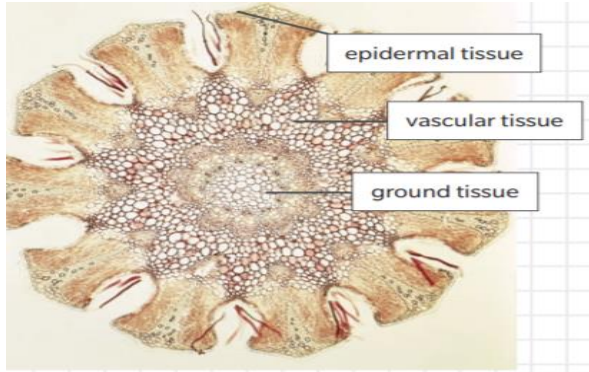
2. **Discuss** Multicellular organisms can be made up of billions of cells. How do you think having specialized cells is an advantage for a multicellular organism?

- **Multicellular living things are able to divide up the labor required to perform life functions between the different levels of organization (organs and organ systems).**
- **A multicellular living thing will not die if one of its cells is damaged or injured.**

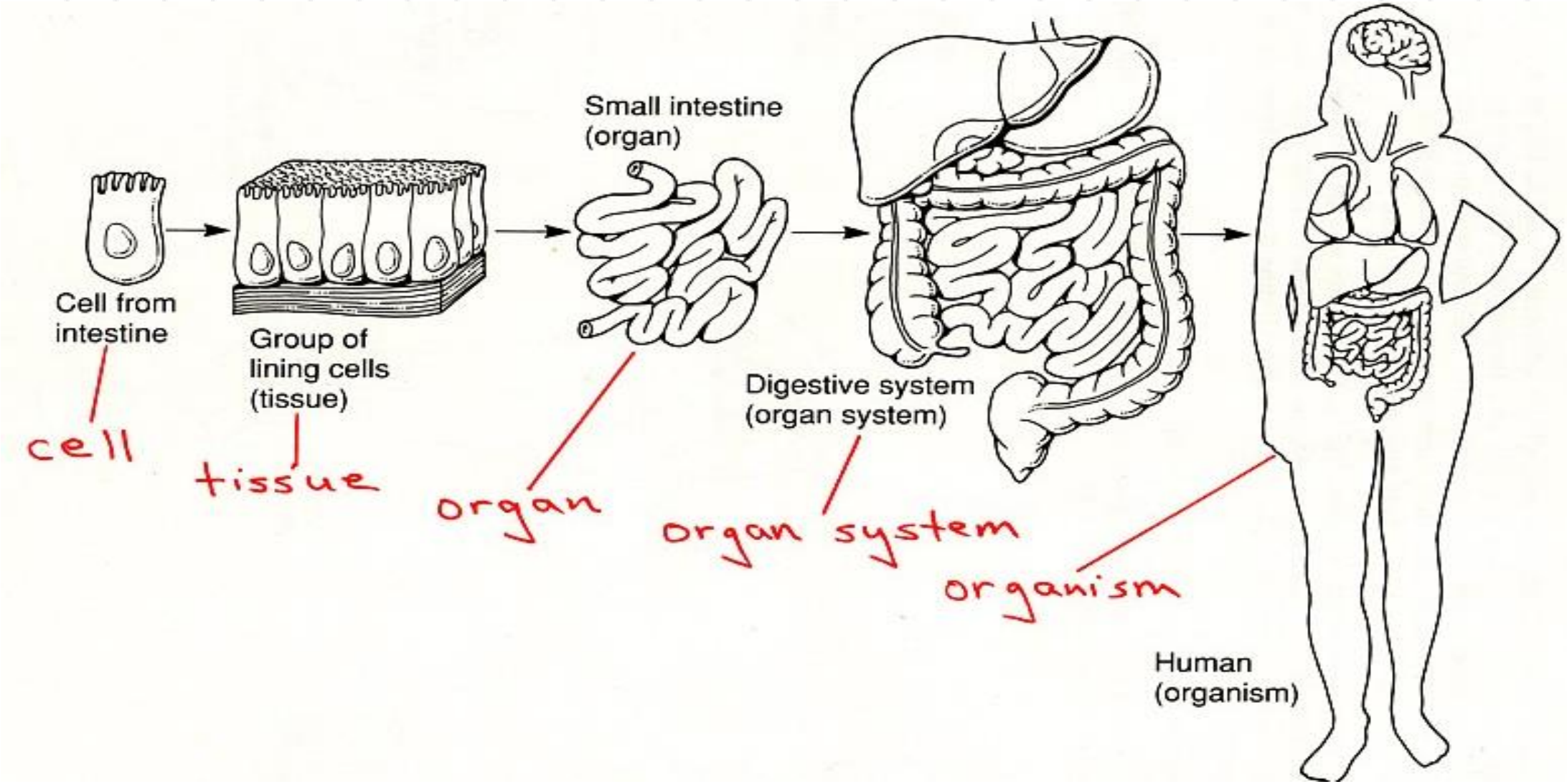


tems are plant organs that transport materials
nd provide support for the plant.

3. Use the oak tree stem as evidence to support the claim that specialized tissues work together to form organs that perform necessary functions.

- **There are three different tissues shown in the stem.**
- **Each tissue has a different structure, which allows it to perform a very specific job.**
- **The three tissues work together to form the stem. The stem is an organ.**
- **Different types of tissues working together form an organ.**

4. Draw a diagram that shows the relationship between cells, tissues, organs, and organ systems.



5. Is the frilled lizard unicellular or multicellular? Use evidence to explain your answer.

- **The lizard is multicellular because it is made up of more than one cell.**
- **You can see that the lizard is made up of organs, which are made up of tissues, and tissues are groups of similar CELLS working together to do s specific task.**

6. Use frilled lizard as evidence to support the claim that organs work together to form organ systems that perform necessary functions.

- **The frilled lizard's circulatory system is shown in the diagram.**
- **The organs of the circulatory system, blood, blood vessels and the heart all work together to perform the task of transporting materials throughout the body.**

11. The tissue that lines the intestine helps release / absorb / break down nutrients by increasing the intestinal surface area. The long extensions of nervous tissue connect / ingest / destroy the cells in the brain and other parts of the body. The muscle cells are organized into flexible fibers because muscle tissue elongates and absorbs / protects / contracts.

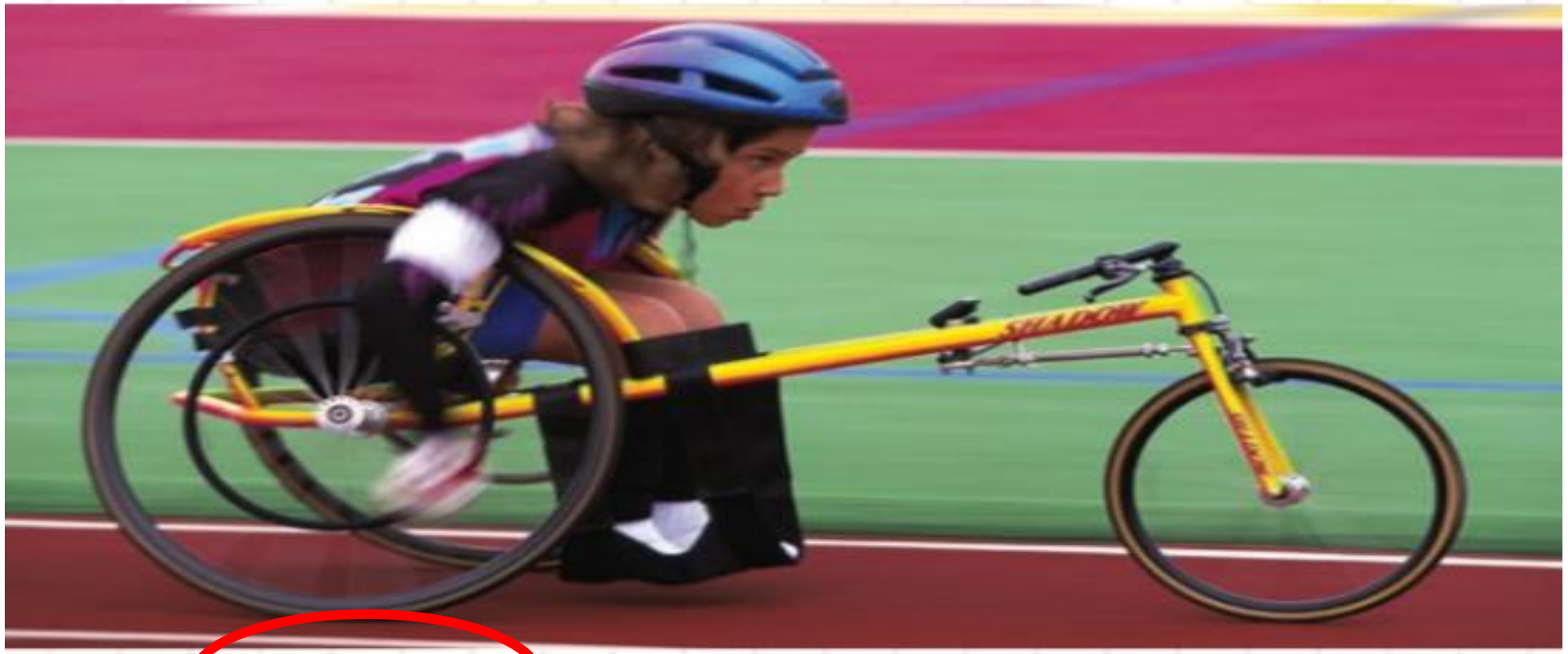
14. Birds have air sacs and lungs. When birds breathe in / out, oxygen-rich air fills the lungs and air sacs. When birds breathe in / out, the oxygen-poor air leaves the lungs, and stored fresh air enters the lungs from the air sacs. This means that birds always have a supply of oxygen-rich / poor air.

15. Describe how the structure of the bird respiratory system provides the energy the bird needs for flight.

The respiratory system is designed to get oxygen rich air to all parts of the bird's body.

The oxygen is used to release energy in the cells of the bird's muscles.

Question 19



A. The muscular / digestive and excretory / skeletal systems allow the arms to move, spinning the wheels of this bike.

Question 19

B. The respiratory/excretory and nervous/circulatory systems allow this student to breathe and read music.

Question 19

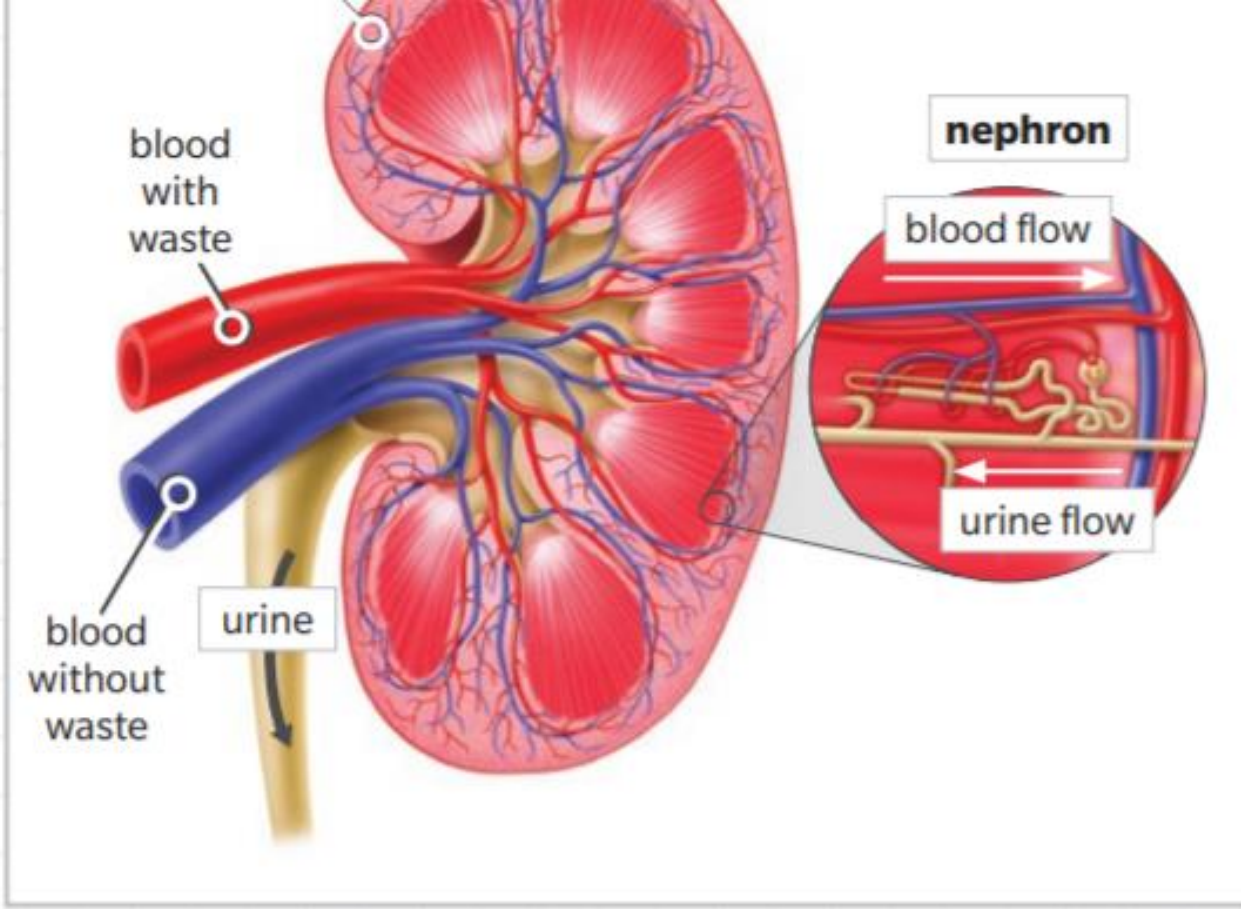
C. Body functions slow down as you sleep, but they do not stop! For example, the digestive / excretory system continues to break down food, and the muscular / circulatory system continues to deliver nutrients throughout the body.

20. Hummingbirds have small, weak feet and rely on their strong wings to move from one place to another. Describe how a disease affecting the muscular system would affect the other body systems of the hummingbird.

If the muscular system did not work properly,
The humming bird would not be to get food.
Without food none of the other systems would have the energy to function.

This hummingbird's wings beat more than 50 times per second!

Study the diagram of the kidney to answer Questions 3–4.



3. Each kidney contains more than 1 million filtering structures called *nephrons*. The nephron is made up of cells that work together. Based on the information, which statement is true?

A. The nephron can be defined as an organ.

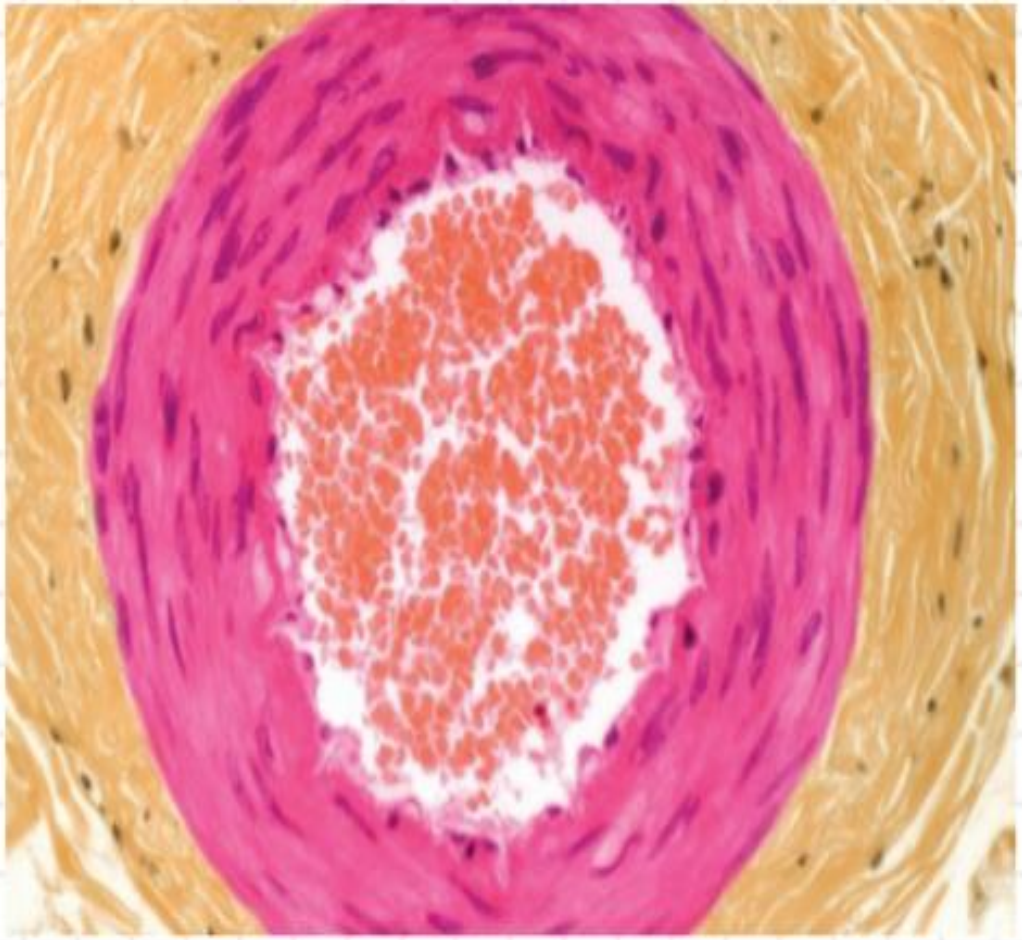
B. The kidney can be defined as an organ system.

C. The nephron can be defined as an organ system.

D. The nephron can be defined as a tissue.

4. Kidneys are organs in the urinary system that remove waste products from the blood. The urinary system is a subsystem of the excretory / digestive system. The urinary system works with the circulatory / digestive system to remove liquid waste from the body.

Cells, tissues, organs, and organ systems are the levels of organization in living things.



A. How does having multiple levels of organization benefit a multicellular organism?

The cells of multicellular organisms are Specialized to perform specific functions (jobs).

This allows for the labor to be divided up among many different organs and organ systems.

A relationship exists between structure and function.

B. Describe how structure is related to function in an organism.

The structure of a cell, tissue or organ, relates to the function it performs . The structure of a spoon allows it to be used to eat a liquid such as soup.

Body systems work together to perform all the functions necessary for the survival of an organism.

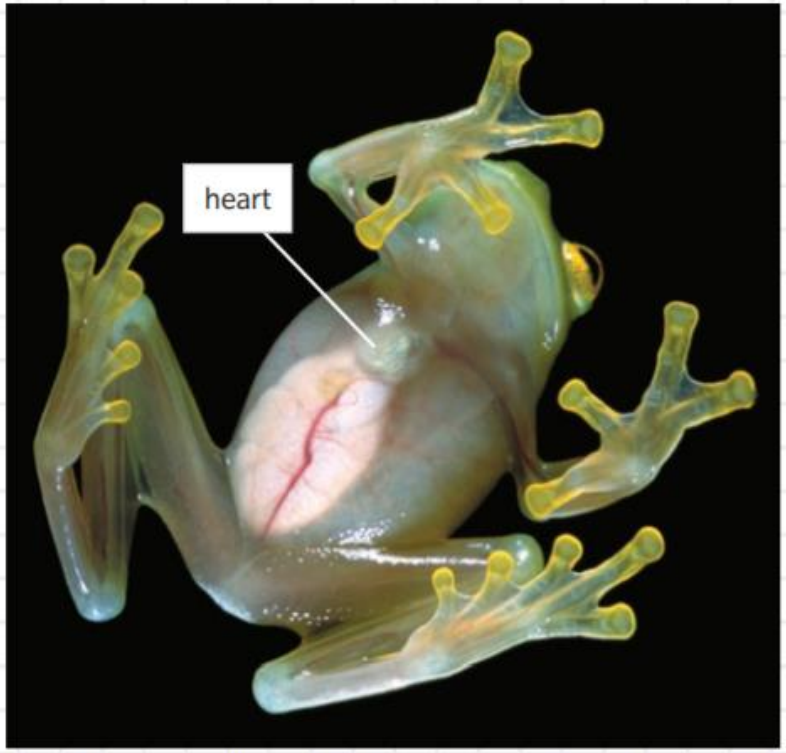
C. Explain why the failure of one organ or organ system can affect the function of other body systems in an organism.

All of the body systems interact and work together. If part of a body system fails, then the system will not be able to do its job. When one system fails it impacts all of the other systems.

3. Which teeth do you think belong to the crabeater seal and which belong to the tiger shark? Write the name in the box provided. Label the photos with the correct animal names.

Answers

3. From left to right: Crabeater seal teeth; The teeth are rounded and contain small ridges to filter krill; Tiger shark teeth; The teeth are pointy, sharp, and contain razor-like edges for biting.



Frogs have a circulatory system and a respiratory system but can also absorb oxygen through their skin.

4. A layer of water just under the frog's skin captures oxygen from air or water and delivers it to blood vessels at the skin's surface. How might this function relate to the fact that frogs are very sensitive to environmental pollution?

4. Because their skin is relatively permeable, frogs readily absorb pollutants in air and water into their bodies.

This blue cicada is emerging from its exoskeleton to start the next phase of its life cycle.

5. The exoskeleton of an insect provides a stiff, protective armo Despite the protection, how might an exoskeleton be a disadvantage for growth and movement?

5. Answers should include disadvantages of an outside shell. Sample answer: The exoskeleton doesn't allow much room for the organism to increase in size. It must be shed when the animal grows.

7. The circulatory system of an insect transports water, nutrients, and wastes, but does not transport oxygen. Why not?

   A. The tracheae connect to the circulatory system in the insect body.

   B. The insect body absorbs oxygen from nutrients and water.

   C. The tracheae deliver oxygen directly to all the tissues in the insect's body.

8. Spiracles can be covered with hairs or spines. How might this structure relate to its function?

The hairs will trap dirt and dust, preventing it from entering and clogging up the opening.

The hairs may also prevent parasites from entering the openings.

9. Which body systems do you think are working together at each stage of the digestive process described below? Enter the systems in the table below.

Process	Systems
chewing of food	**Skeletal**
movement of food through the body	**Muscular**
absorption and transport of nutrients	**Digestive** **Circulatory**
getting rid of carbon dioxide	**Excretory, respiratory**

12. The serval is using its ears to locate prey. It will respond by pouncing and trying to catch the rodent. The male silkworm moth is detecting the chemicals given off by the female with his large antennae. He will respond by travelling to the female. The scallop can see the motion of predators with its many eyes. It will respond by trying to escape.

13. Answers should include a stimulus, a method of detection, and a description of body systems working together to respond. Sample answer: Your eyes detect the color of a red traffic light. Your nervous system sends messages to your muscular system so you can put your foot on the brake.

Answer the following questions to check your understanding of the lesson.

Use the photo below to answer Questions 3 and 4.

3. Which two systems are represented in this model?

A. circulatory and respiratory

B. nervous and circulatory

C. excretory and respiratory

D. nervous and digestive

4. Blood travels through the circulatory / excretory system to the lungs / kidneys where it interacts with the digestive / respiratory system to exchange gases.

The blood vessels, heart, and lungs were filled with a plastic polymer to make this cast.

5. Which stimulus is the cheetah responding to? Circle all that apply.

A. The cheetah is responding to the motion of the wildebeest.

B. The cheetah is responding to hunger felt inside its digestive system.

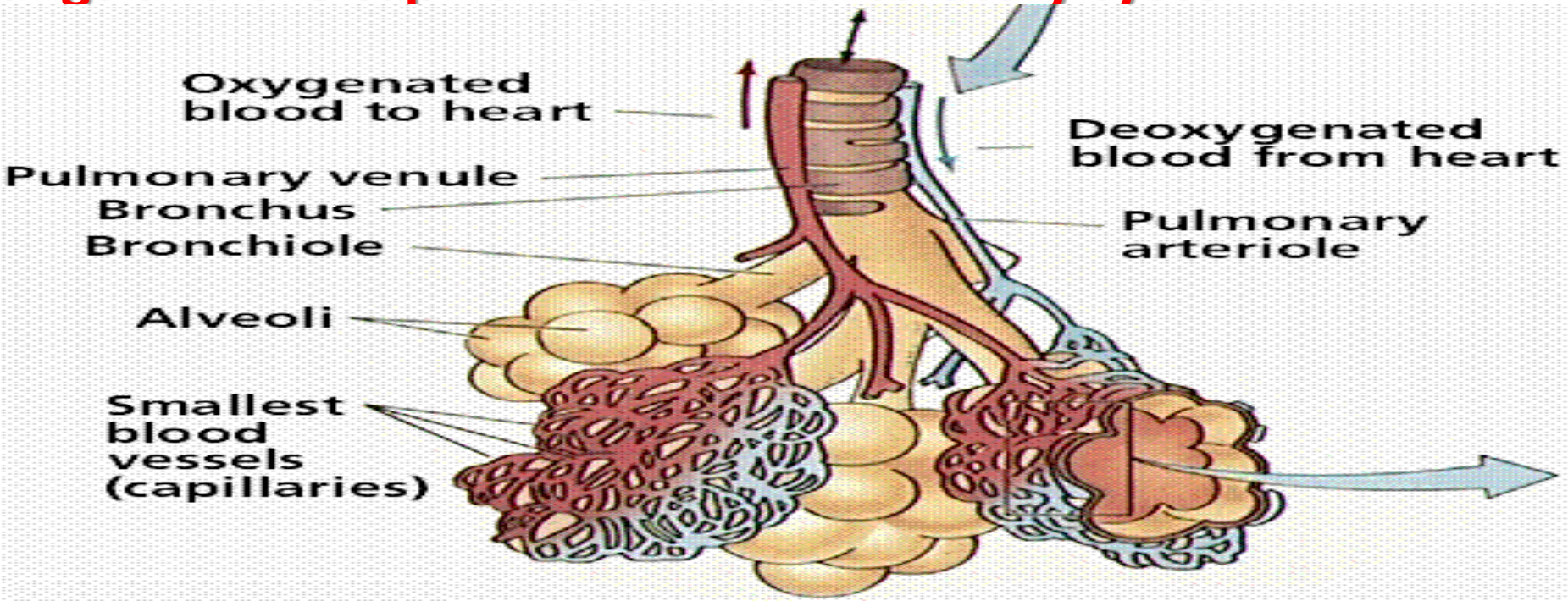
C. The cheetah is responding to its internal temperature.

6. These animals' bodies are complex systems composed of many interacting subsystems. The excretory/ digestive/ muscular system is moving the animals' bodies.

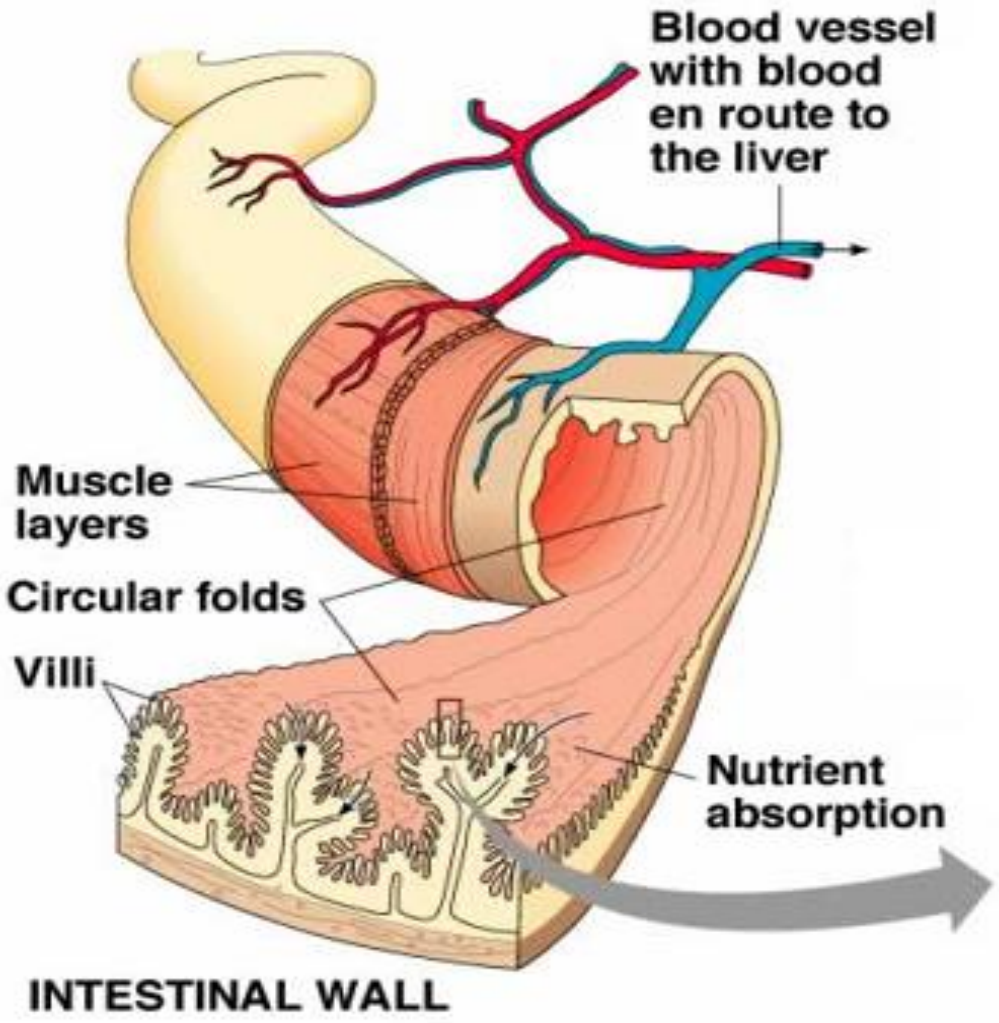
Running at top speeds, the wildebeest and cheetah are using their digestive / muscular/ nervous systems to take in information from their surroundings and communicate these signals to the body.

The animals' circulatory/ digestive / muscular systems are working to deliver oxygen-rich blood to cells in all parts of their bodies. Their circulatory/ digestive/ respiratory systems are taking oxygen into their bodies and working to get rid of carbon dioxide.

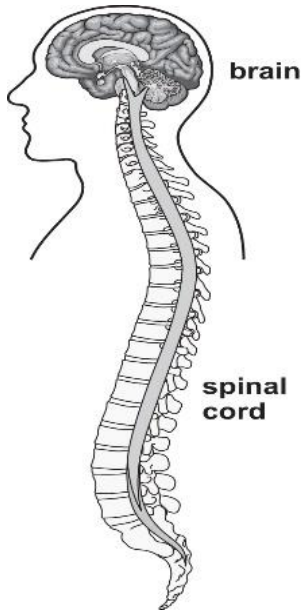
- The circulatory system brings blood to the lungs to get oxygen and to get rid of carbon dioxide. The lungs are part of the respiratory system. The lungs and the other respiratory organs work to bring in oxygen rih air when we inhale. When we exhale air that contains carbon dioxide leaves the body through the respiratory organs.
- The two systems inter connect in the lungs in the alveoli, the location where oxygen and carbon dioxide are exchanged between the tissues of the lungs and the capillaries of the circulatory system.



- The circulatory system has capillaries located in the villi of the small intestine.
- The villi of the digestive system absorb digested nutrients which then enter the capillaries.
- The capillaries of the circulatory system then connect to larger blood vessels which in turn carry nutrients AWAY from the small intestine and bring the nutrients to the rest of the body.
- The two systems interact to bring in and distribute nutrients to the other systems



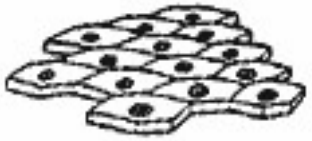
This diagram shows the two main parts of the human body's central nervous system.



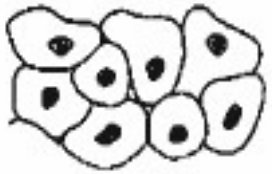
According to the diagram, which term can best describe the brain? The brain is

an organ

8. Some human body cells are shown in the diagrams below.

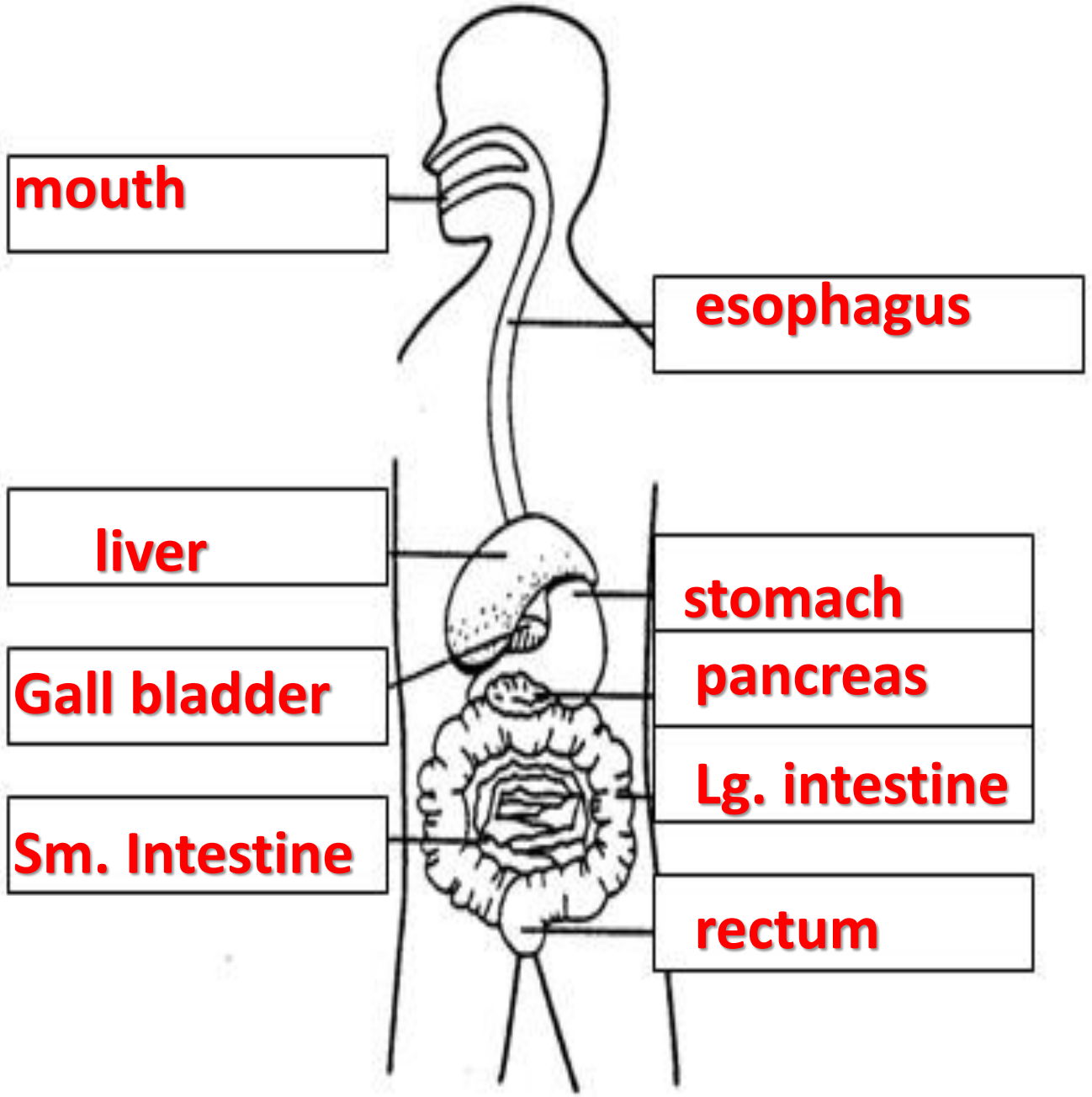

Cells from skin


Blood cells

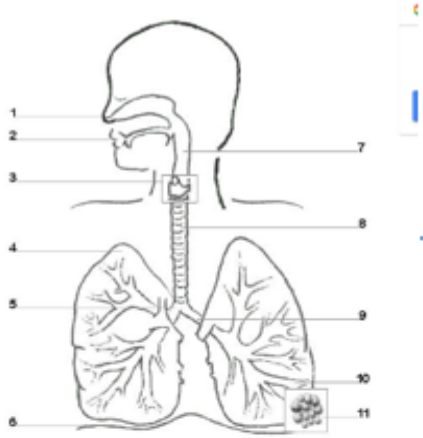

Cells from lining of bladder


Cells from lining of trachea

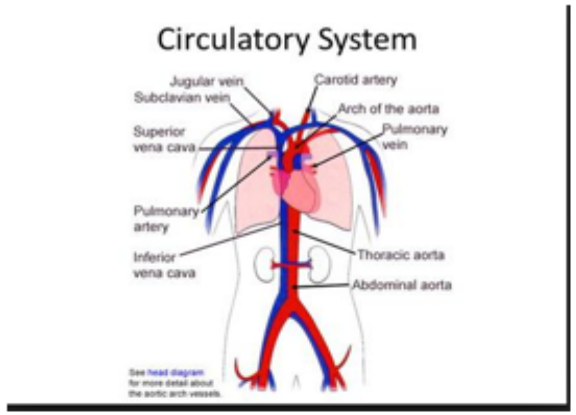
This group of cells represent different **tissues**


mouth
esophagus
liver
stomach
Gall bladder
pancreas
Lg. intestine
Sm. Intestine
rectum

System	Function	Main parts/Organs
Circulatory	carries oxygen, water, and nutrients to all the cells of the body. 2 subsystems are the the cardiovascular system and the lymphatic system	– heart – blood vessels
Digestive	Breaks down food into usable nutrients for the body to produce energy and provide growth and repair for cells. the digestive system also removes solid waste products from the process of digestion.	– stomach – teeth – intestines – saliva (chemical digestion)
Excretory	removes wastes and toxins from the body. It removes extra water, carbon dioxide, other toxins, and salts. These by-products can be released through process of exhaling as well as sweat.	– skin – lungs – kidneys
Respiratory	Brings in oxygen and takes out carbon dioxide. *animal cells need oxygen to release energy from food.	– skin – lungs – gills
Nervous	sends signals throughout the body to communicate what should happen in the organism. In charge of detecting and reacting to different environmental conditions. It collects and processes information and then sends signals.	– brain – nerve cells – eyes – ears – hair – skin – antennae
Skeletal/ Muscular	provides internal and external movement for animals. Also, provides support for the body.	– bones – muscles – tendons – ligaments – other hard, nonbony structures

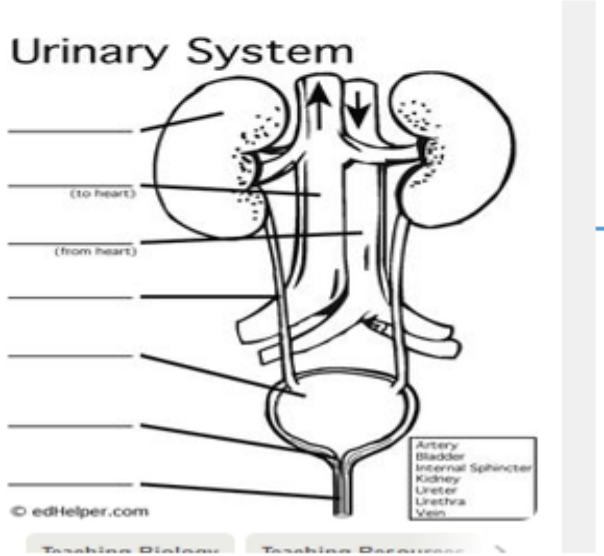


Respiratory

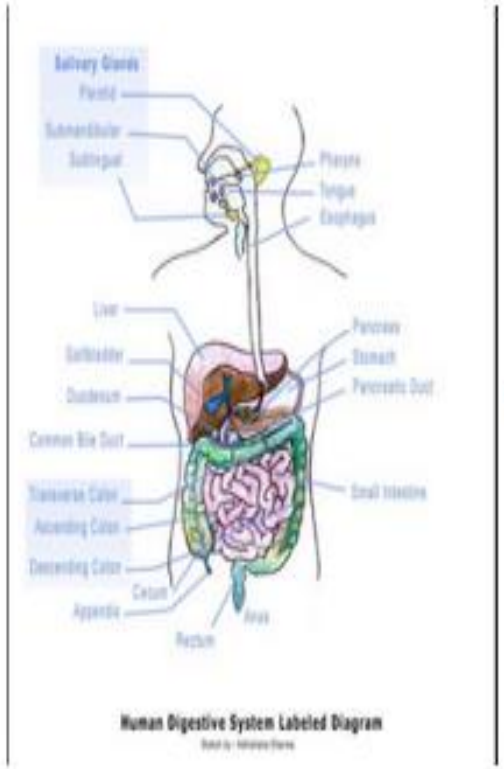


Circulatory

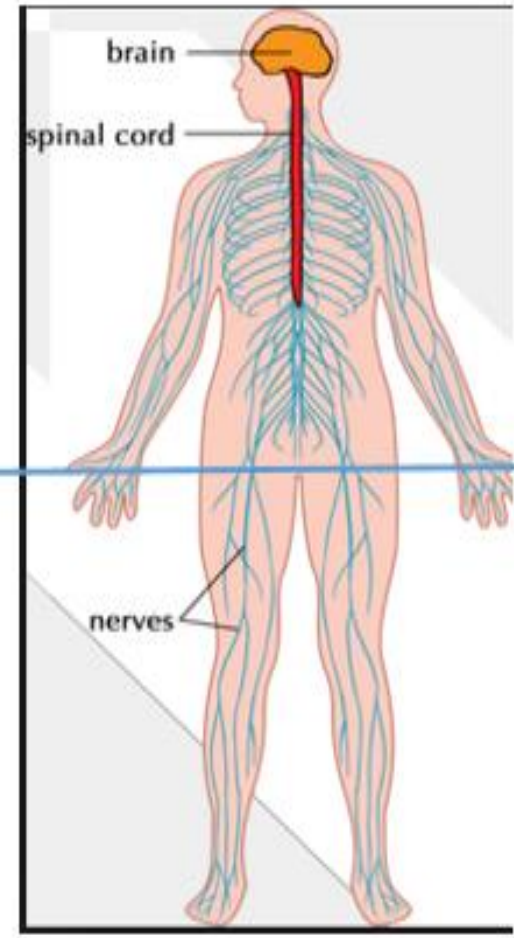
Muscular/Skeletal



Excretory



Digestive



Nervous