

Extra Credit Critical Thinking Questions (for any Anatomy &/or Physiology class)

Most of the following questions are designed to go a little beyond the specific knowledge you are actually accountable for in this class. You may have to search for additional information to answer some of them. There are textbooks in the library or a number of resources on the web that you can use to find answers to questions not discussed in your text. A few will require only a sentence or two, most will require some elaboration and explanation. Please use the actual number given for each question, you do not need to write out the question you are answering. The correct answer to each question is worth one point. Any points you receive from answering these questions will contribute toward your total EC points possible. Extra Credit answers are due on the test date covering those topics, they will not be accepted after that. Copying answers from a classmate will get both of you an "F" in the course.

The Human Body, an Orientation

7. People who are allergic to penicillin or aspirin often wear Medic Alert bracelets or necklaces that note this fact in case they need emergency medical treatment and are unable to communicate. Why would it be important for a person with **situs inversus** to have this noted on a Medic Alert bracelet?
9. Antipyretic medicines, such as aspirin, oppose the influence of a pyrogen on the body's thermostat. How do antipyretics reduce fever? What is the principal disadvantage of using an antipyretic to relieve a fever? Why are chills associated with the onset of a fever?

Basic Chemistry & Biochemistry

3. Based on your own body weight, how much of each of the following elements do you have in your body IN GRAMS!!!
 - Oxygen
 - Carbon
 - Calcium
 - Sodium
 - Iodine
 - IronShow your work.
6. An important buffer system in the human body involves carbon dioxide and bicarbonate ions. If a person became excited and exhaled large amounts of carbon dioxide while hyperventilating, how will the pH of their blood be affected and why.

Cells and Tissues

1. A "red-hot" bacterial infection of the intestinal tract irritates the intestinal cells and interferes with digestion. Such a condition is often accompanied by diarrhea, which causes loss of body water. On the basis of what you have learned about osmotic water flows, explain why diarrhea may occur.
5. Many athletes work to reduce their body fat to the lowest possible percent. What are some of the functional and structural consequences that could develop if too little body fat were present.

Skin and Body Membranes

5. The skin of infants is more easily penetrated and injured by abrasion than that of adults. Based on this fact, which stratum of the epidermis is probably much thinner in infants than in adults.
7. Explain how an organ can be located within the abdominal cavity but not within the peritoneal cavity.

The Skeletal System

4. While working at an excavation, an archaeologist finds several small skull bones. She examines the frontal, parietal, and occipital bones and concludes that the skulls are those of children not yet 1 year old. How can she tell their ages from examining just these few bones?
7. Explain why running helps prevent osteoporosis in the elderly. Does the benefit include all bones or mainly those of the legs?

The Muscular System

1. Assume you have a 10 pound weight in your right hand. Explain why it is easier to flex the right elbow when your forearm is supinated than when it is pronated.
7. When a suicide victim was found, the coroner was unable to remove the drug vial clutched in his hand. Explain the reasons for this on a cellular level. If the victim had been discovered three days later, would the coroner have had the same difficulty, explain.

The Nervous System

3. If neurons in the CNS lack centrioles and are unable to divide, how can a person develop brain cancer?
7. General and local anesthetics block action potential generation, thereby rendering the nervous system quiescent while surgery is performed. What specific process do anesthetics impair, and how does this interfere with nerve transmission?

Special Senses

1. Mrs. Orlando has been noticing flashes of light and tiny specks in her right visual field. When she begins to see a veil floating before her right eye, she makes an appointment to see the eye doctor. What is your diagnosis? Is the condition serious? Explain.
6. Which taste sensations could be lost after damage to
 - a. the facial nerve
 - b. the glossopharyngeal nerveWhy?

A fracture of which cranial bone would most likely eliminate the sense of smell? Why?

The Endocrine System

3. Julie is pregnant but is not receiving prenatal care. She has a poor diet consisting mostly of fast food. She drinks no milk preferring colas instead. How would this situation affect Julie's level of parathyroid hormone? Explain.
4. Describe as many problems as you can think of that elderly people might have as a result of decreasing hormone production.

The Circulatory System

3. The most common site of varicose veins is the greater saphenous vein of the leg. Why?
7. Most of the ATP produced in cardiac muscle is derived from the metabolism of fatty acids. During times of exertion, cardiac muscle cells can also use lactic acid as an energy source. Why would this adaptation be advantageous to cardiac function?

Blood & Hematology

1. A middle aged college professor from Boston is in the Swiss Alps studying astronomy. He arrived two days ago and plans to stay the entire year. However, he notices that he is short of breath when he walks up steps and that he tires easily with any physical activity. His symptoms gradually disappear; after two months, he feels fine. Upon returning to the United States, he has a complete physical exam and is told that his erythrocyte count is higher than normal. Attempt to explain these findings. Will his RBC count remain at this level, why or why not?
4. According to the old saying, "Good food makes good blood." Name three substances in the diet that are **essential** for "good blood." What blood disorders develop if these substances are absent from the diet?

The Lymphatic System

2. Why does it make more functional sense for the two main lymphatic ducts to connect to the subclavian veins than it would for them to connect to the subclavian arteries?
3. Explain the symptoms that might arise if lymphatic vessels in the legs become blocked. What might cause such a condition?

Body Defenses

2. Mr. James, an 80 year old man, is grumbling about having to receive a flu shot every year. Flu viruses have a high mutation rate which results in the appearance of new proteins on the flu virus' outer covering. How do these factors help to explain the need to get a flu shot each year?
8. Suppose a new virus emerged that selectively destroyed memory T cells and memory B cells. What would be the pathological effects of such a virus?

The Respiratory System

3. A patient has an infection in the nasal cavity. Name seven organs or places to which the infection could spread if not treated.
5. A surgeon removed three adjacent bronchopulmonary segments from the left lung of a patient with Tuberculosis. Almost half of the lung was removed yet there was no severe bleeding, and relatively few blood vessels had to be cauterized (closed off). Why was the surgery so easy to perform? Be specific.

The Digestive System

3. Why, specifically, does a vegetarian usually have to be more careful about his/her diet than a person who eats meat?
5. Sometimes a gallstone can move to the pancreatic duct and block or impair the flow of pancreatic juices, thus causing pancreatitis. What symptoms would you expect to see if this occurred?

The Urinary System

2. In some patients with diabetes mellitus not enough insulin is produced, consequently, blood glucose levels increase. If blood glucose levels rise high enough, the kidneys are unable to reabsorb all the glucose that filters out and glucose "spills over" into the urine. What effect would this have on urine concentration and volume? How would the body attempt to adjust to this?
3. Describe the important differences between blood plasma and renal filtrate, and relate the differences to the structure of the filtration membrane.

Fluid, Electrolyte, and Acid-Base Balance

1. Explain how emphysema and congestive heart failure can lead to acid-base imbalances.
4. Raymond Chu is a party animal. Each weekend he consumes liberal amounts of alcoholic beverages. Alcohol stimulates hydrochloric acid secretion in the stomach. What changes occur in his respiratory rate and the pH of his urine following one of his typical binges?

The Reproductive System

4. A new mother tells you that when she nurses her baby, she feels as if she is having menstrual cramps. How would you explain this phenomenon?
6. Describe the effects not related to reproduction that the sex hormones (testosterone, estrogen, progesterone) have on the body