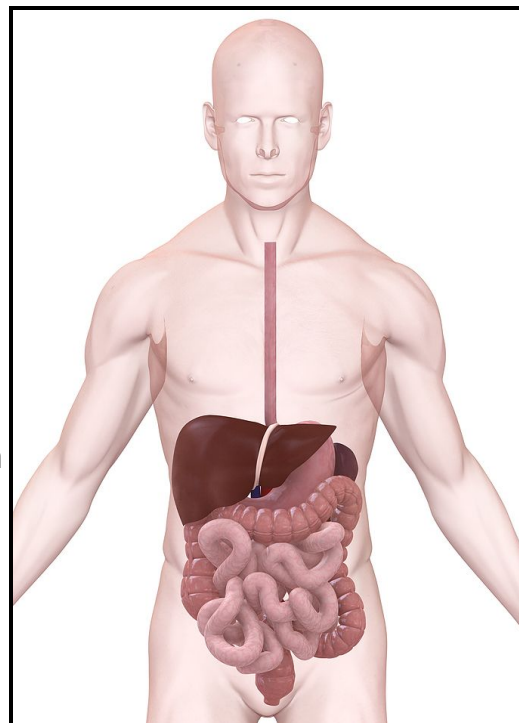




Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Liver Function and You

- 1 How do the levels of organization in biology create an entire biological system? Multicellular organisms have very distinct levels of organization that vary from the single atom to the entire organism. This is especially noticeable in complex, multicellular organisms, such as arthropods or vertebrates. Each part depends on the other parts for proper function and health. If any of the levels are affected, the rest of the system will be affected by the change.
- 2 We can see complexity at every level when we study the biological world. There is a hierarchy of organization from the smallest atoms to the interactions of populations in an ecosystem. Atoms combine to make molecules, and molecules of various types make up cells. Tissues, made of groups of similar cells, work together in the form of organs. In a complex, multicellular organism, organs work together in organ systems. We can follow the pattern beyond the level of an individual organism. Organisms of the same species live together in populations. Populations of different species are described as an ecological community within an ecosystem. In other words, all the parts work together to create a whole.
- 3 It is important to see how various cells work together to function and cope with the environmental changes that a single cell could not survive in alone. There are many examples in which similar cells in animals work together as a tissue to perform a function. Nerve cells carry impulses to communicate with other cells. Muscle cells contract to pull, or squeeze, around a tube and move the material inside. Glandular tissues make chemicals that are released for use in other organs throughout the body. Tissues that work together to perform a specific function are called *organs*. The stomach, for example, is made of muscle, glands, nerves, and other tissues; it is just one of the organs in the digestive system. Different organs work together to form entire systems. Those systems often overlap to complete other functions, as well.
- 4 One of the most important levels of organization relates to the various organ systems. Examples of organ systems include the digestive system, the circulatory system, and the respiratory system. Each organ system performs a vital function, such as aiding in digestion, circulating materials through the body, or breathing. Proper organ function does not only depend on the health of individual cells of that organ; it also depends on the health of the other individual organs and their cells. In addition, the organs and various tissues must communicate





## Reading Science

with each other so that they can work together effectively. If one organ fails, the entire organism is impacted and could die. This makes the organ system a good point at which to begin the study of the levels of biological organization.

- 5 One of the most important organs in animal systems is the liver. Its functions are tied to almost every other organ of the animal body. The liver is found in all vertebrates. It helps maintain the homeostasis of the entire organism. While each vertebrate's liver is slightly different, it is always one of the largest of visceral, or internal, organs. In humans, it is also the largest visceral organ.
- 6 There are many reasons why the liver is such a critical component of the biological hierarchy of vertebrates. Your liver is the largest chemical-processing center in your body. Specialized cells in your liver process the carbohydrates (sugars) you eat, turning them into molecules that your body can use. Sugars are converted into glycogen and stored in the liver. They release back into your body as needed. In this way, your liver is a critical organ in maintaining blood glucose levels by regulating your carbohydrate metabolism. Your liver will pick up signals from molecules and blood cells and will respond as necessary.
- 7 Two other major functions of your liver include protein and lipid metabolism. The liver plays a huge role in the synthesis of amino acids; those amino acids are the individual building blocks of proteins, giving structure to muscles and other tissues in the body. The liver also affects the function of the circulatory system. It creates necessary blood proteins, such as clotting factors. As far as lipids are concerned, your liver processes triglycerides and helps break down fats. It also produces cholesterol. Your cells need cholesterol for a variety of functions, including making hormones and parts of plasma membranes.
- 8 Not only does the liver synthesize important compounds, it also plays a critical role in the breakdown and disposal of toxins. It is also important to the digestive process and excretory system. The liver removes internal substances, such as ammonia, insulin, damaged red blood cells, and other cell waste. The liver produces a substance called *bile*. In the digestive system, bile helps break down the fats in the foods you eat. It also helps break down chemicals, such as drugs and alcohol, that are introduced into the system. It is this action of your liver that is the reason why the effects of the medicine you take do not last forever.



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1. Paragraph 2 is about the hierarchy of the elements that work together in biological organisms. Which of the following is the correct order of hierarchy?
  - A. Cells, organs, molecules, tissues, atoms
  - B. Molecules, cells, tissues, atoms, organs
  - C. Atoms, molecules, cells, tissues, organs
  - D. None of the above

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2. In vertebrates, which biological system carries out more chemical reactions than any other organ or system?
  - A. The liver
  - B. The heart
  - C. The digestive system
  - D. The circulatory (blood) system



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3. Why is the liver such an important organ in a vertebrate's biological system?

- A. It is the largest organ of the body.
  - B. It is the largest chemical-processing center in the body.
  - C. It has more specialized cells than any other organ.
  - D. It processes waste out of the body.
- 

4. In the biological hierarchy of systems, cells will combine to form—

- A. Organs
- B. Bodies
- C. Tissues
- D. Molecules



## Reading Science

5. The word *visceral* is found in paragraph 5. This word means—

- A. Homeostasis
  - B. Vertebrate
  - C. Metabolism
  - D. None of the above
- 

6. The liver is essential to the health of the organism. One major function of the liver is—

- A. To create tissues
- B. To perform proper organ functions with individual cells
- C. To synthesize amino acids
- D. All of the above