

1. A fully functioning enzyme molecule is arranged in a complex three-dimensional shape. This shape determines the

- A) **specific type of molecule it interacts with during a reaction**
- B) rate at which the enzyme breaks down during a reaction it regulates
- C) pH of all body systems
- D) temperature of the products of the reaction it regulates

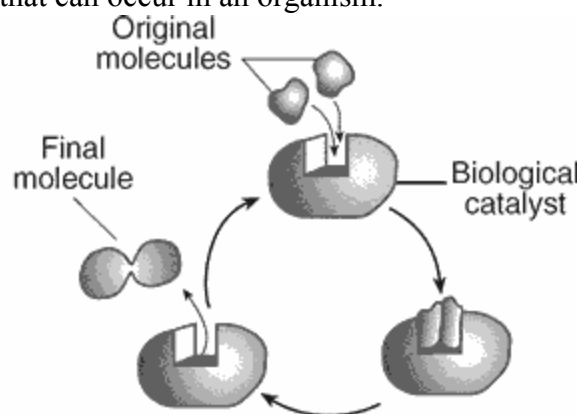
2. A scientist plans to cut a segment of DNA so that it can be inserted into the DNA of a bacterium, a single-celled organism. The scientist needs to use a special type of organic molecule to perform this cutting process. This molecule is

- A) a lipid
- B) a carbohydrate
- C) **an enzyme**
- D) a hormone

3. Which statement best describes enzymes?

- A) Every enzyme controls many different reactions.
- B) **The rate of activity of an enzyme might change as pH changes.**
- C) Temperature changes do not affect enzymes.
- D) Enzymes are produced from the building blocks of carbohydrates.

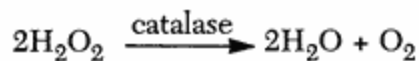
4. The diagram below represents a series of reactions that can occur in an organism.



This diagram best illustrates the relationship between

- A) **enzymes and synthesis**
- B) amino acids and glucose
- C) antigens and immunity
- D) ribosomes and sugars

5. Hydrogen peroxide (H_2O_2) is a toxic by-product of cellular metabolism in aerobic organisms. The reaction below occurs within the cells to prevent the accumulation of hydrogen peroxide.

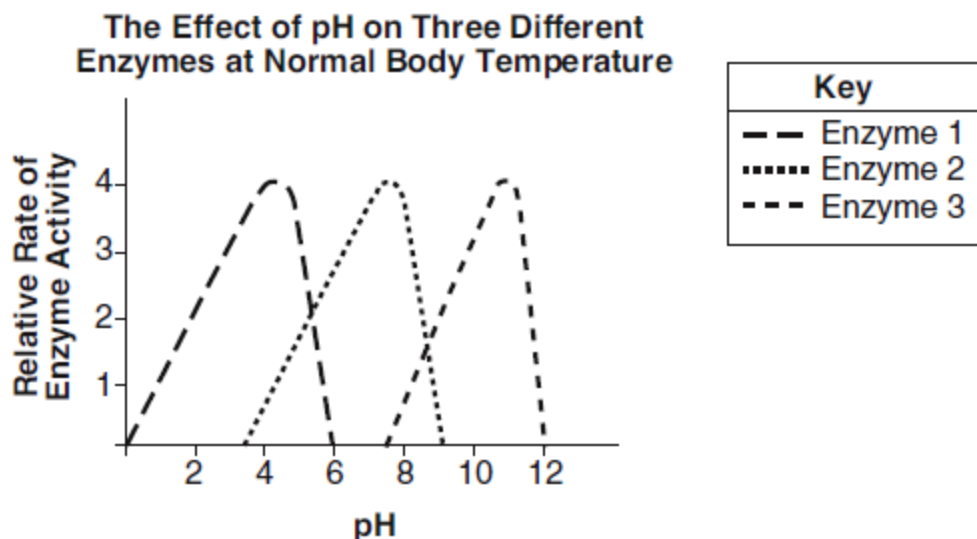


In this reaction, catalase functions as an

- A) **enzyme in the breakdown of hydrogen peroxide**
- B) enzyme in the synthesis of hydrogen peroxide
- C) emulsifier in the digestion of hydrogen peroxide
- D) indicator in the detection of hydrogen peroxide

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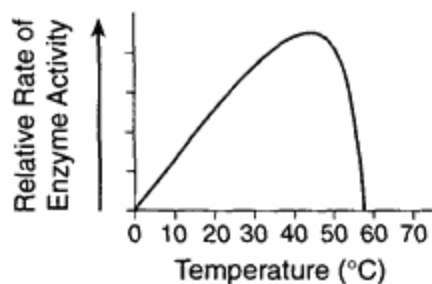
6. The graph below represents the effect of pH on three different enzymes at normal body temperature.



The graph illustrates that enzymes 1, 2, and 3

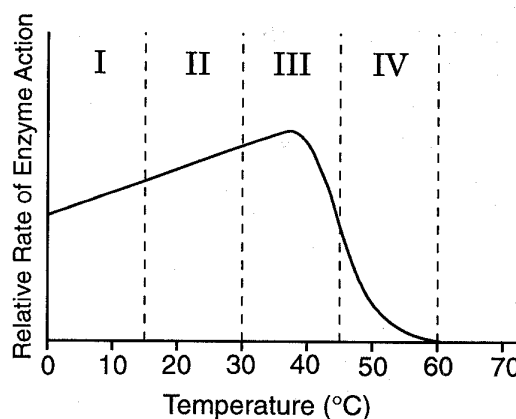
- A) are not affected by pH
- B) **work best at different pH levels**
- C) work best in an acidic environment
- D) work best in a basic environment

7. Which statement is a valid conclusion based on the information in the graph below?



- A) The maximum rate of human digestion occurs at about 45° C.
- B) The maximum rate of human respiration occurs at about 57° C.
- C) **Temperature can influence the action of an enzyme.**
- D) Growth can be controlled by enzyme action.

8. Base your answer to the following question on the graph below and on your knowledge of biology.



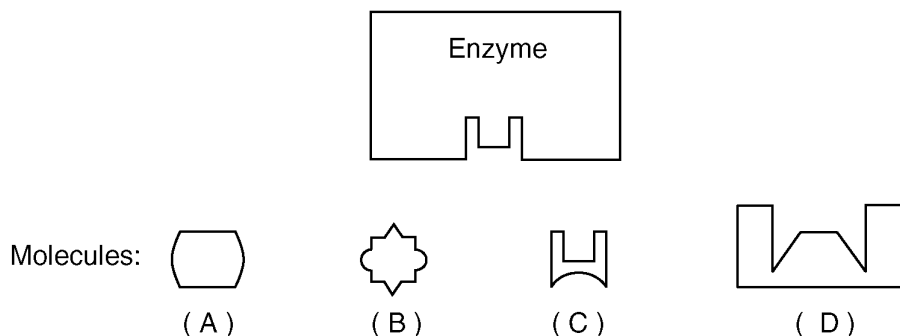
Which section of the graph includes the point at which the enzyme **started** to denature?

- A) I
- B) II
- C) **III**
- D) IV

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9. Base your answer to the following question on the information below.

An enzyme and four different molecules are shown in the diagram below.



The enzyme would most likely affect reactions involving

- A) molecule *A*, only
B) **molecule *C*, only**
C) molecules *B* and *D*
D) molecules *A* and *C*

10. Which activity completes an enzyme-controlled reaction?

- A) synthesis of coenzymes by enzymes
B) initial formation of an enzyme-substrate complex
C) **separation of the enzyme and the products of the reaction**
D) destruction of the enzyme

11. Most organisms contain

- A) organic compounds, only
B) inorganic compounds, only
C) **both organic and inorganic compounds**
D) neither organic nor inorganic compounds

12. Which compound is inorganic?

- A) glucose ($C_6H_{12}O_6$)
B) **carbon dioxide (CO_2)**
C) ethane (C_2H_6)
D) stearic acid ($C_{18}H_{36}O_2$)

13. Which elements are present in all organic compounds?

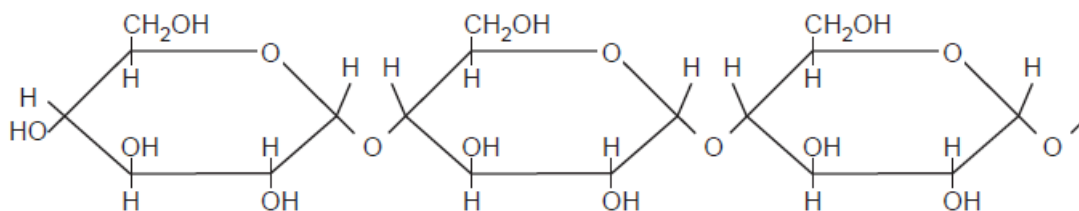
- A) hydrogen and oxygen
B) nitrogen and oxygen
C) nitrogen and carbon
D) **hydrogen and carbon**

14. Which substance plays a major role in most of the chemical reactions that occur in a living cell?

- A) **water**
B) glycogen
C) glycerol
D) maltose

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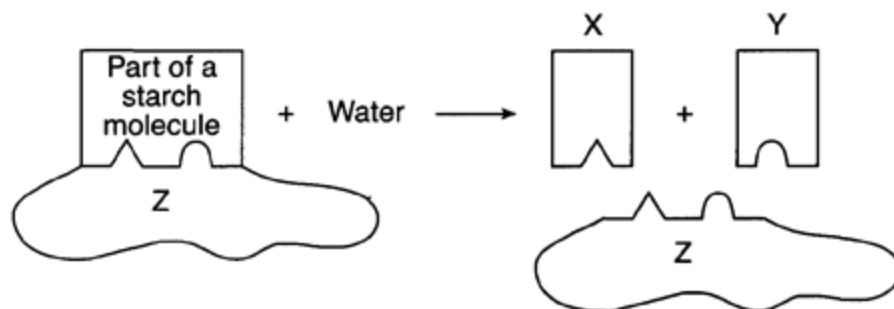
15. Base your answer to the following question on the diagram below and on your knowledge of biology. The diagram represents a portion of a starch molecule.



The building blocks for this molecule are

- A) amino acids
B) **simple sugars**
C) fats
D) molecular bases

16. An energy-rich organic compound needed by organisms is
- A) water B) salt
C) oxygen **D) glucose**
17. Base your answer to the following question on the diagram below, which represents a chemical reaction that occurs in the human body, and on your knowledge of biology.
19. Butter and oil are examples of food composed of
- A) carbohydrates **B) lipids**
C) proteins D) nucleotides



Substances X and Y are examples of which kind of molecule?

- A) simple sugar B) amino acid C) fat D) hormone

18. More energy can be released from a fat molecule than from a glucose molecule because the fat molecule contains more

 - A) genes
 - B) organic compounds
 - C) chemical bonds**
 - D) mitochondria

20. In living organisms, lipids function mainly as

 - A) sources of stored energy and transmitters of genetic information
 - B) sources of stored energy and components of cellular membranes**
 - C) transmitters of genetic information and catalysts of chemical reactions
 - D) catalysts of chemical reactions and components of cellular membranes

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21. Which statement best describes some protein molecules in a cell?

- A) **Proteins are long, folded chains that can form various cell parts.**
- B) Proteins are composed of four different starches that direct cell activity.
- C) Proteins are long, twisted strands of glucose that regulate cells.
- D) Proteins are genetically diverse substances that are synthesized in the nucleus.

22. The basic building blocks of a protein are

- A) glucose molecules **B) amino acids**
- C) hormones D) fats

23. Enzymes are a type of

- A) Carbohydrate **B) Protein**
- C) Nucleotide D) Fatty acid

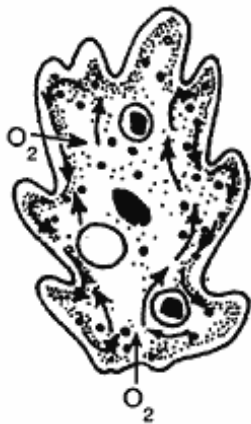
24. The way a protein molecule is folded determines the shape of the molecule, which determines the

- A) function of that protein**
- B) structure of ATP containing that protein
- C) type of simple sugars in that protein
- D) amino acids in that protein

25. Which pH value indicates the most acidic condition?

- A) 1.6** B) 2.1 C) 7.3 D) 11.1

26. Which life process is indicated by the arrows in the diagram of an amoeba shown below?



- A) digestion B) excretion
- C) fermentation **D) transport**

27. An iodine test of a tomato plant leaf revealed that starch was present at 5:00 p.m. on a sunny afternoon in July. When a similar leaf from the same tomato plant was tested with iodine at 6:00 a.m. the next morning, the test indicated that less starch was present. This reduction in starch content most likely occurred because starch was

- A) changed directly into proteins
- B) transported out of the leaves through the guard cells
- C) transported downward toward the roots through tubes
- D) changed into simple sugars**

28. Nutrition involves those activities by which organisms

- A) remove cellular waste products
- B) obtain and process materials needed for other activities**
- C) exchange gases with their environment
- D) absorb and circulate materials

29. Which process is a form of autotrophic nutrition?

- A) transport B) regulation
- C) fermentation **D) photosynthesis**

30. The delivery of oxygenated blood to all tissues around the body involves what two life functions?

- A) Digestive and circulatory
- B) Digestive and respiratory
- C) Respiratory and circulatory**
- D) Excretory and circulatory

31. During gas exchange, the cell membrane of a single-celled organism has the same function as which organ system in humans?

- A) nervous B) reproductive
- C) digestive **D) respiratory**

32. Which of the following is the primary nutrient used in metabolism?

- A) Sugar** B) Lipids
- C) Proteins D) genetic material

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33. Living organisms can best be distinguished from nonliving things by determining the presence or absence of

- A) carbon atoms
- B) oxygen atoms
- C) metabolic activities**
- D) chemical reactions

34. Which term includes all the activities required to keep an organism alive?

- A) growth
- B) excretion
- C) metabolism**
- D) nutrition

35. Which group contains only molecules that are each assembled from smaller organic compounds?

- A) proteins, water, DNA, fats
- B) proteins, starch, carbon dioxide, water
- C) proteins, DNA, fats, starch**
- D) proteins, carbon dioxide, DNA, starch

36. Organisms combine simple molecules to form complex molecules by the process of

- A) ingestion
- B) synthesis**
- C) regulation
- D) hydrolysis

37. The chart below contains information about some structures found in single-celled organisms

Cell Structures

Structure	Function
contractile vacuole	maintains water balance
flagellum	movement
chloroplast	food production

The information in this chart best illustrates the biological concept that

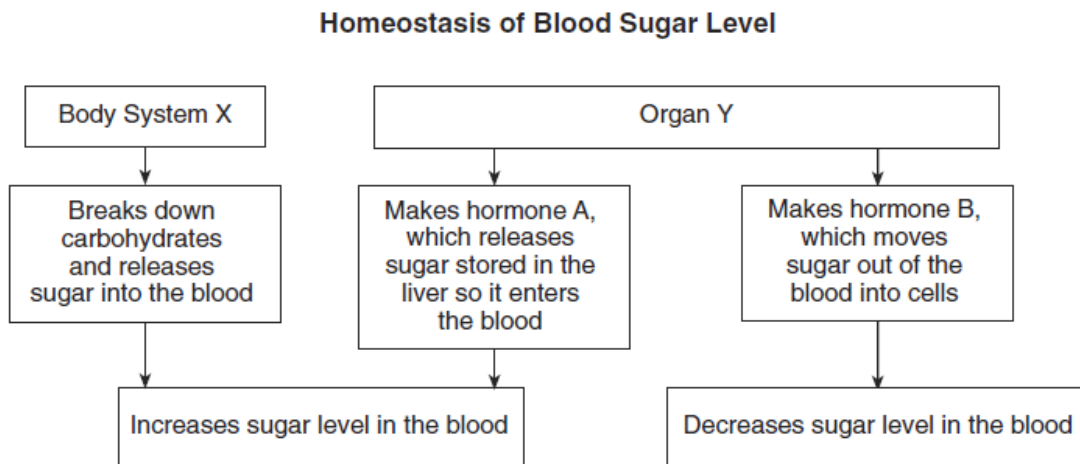
- A) all single-celled organisms contain contractile vacuoles, a flagellum, and chloroplasts
- B) single-celled organisms contain structures that function in maintaining homeostasis**
- C) the organs found in complex organisms evolved from these three structures
- D) multicellular organisms do not contain any cell structures

38. When the human body is responding to stress, the hormone adrenaline is released. A short time later, the body returns to normal. This is an example of how a human

- A) reacts to an antibody
- B) develops genetic variation in body cells
- C) maintains cellular organization
- D) maintains dynamic equilibrium**

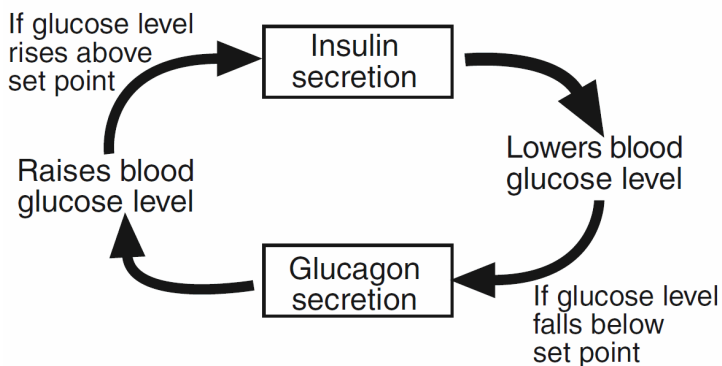
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39. Base your answer to the following question on the diagram below and on your knowledge of biology. This diagram represents the roles of different parts of the human body in keeping blood sugar at a balanced, normal level over time.



When body system *X* releases too much sugar into the blood, the body can maintain homeostasis by making

- A) **more hormone A, only** B) more hormone *B*, only
C) more hormone *A* and more hormone *B* D) no hormone *A* and no hormone *B*
40. The diagram below represents a sequence of events that occurs in the human body throughout the day.

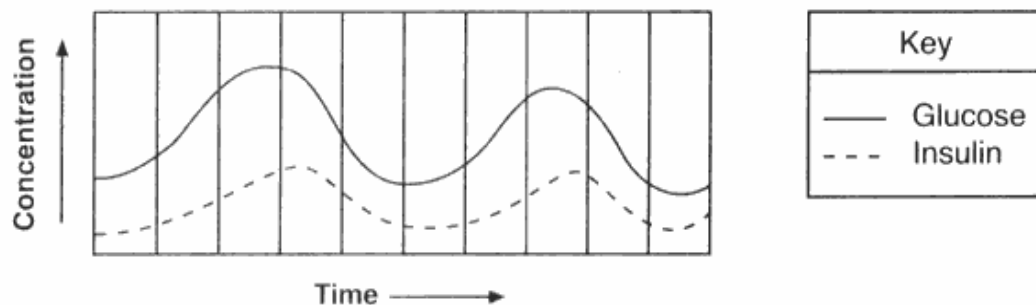


These events can best be described as an example of

- A) an energy cycle B) recycling of inorganic materials
C) **a feedback mechanism** D) a learned behavior

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41. The graph below shows the levels of glucose and insulin in the blood of a human over a period of time.

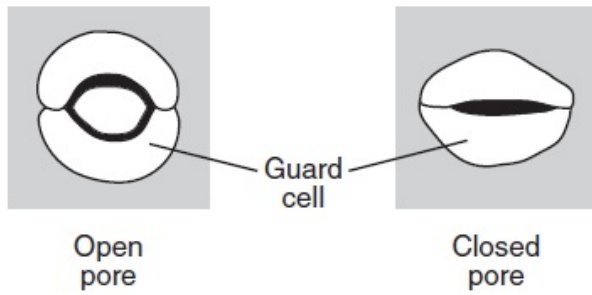


This graph represents

- A) an allergic reaction B) nutrition
C) **maintenance of dynamic equilibrium** D) photosynthesis
42. Excretion is best described as the removal of
- A) **metabolic wastes from a cell**
B) toxic wastes by the process of cyclosis
C) water molecules from dipeptide hydrolysis
D) undigested material from the digestive tract
43. The list below includes three organ systems that are directly used when a human runs.
- circulatory system
muscular system
skeletal system
- Which system should also be included in the list?
- A) immune system
B) reproductive system
C) digestive system
D) **nervous system**
44. The life function responsible for the coordination and control of all life activities in an organism is known as
- A) **regulation** B) reproduction
C) excretion D) nutrition
45. Rabbits have evolved strategies that get them through periods of time when there is little food. The diagram below represents essential life functions that rabbits need to perform.
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- Which life function in the diagram could be eliminated without affecting an individual rabbit's ability to survive when food is scarce?
- A) digestion B) excretion
C) circulation D) **reproduction**
46. Which life activity is *not* required for the survival of an individual organism
- A) nutrition B) respiration
C) **reproduction** D) synthesis

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47. The diagram below represents a change in guard cells that open and close pores in a plant.



This change directly helps to

- A) increase heterotrophic nutrition
- B) absorb minerals
- C) **regulate water loss**
- D) reduce seed production

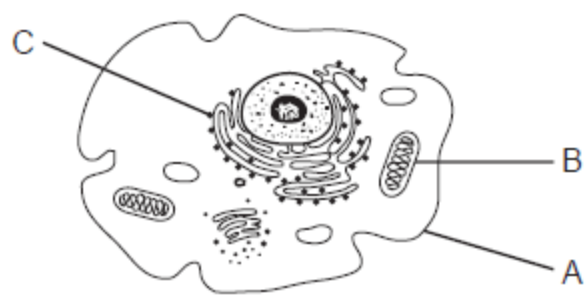
48. The diagram below represents a cell that produces digestive enzymes.



Which cellular structure would be the most likely location for the synthesis of these enzymes?

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

49. Structures in an animal cell are represented in the diagram below.



Which row in the chart correctly identifies the functions of structures *A*, *B*, and *C*?

Row	Structure A	Structure B	Structure C
(1)	waste removal	extract energy from nutrients	protein synthesis
(2)	information storage	transport of materials	storage of liquids
(3)	protein synthesis	storage of wastes	reproduction
(4)	cell communication	transport of materials	waste removal

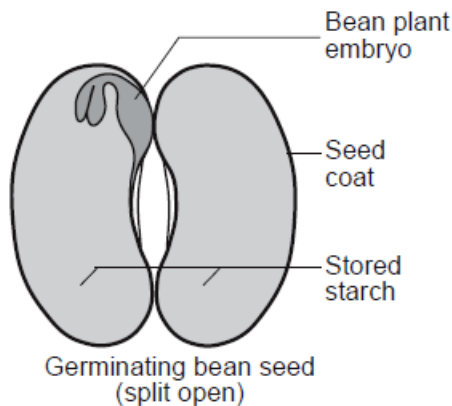
- A) 1 B) 2 C) 3 D) 4
-

50. An ameba, a one-celled organism, can move, ingest, and transport materials within the cell, because it has

- A) organs **B) organelles**
C) tissues D) systems

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Base your answers to questions 51 and 52 on the diagram and information below and on your knowledge of biology. The diagram represents a germinating bean seed that has been split open.



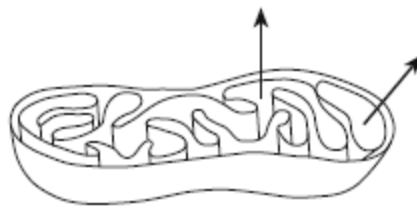
51. Plants are able to continue to grow and develop once the starch supply in the seed is gone, because they

- A) develop roots to absorb starch from the environment
- B) grow leaves, which use light energy for cell respiration
- C) have chloroplasts and use light energy to make more food**
- D) produce more seeds, which contain additional food reserves

52. When water is available and growth begins, the plant embryo inside the seed secretes enzymes to digest the starch stored in the seed. The enzymes in cells of the plant embryo are produced directly by the

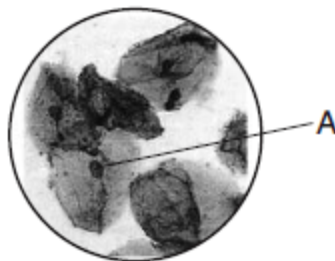
- | | |
|---------------------|-------------|
| A) ribosomes | B) nuclei |
| C) mitochondria | D) vacuoles |
-

53. The diagram below represents a cell structure involved in converting energy stored in organic molecules into a form used by animal cells.



The arrows represent the movement of which substances?

- A) carbon dioxide and sugar
 - B) oxygen and ATP
 - C) ATP and carbon dioxide**
 - D) oxygen and sugar
54. A photograph of human cells as seen with a compound light microscope is shown below. A cell structure is labeled *A*.

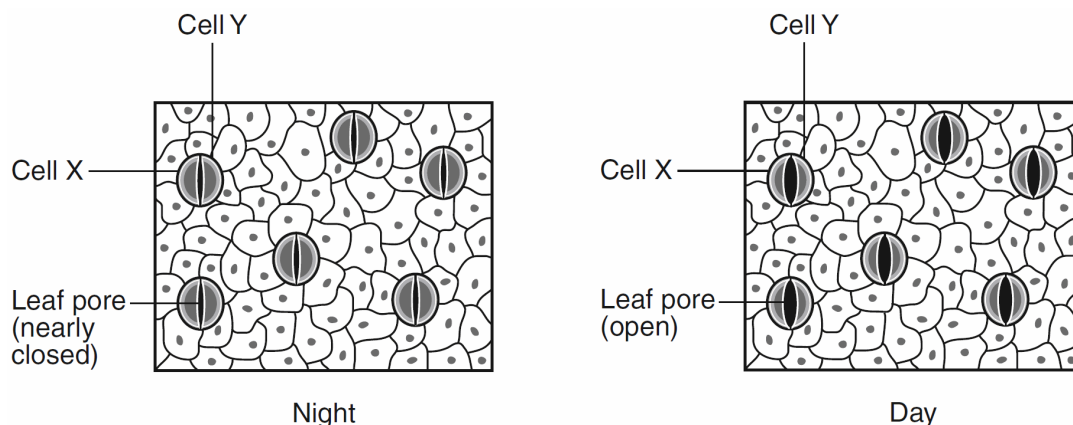


Structure *A* is most likely a

- A) mitochondrion that synthesizes food for the cell
- B) nucleus that is the site of food storage
- C) mitochondrion that absorbs energy from the Sun
- D) nucleus that is responsible for the storage of information**

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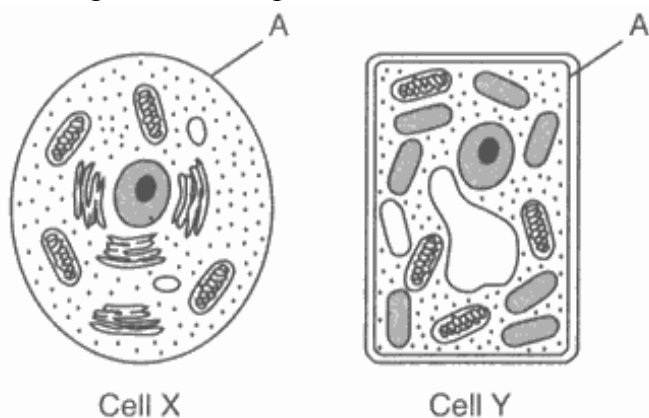
55. The diagram below represents changes in the sizes of openings present in leaves as a result of the actions of cells *X* and *Y*.



The actions of cells *X* and *Y* help the plant to

- A) maintain homeostasis by controlling water loss
- B) store excess heat during the day and remove the heat at night
- C) absorb light energy necessary for cellular respiration
- D) detect changes in the biotic factors present in the environment

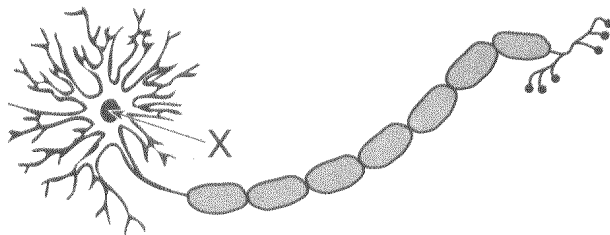
56. The diagram below represents two cells, *X* and *Y*.



Which statement is correct concerning the structure labeled A?

- A) It aids in the removal of metabolic wastes in both cell *X* and cell *Y*.
- B) It is involved in cell communication in cell *X*, but not in cell *Y*.
- C) It prevents the absorption of CO₂ in cell *X* and O₂ in cell *Y*.
- D) It represents the cell wall in cell *X* and the cell membrane in cell *Y*.

57. Base your answer to the following question on the diagram below of a cell associated with coordination and on your knowledge of biology.



Structure X would be involved in the

- A) storage of digestive enzymes
- B) absorption of energy from the Sun
- C) development of pathogens
- D) synthesis of proteins

Answer Key
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1. **A**
2. **C**
3. **B**
4. **A**
5. **A**
6. **B**
7. **C**
8. **C**
9. **B**
10. **C**
11. **C**
12. **B**
13. **D**
14. **A**
15. **B**
16. **D**
17. **A**
18. **C**
19. **B**
20. **B**
21. **A**
22. **B**
23. **B**
24. **A**
25. **A**
26. **D**
27. **D**
28. **B**
29. **D**
30. **C**
31. **D**
32. **A**
33. **C**
34. **C**
35. **C**
36. **B**

37. **B**
 38. **D**
 39. **A**
 40. **C**
 41. **C**
 42. **A**
 43. **D**
 44. **A**
 45. **D**
 46. **C**
 47. **C**
 48. **A**
 49. **A**
 50. **B**
 51. **C**
 52. **A**
 53. **C**
 54. **D**
 55. **A**
 56. **A**
 57. **D**
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