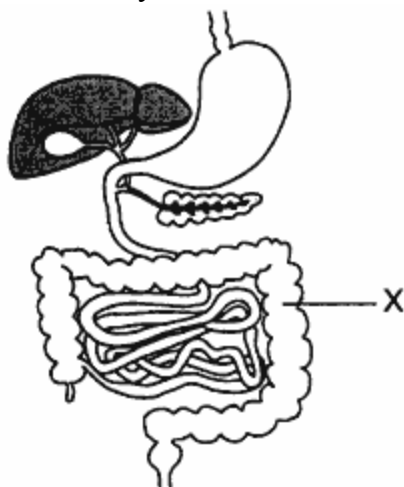


This process is an example of

A) a feedback mechanism maintaining homeostasis
B) the digestion of sugar by insulin
C) the hormonal regulation of gamete production
D) an immune system responding to prevent disease

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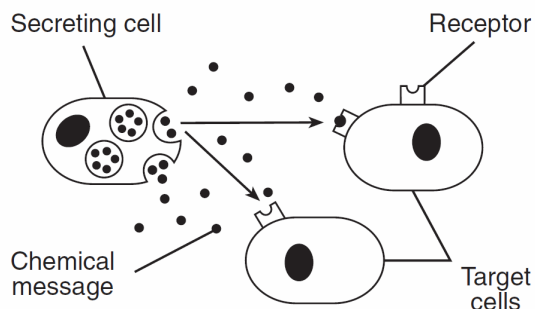
28. The diagram below represents a portion of the human body.



The principal function of structure *X* is to

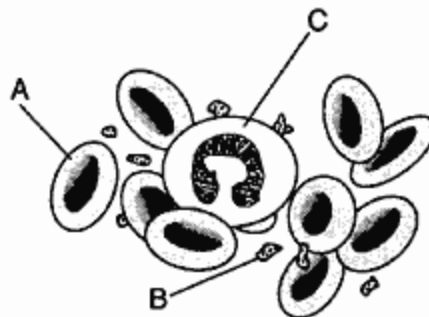
- A) secrete sex hormones
 - B) digest bile
 - C) absorb water
 - D) produce salivary enzymes
29. Newborn infants nursing from their mother receive milk containing antibodies against diseases to which the mother is immune. The infants, however, remain immune to those diseases for only a short time. This situation is an example of
- A) active immunity
 - B) a phagocytic activity
 - C) passive immunity
 - D) an oral vaccine
30. Which sequence represents structures organized from least complex to most complex?
- A) brain → nervous system → nucleus → nerve cell
 - B) nervous system → brain → nerve cell → nucleus
 - C) nucleus → nerve cell → brain → nervous system
 - D) nerve cell → nucleus → nervous system → brain
31. Secondary sex characteristics in males are regulated by
- | | |
|------------------|-------------|
| A) testosterone | B) amylase |
| C) acetylcholine | D) estrogen |

32. The diagram below shows how a chemical message produced by one cell is received by other cells.



If these chemical messages are destroyed, the target cells will

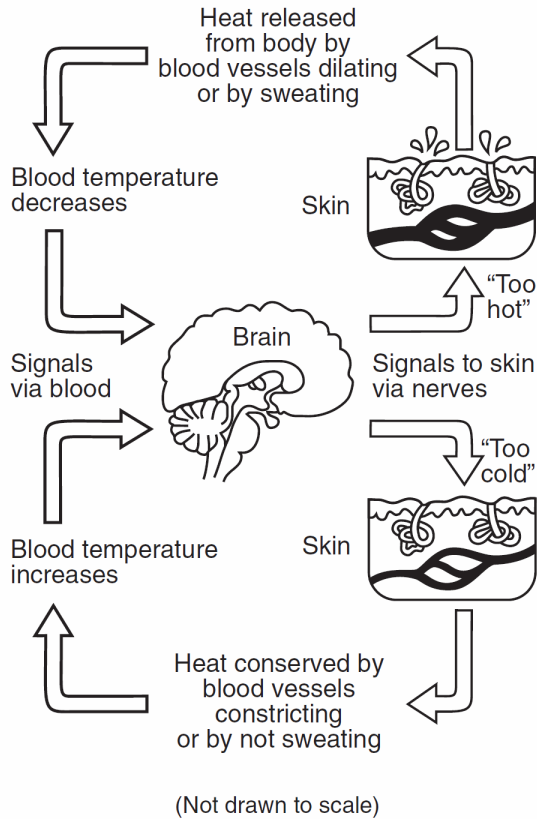
- A) no longer be produced in the organism
 - B) not respond with appropriate actions
 - C) develop different receptors
 - D) produce their own chemical messages
33. Which statement correctly describes the activities of the components of human blood shown in the diagram below?



- A) Both *A* and *B* function in immune responses, and *C* transports oxygen.
 - B) *A* transports oxygen, *B* initiates clots, and *C* functions in immune responses.
 - C) Both *B* and *C* provide immunity, and *A* transports nutrients.
 - D) *A*, *B*, and *C* are able to synthesize hemoglobin.
34. An allergic reaction to certain types of natural, unprocessed foods, such as peanuts, is caused by
- A) a lack of digestive enzymes
 - B) microorganisms living within the food
 - C) a response to specific antigens
 - D) high levels of carbon dioxide in the air

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35. Activities in the human body are represented in the diagram below



Source: Campbell and Reece,
Biology, 6th edition (adapted)

Which title would be appropriate for the diagram?

- A) The Nervous System Responds to Changes in Blood Sugar Levels
- B) Feedback Mechanisms Help to Maintain Homeostasis
- C) Rate of Excretion Varies in Response to Amount of Water Taken In
- D) Respiratory Rate Responds to an Increase in Muscle Activity

36. Which statement best describes an immune response?

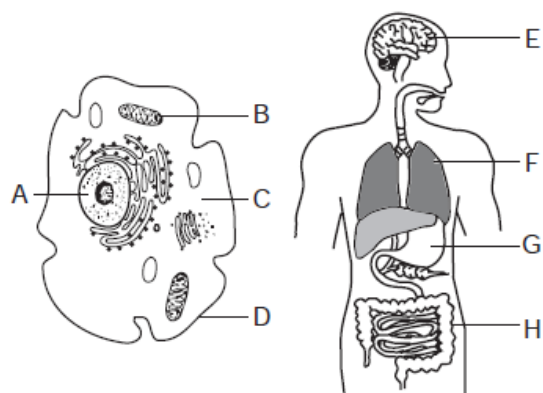
- A) It releases red blood cells that destroy parasites.
- B) It usually involves the recognition and destruction of pathogens.
- C) It always produces antibiotics.
- D) It stimulates asexual reproduction and resistance in pathogens.

37. The kidney is an organ that collects wastes and excess water from the blood and sends them to the bladder where they are stored before being removed from the body. Which two systems work together to perform this function?

- A) circulatory and excretory
- B) immune and respiratory
- C) digestive and circulatory
- D) skeletal and nervous

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Base your answers to questions 38 and 39 on the diagrams below and on your knowledge of biology. The diagrams represent a single-celled organism and a multicellular organism.



38. Which statement correctly identifies the levels of organization for the structures indicated?

- A) *A* and *B* are organelles; *E* and *G* are organs.
- B) *A* and *B* are tissues; *E* and *G* are organs.
- C) *A* and *B* are tissues; *E* and *G* are organelles.
- D) *A* and *B* are organs; *E* and *G* are systems.

39. Rotenone is an insecticide that is toxic to humans as well as to insects. Rotenone interferes with the process of ATP production in the cell. Which row in the chart below correctly identifies the structure where ATP is produced and the reason it is affected by rotenone?

Row	Structure	Reason Affected
(1)	A	It would be unable to store enzymes for ATP production.
(2)	B	Production of ATP would occur less efficiently.
(3)	C	The raw materials used for ATP production would be altered.
(4)	D	Absorption of the ATP would increase here.

- A) 1 B) 4 C) 2 D) 3

40. One similarity between cell receptors and antibodies is that both

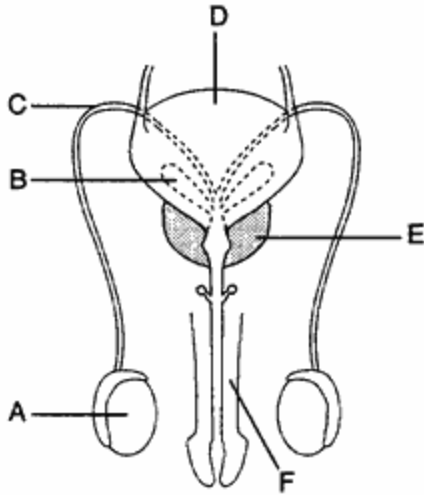
- A) are produced by nerve cells
- B) are involved in digestion
- C) slow the rates of chemical reactions
- D) are highly specific in their actions

41. An individual eats a hamburger. Which two systems must interact to transfer the nutrients in the hamburger to human muscle tissue?

- A) digestive and circulatory
- B) digestive and immune
- C) circulatory and respiratory
- D) respiratory and excretory

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42. Base your answer to the following question on "the diagram below.



Which letter indicates a structure that is *not* involved in the production or delivery of gametes?

- A) A B) B C) C D) D E) F

43. Which part of the blood is correctly paired with its function?

- A) platelets – produce antibodies
- B) plasma – transports wastes and hormones
- C) white blood cells – carry oxygen
- D) red blood cells – fight infection

44. What is a major difference between red blood cells and white blood cells?

- A) Red blood cells contain hemoglobin, but white blood cells do not.
- B) Red blood cells contain nuclei, but white blood cells do not.
- C) Red blood cells engulf foreign bacteria, but white blood cells do not.
- D) Red blood cells can move, but white blood cells cannot.

45. In 1995, during an Ebola virus outbreak, approximately 80% of the infected individuals died. Which statement is an inference that could be made based on this information?

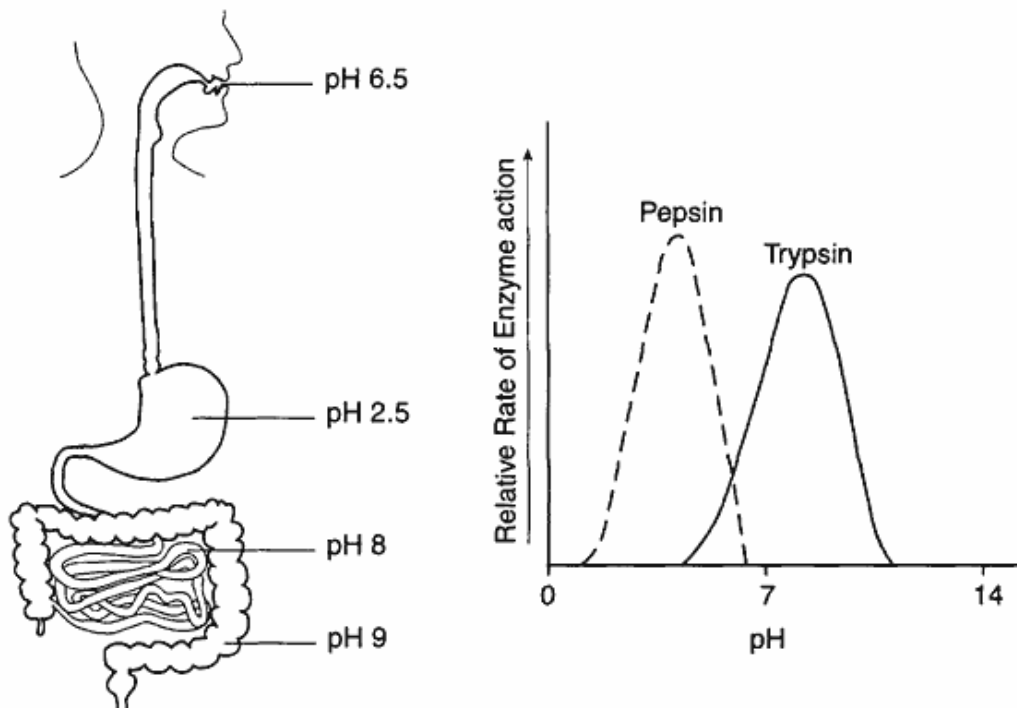
- A) The individuals who survived were not exposed to the Ebola antigens
- B) The individuals who survived were able to produce antibodies against the Ebola virus
- C) Eighty percent of the population was infected with a viral antigen.
- D) Eighty percent of the population had a natural immunity to the Ebola virus.

46. A student received a flu shot in the fall. During the flu season, the student caught a cold. The most likely reason the vaccine he received did not prevent the cold was that

- A) his illness was not caused by a pathogen
- B) the vaccine he received contained only flu virus antigens
- C) he did not get the vaccine at the right time of year
- D) his body produced antibiotics in response to the vaccine

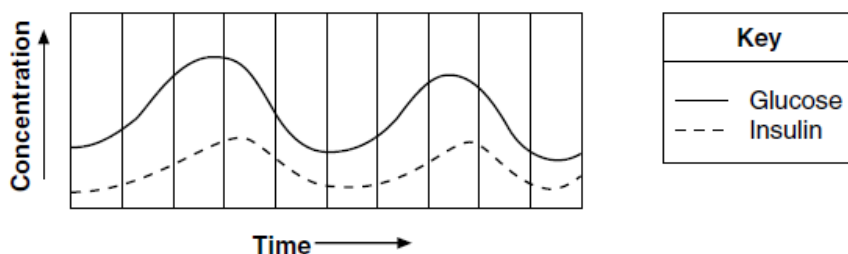
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47. Base your answer to the following question on the diagram and graph below and on your knowledge of biology. The diagram represents the human digestive system. Pepsin and trypsin are human digestive enzymes.



The graph indicates that pepsin would function best in the

- A) large intestine B) stomach C) small intestine D) mouth
48. The diagram below represents levels of glucose and insulin found within the bloodstream of a healthy person throughout the course of the day.

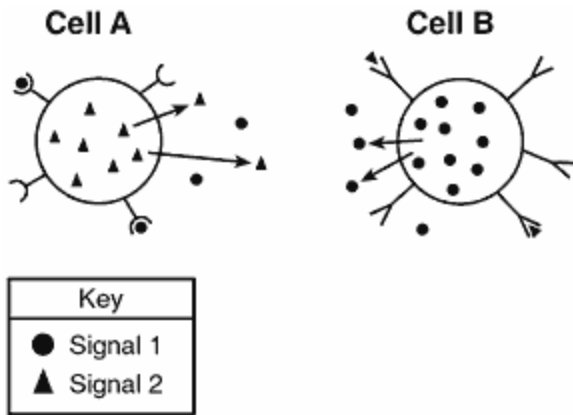


The increase in insulin levels following an increase in glucose levels in the blood can best be explained by

- A) insulin being released into the blood to digest glucose
B) an excess of glucose-stimulating guard cells
C) a feedback mechanism that regulates blood glucose levels
D) a response of the immune system to lower excess blood glucose levels

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49. Cellular communication is illustrated in the diagram below.



Information can be sent from

- A) cell *A* to cell *B* because cell *A* is able to recognize signal 2
- B) cell *A* to cell *B* because cell *B* is able to recognize signal 1
- C) cell *B* to cell *A* because cell *B* is able to recognize signal 2
- D) cell *B* to cell *A* because cell *A* is able to recognize signal 1