

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. On your answer sheet please include subject titles. 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

1. When we begin to become dehydrated, we usually become thirsty, which causes us to drink fluids. On the basis of what you now know about control systems, decide whether the thirst sensation is part of a negative or a positive feedback control system and defend your choice.
4. Explain how negative-feedback mechanisms work to control respiratory rate and heart rate when a person is at rest and when the person is exercising.

Basic Chemistry & Biochemistry

1. A number of antibiotics act by binding to certain essential enzymes in the target bacteria. How might these antibiotics influence the chemical reaction controlled by the enzyme? What might be the effect on the bacteria? On the person taking the antibiotic prescription?
2. Evelyn is quite proud of her slender, model-like figure and boasts that she doesn't have an “ounce of excess body fat.” Barbara, on the other hand, is grossly overweight. She complains of being “hot” most of the time, and on a hot day she is miserable. Evelyn generally feels chilled except on very hot days. Explain the relative sensitivity to environmental temperature of these two women on the basis of information you have been given in the Organic Compounds section of this chapter.

Cells and Tissues

2. In adults, over 90% of all cancers are either adenomas (adenocarcinomas) or carcinomas. In fact, cancers of the skin, lung, colon, breast, and prostate are all in these categories. Which one of the four basic tissue types gives rise to most cancers? Why do you think this is so?
4. Certain antibiotics can damage ribosomes in normal human cells. People taking such medications must be closely monitored. Explain the possible consequences of the loss of a large number of ribosomes in certain tissues or organs.

Skin and Body Membranes

1. Victims of third degree burns demonstrate the vital functions performed by the skin. What are the two most important problems encountered clinically with such patients? Explain each in terms of the absence of skin.
3. What does sunlight do to promote bone maintenance and growth?

The Skeletal System

1. A 75 - year - old woman and her 9 - year - old granddaughter were in a train crash in which both sustained trauma to the chest. X rays showed that the grandmother had several fractured ribs but her granddaughter had none. Explain these surprisingly (?) different findings in terms of specific facts you have learned from this chapter.
2. You overhear some anatomy students imagining out loud what their bones would look like if they had compact bone on the inside and spongy bone on the outside, instead of the other way around. You tell them that such imaginary skeleton would be poorly designed mechanically and would break easily. Explain your reasons for saying this.

The Muscular System

2. When Eric returned from jogging, he was breathing heavily, sweating profusely, and complained that his legs ached and felt weak. His wife poured him a sports drink and urged him to take it easy until he could "catch his breath." On the basis of what you have learned about muscle energy metabolism, respond to the following questions:
 - Why is Eric breathing heavily?
 - What ATP harvesting pathway have his working muscles been using that leads to such a breathing pattern?
 - What metabolic product(s) might account for his sore muscles and his feeling of muscle weakness?
5. If the quadriceps femoris of the left leg were paralyzed, how would a person's ability to walk be affected?

The Nervous System

1. Jed, a couch potato, likes to eat a very large meal in the evening. After the meal, his wife asks him to help clean the dishes, but Jed explains that he is "too tired" and promptly goes to sleep. What seems to be his *physiological* problem (he obviously has some behavioral deficiencies as well!)
4. What part of the brain is being tested when a police officer asks a DWI suspect to walk a straight line and touch his nose with his finger. Explain.

Special Senses

3. Describe all the sensations involved in biting into an apple. Explain which of those sensations are special and which are general. What types of receptors are involved?
5. Mr. Gaspe appeared at the eye clinic complaining of a chip of wood in his eye. no foreign body was found, but the conjunctiva was obviously inflamed. What name is given to this inflammatory condition, and where would you look for a foreign body that has been floating around on the eye surface for a while?

The Endocrine System

- Johnny, a five year old boy, has been growing by leaps and bounds. His height is 100% above normal for his age group and recently he has been complaining of headaches and vision problems. A CT scan reveals a large pituitary tumor. What hormone is being secreted in excess? What name is given to the condition that Johnny will exhibit if corrective measures are not taken? and, What is the probable cause of his headaches and visual problems?
5. Explain why diabetes is a much more widespread and serious problem than extreme hypoglycemia; (think synergists and antagonists).

The Circulatory System

1. A middle-aged woman is admitted to the coronary care unit with a diagnosis of left ventricular failure resulting from a myocardial infarction. Her chart indicates that she was awakened in the middle of the night by *severe chest pain*. Her *skin is pale and cold*, and *moist sounds of pulmonary edema* are heard over the lower regions of both lungs. Explain how failure of the left ventricle might cause these signs and symptoms.
2. Heather, a newborn baby, needs surgery because she was born with an aorta that arises from the right ventricle and a pulmonary trunk that issues from the left ventricle, a condition called transposition of the great vessels. What are the physiological consequences of this defect?

Blood & Hematology

2. A young child is diagnosed as having acute lymphocytic leukemia. Her parents cannot understand why infection is a major problem for Janie when her WBC count is so high. Can you provide an explanation for Janie's parents.
3. E. Z. Goen habitually uses barbiturates to depress feelings of anxiety. Because barbiturates suppress the respiratory centers in the brain, they cause hypoventilation (i.e., a slower than normal rate of breathing.) What will happen to E.Z.'s erythrocyte count if he continues the use of barbiturates? Explain.

The Lymphatic System

1. Compare and contrast the structure of a lymphatic capillary with that of a blood capillary. Explain how their structural differences are related to their functional differences.
2. Why does it make more functional sense for the two main lymphatic ducts to connect to the subclavian veins that it would for them to connect to the subclavian arteries?

Body Defenses

1. Explain the underlying physiological mechanisms responsible for the cardinal signs of acute inflammation: *heat, pain, redness, and swelling*.
4. Antihistamines block the effect of a chemical called histamine, that is released during the inflammatory response. After studying the specific effects of histamine, describe the effects that an antihistamine would have on the inflammatory response, and whether these effects would be beneficial or not.

The Respiratory System

1. Alvin, a smoker, sees his doctor because he has a persistent cough and becomes short of breath after very little exertion. He has a barrel chest, a red face, and explains that it is difficult for him to exhale but not to inhale. What diagnosis will the doctor make?
2. Harry, the swimmer with the fastest time on the Springfield college swim team, routinely hyperventilates before a meet, as he says "to sock some more oxygen into my lungs so I can swim longer without having to breathe." First of all, what very basic fact about the loading of oxygen has Harry forgotten? Second, how is Harry jeopardizing not only his time but his life?

The Digestive System

2. A baby is admitted to the hospital with a history of diarrhea and watery feces occurring over the last three days. The baby has sunken fontanelles, indicating extreme dehydration. On examination, the baby is found to have a bacterium induced colitis, and antibiotics are prescribed. Because of the baby's loss of intestinal juices, do you think that his blood would indicate acidosis or alkalosis? Explain your reasoning.
4. Describe or make a flow chart of the neural and hormonal controls of stomach secretions.

The Urinary System

1. Ima Large ate a full bag of potato chips while watching TV one evening. What effect did this have on her urine concentration and volume? Explain.
5. Carlos has advanced arteriosclerosis. An analysis of his blood indicates elevated levels of aldosterone and decreased levels of ADH. Explain.

The Reproductive System

1. A 36 year old mother of four is considering tubal ligation as a means of ensuring that her family gets no larger. She asks the physician if she will become "menopausal" after the surgery. How would you answer her question and explain away her concerns? Explain what a tubal ligation is.
5. Women bodybuilders and women with eating disorders such as anorexia nervosa commonly experience amenorrhea. What does this fact suggest about the relation between body fat and menstruation? What might be the benefit of amenorrhea under such circumstances?