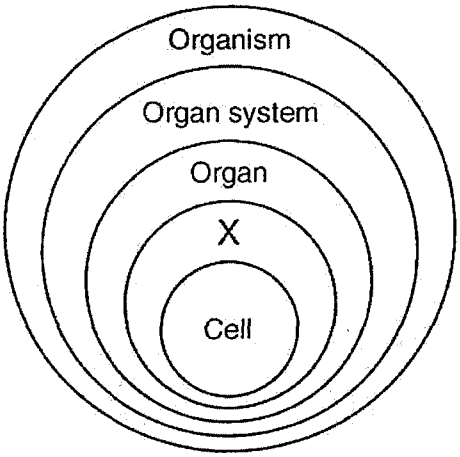
1. The diagram below represents levels of organization in living things.



Which term would best represent *X*?
1) human
2) tissue
3) stomach
4) organelle

2. Which sequence of terms is in the correct order from simplest to most complex?
1) cells → tissues → organs → organ systems
2) tissues → organisms → cells → organ systems
3) cells → tissues → organ systems → organs
4) organs → organisms → organ systems → cells

3. The respiratory system includes a layer of cells in the air passages that clean the air before it gets to the lungs. This layer of cells is best classified as
1) a tissue
2) an organ
3) an organelle
4) an organ system

4. A human liver cell and a human skin cell in the same person have the same genetic sequences. However, these cells are different because the liver cell
1) has more dominant traits than the skin cell
2) can reproduce but the skin cell cannot
3) carries out respiration but the skin cell does not
4) uses different genes than the skin cell

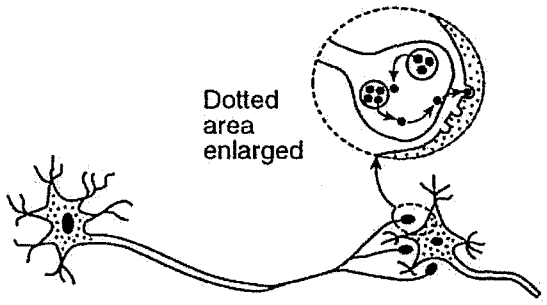
5. Humans require organ systems to carry out life processes. Single-celled organisms do not have organ systems and yet they are able to carry out life processes. This is because
1) human organ systems lack the organelles found in single-celled organisms
2) a human cell is more efficient than the cell of a single-celled organism
3) it is not necessary for single-celled organisms to maintain homeostasis
4) organelles present in single-celled organisms act in a manner similar to organ systems

6. The table below provides some information concerning organelles and organs.

Function	Organelle	Organ
gas exchange	cell membrane	lung
nutrition	food vacuole	stomach

Based on this information, which statement accurately compares organelles to organs?
1) Functions are carried out more efficiently by organs than by organelles.
2) Organs maintain homeostasis while organelles do not.
3) Organelles carry out functions similar to those of organs.
4) Organelles function in multicellular organisms while organs function in single-celled organisms

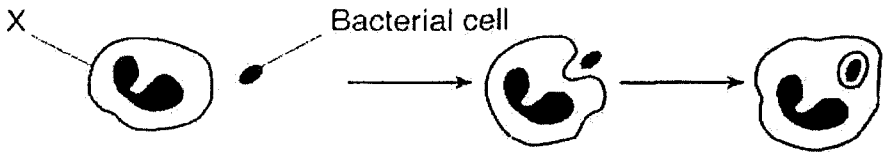
7. A process that occurs in the human body is represented in the diagram below.



Which statement is most closely associated with the diagram?
1) Small molecules are obtained from large molecules during digestion.
2) Certain molecules are replicated by means of a template.
3) Receptor molecules play an important role in communication between cells.
4) Energy from nutrients is utilized for waste disposal.

8. In some people, substances such as peanuts, eggs, and milk cause an immune response. This response to usually harmless substances is most similar to the
1) action of the heart as the intensity of exercise increases
2) mechanism that regulates the activity of guard cells
3) action of white blood cells when certain bacteria enter the body
4) mechanism that maintains the proper level of antibiotics in the blood

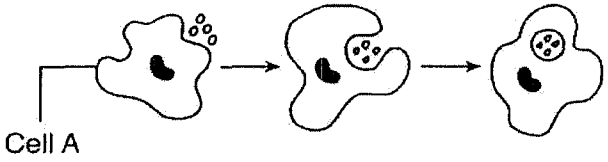
9. The diagram below shows a cell in the human body engulfing a bacterial cell.



The cell labeled *X* is most likely a

1) red blood cell 2) white blood cell 3) liver cell 4) nerve cell

10. The diagram below represents an event that occurs in the blood.



Which statement best describes this event?

1) Cell *A* is a white blood cell releasing antigens to destroy bacteria.
2) Cell *A* is a cancer cell produced by the immune system and it is helping to prevent disease.
3) Cell *A* is a white blood cell engulfing disease- causing organisms.
4) Cell *A* is protecting bacteria so they can reproduce without being destroyed by predators.

11. Some human white blood cells help destroy pathogenic bacteria by

1) causing mutations in the bacteria
2) engulfing and digesting the bacteria
3) producing toxins that compete with bacterial toxins
4) inserting part of their DNA into the bacterial cells

12. The immune system of humans may respond to chemicals on the surface of an invading organism by

1) releasing hormones that break down these chemicals
2) synthesizing antibodies that mark these organisms to be destroyed
3) secreting antibiotics that attach to these organisms
4) altering a DNA sequence in these organisms

13. A vaccine used against an infectious disease may contain

1) specialized blood cells 3) a variety of antibiotics
2) toxic enzymes 4) weakened pathogens

14. The virus that causes AIDS is damaging to the body because it

1) targets cells that fight invading microbes
2) attacks specific red blood cells
3) causes an abnormally high insulin level
4) prevents the normal transmission of nerve impulses

15. To replace burned skin, doctors can successfully transplant replacement skin taken from another part of the body of the burn victim. Which statement best explains why the transplanted skin is *not* rejected?

1) The transplanted skin is damaged, making the immune system nonfunctional.
2) The antigens of the replacement skin are the same as those of the damaged skin.
3) Burn victims lose so much blood that white blood cells cannot cause an immune response.
4) There is no blood supply to the skin, so mixing of antigens does not occur.

16. 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?

1) The individuals who survived were able to produce antibodies against the Ebola virus
2) The individuals who survived were not exposed to the Ebola antigens
3) Eighty percent of the population had a natural immunity to the Ebola virus.
4) Eighty percent of the population was infected with a viral antigen.

17. To increase chances for a successful organ transplant, the person receiving the organ should be given special medications. The purpose of these medications is to

1) increase the immune response in the person receiving the transplant
2) decrease the immune response in the person receiving the transplant
3) decrease mutations in the person receiving the transplant
4) increase mutations in the person receiving the transplant

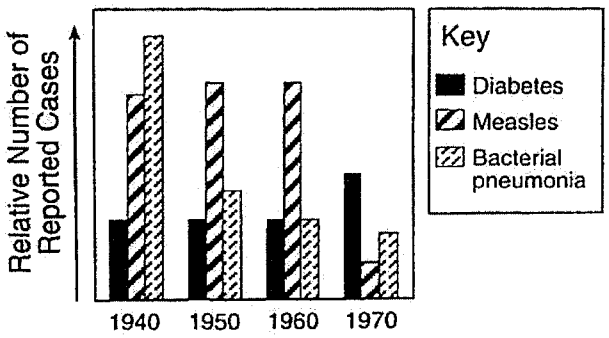
18. Vaccinations help prepare the body to fight invasions of a specific pathogen by

1) inhibiting antigen production
2) stimulating antibody production
3) inhibiting white blood cell production
4) stimulating red blood cell production

19. Which statement best describes how a vaccination can help protect the body against disease?
    1) Vaccines directly kill the pathogen that causes the disease.
    2) Vaccines act as a medicine that cures the disease.
    3) Vaccines cause the production of specific molecules that will react with and destroy certain microbes.
    4) Vaccines contain white blood cells that engulf harmful germs and prevent them from spreading throughout the body.

Base your answers to questions 20 through 22 on the graph below and on your knowledge of biology.

Incidence of Three Human Diseases in Four Different Years



20. Which statement provides the best possible reason for the decrease in number of cases of bacterial pneumonia from 1940 to 1970?
    1) As a result of genetic engineering, humans became immune to the bacteria.
    2) Antibiotics were made available for the treatment of bacterial infections.
    3) The bacteria did not respond to medical treatments.
    4) As a result of sexual reproduction, the bacteria evolved into a harmless form.

21. The greatest difference between the incidence of measles and the incidence of bacterial pneumonia occurred in
    1) 1940
    2) 1950
    3) 1960
    4) 1970

22. Which statement best explains a change in the incidence of disease in 1970?
    1) Children were vaccinated against measles.
    2) New drugs cured diabetes.
    3) The bacteria that cause pneumonia developed a resistance to drugs.
    4) New technology helped to reduce the incidence of all three diseases.

23. Which transplant method would prevent the rejection of tissue after an organ transplant?
    1) using organs cloned from the cells of the patient
    2) using organs produced by genetic engineering to get rid of all proteins in the donated organs
    3) using organs only from pigs or monkeys
    4) using an organ donated by a close relative because the proteins will always be identical to those of the recipient

24. Certain microbes, foreign tissues, and some cancerous cells can cause immune responses in the human body because all three contain
    1) antigens
    2) enzymes
    3) fats
    4) cytoplasm

25. Scientific studies have indicated that there is a higher percentage of allergies in babies fed formula containing cow's milk than in breast-fed babies. Which statement represents a valid inference made from these studies?
    1) Milk from cows causes allergic reactions in all infants.
    2) Breast feeding prevents all allergies from occurring.
    3) There is no relationship between drinking cow's milk and having allergies.
    4) Breast milk most likely contains fewer substances that trigger allergies.

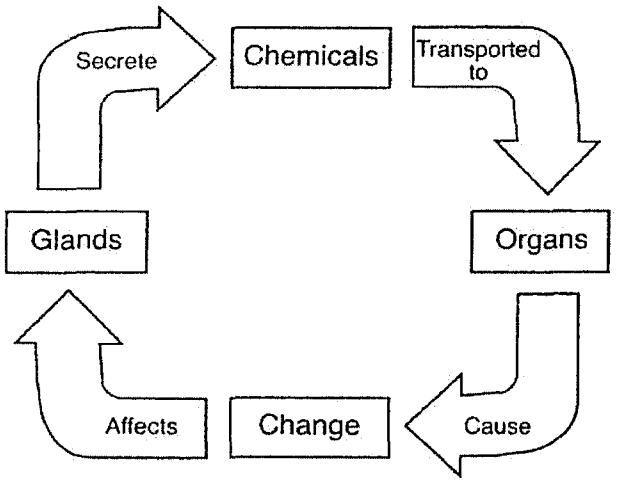
26. Allergic reactions are most closely associated with
    1) the action of circulating hormones
    2) a low blood sugar level
    3) immune responses to usually harmless substances
    4) the shape of red blood cells

27. Which hormone does *not* directly regulate human reproductive cycles?
    1) testosterone
    2) estrogen
    3) insulin
    4) progesterone

28. After a hormone enters the bloodstream, it is transported throughout the body, but the hormone affects only certain cells. The reason only certain cells are affected is that the membranes of these cells have specific
    1) receptors
    2) tissues
    3) antibodies
    4) carbohydrates

29. The pancreas produces one hormone that lowers blood sugar level and another that increases blood sugar level. The interaction of these two hormones most directly helps humans to
    1) maintain a balanced internal environment
    2) digest needed substances for other body organs
    3) dispose of wastes formed in other body organs
    4) increase the rate of cellular communication

30. The diagram below represents an interaction between parts of an organism.



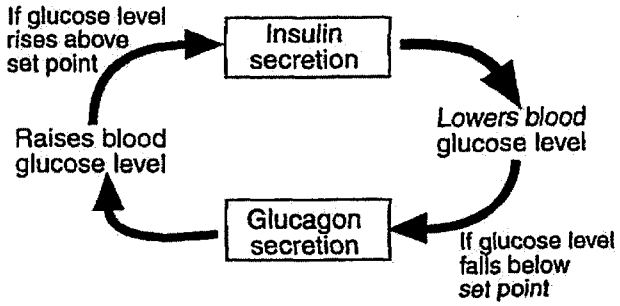
The term *chemicals* in this diagram represents
1) starch molecules
2) DNA molecules
3) hormone molecules
4) receptor molecules

31. Which row in the chart below contains a correct comparison between nervous regulation and chemical regulation?

Row	Nervous Regulation	Chemical Regulation
A	Slow response	Fast response
B	Long duration	Short duration
C	Involves neuro-transmitters	Involves hormones
D	Common to all organisms	Only in multi-cellular animals

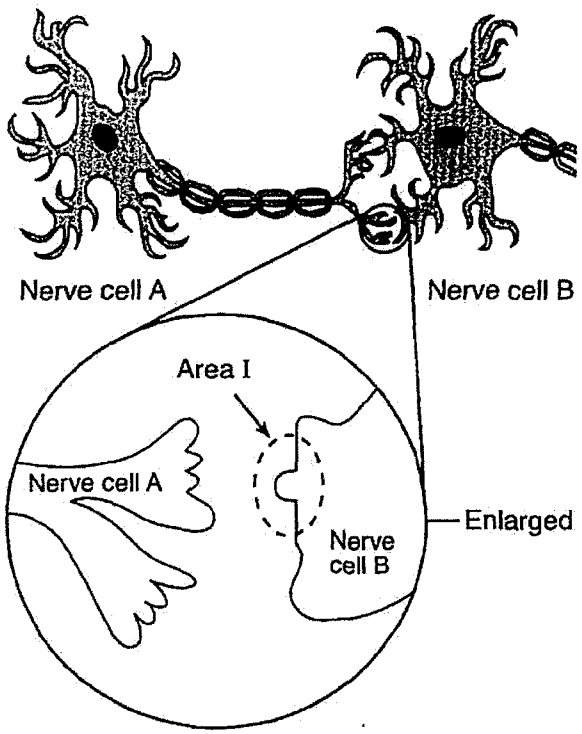
1) *A*
2) *B*
3) *C*
4) *D*

32. The diagram below represents the actions of two hormones in the human body.



This diagram best illustrates
1) recombination
2) feedback
3) insertion
4) deletion

Base your answers to questions 33 through 35 on the diagram of nerve cells below and on your knowledge of biology.



33. Identify *one* substance, other than the secretions from nerve cells, used in cell communication.

34. In the space below, sketch a chemical molecule that might be released from nerve cell *A* and be recognized and bind to area I of nerve cell *B*.

35. Describe what would happen if a drug molecule shaped like ☐ were introduced into this nerve pathway.