

## **Extra Credit Critical Thinking Questions** (for Biol 2404 Fall,2008)

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 put questions for each chapter on a separate sheet of paper** with the subject at the top of the page. The 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**

3. Diabetes is a disorder in which the pancreas (an organ) fails to produce insulin (a chemical) that is normally made by the pancreas and released into circulation. List as many levels of organization as you can in which this disorder could be corrected.
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

### **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  
Iron  
Show your work.
4. Mrs. Roberts, in a diabetic coma, has just been admitted to Noble Hospital. Her blood pH indicates that she is in severe acidosis, and measures are quickly instituted to bring her blood pH back within normal limits. Why, specifically, is severe acidosis dangerous?

### **Cells and Tissues**

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.
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**

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.
7. Explain how an organ can be located within the abdominal cavity but not within the peritoneal cavity.

### **The Skeletal System**

7. Explain why running helps prevent osteoporosis in the elderly. Does the benefit include all bones or mainly those of the legs?
20. Sherry is a pregnant teenager. Her diet before she was pregnant consisted mostly of junk food and that hasn't changed since she became pregnant. Approximately 8-10 weeks into her pregnancy, she falls and breaks her arm. She doesn't understand why the bone broke, because it wasn't a hard fall. Test results determine that a significant amount of bone demineralization is occurring. Explain what is happening to Sherry.

## **The Muscular System**

10. A patient is suspected of suffering from either muscular dystrophy or myasthenia gravis. How could you distinguish between the two conditions?
11. Fred noticed that his rate of respiration was elevated after running a 100-meter race but was not as elevated after running slowly for a much longer distance. Since Fred knows that you are an ace physiology student, he asks you for an explanation. What would you tell him?

## **The Nervous System**

3. If neurons in the CNS lack centrioles and are unable to divide, how can a person develop brain cancer?
25. Would autonomic functions be affected if the ventral roots of the cervical spinal nerves were damaged? Why or why not?

## **Special Senses**

4. Sally, a 9-year-old girl, told the clinic physician that her "ear lump hurt" and she kept "getting dizzy and falling down." As she told her story, she pointed to her mastoid process. An otoscopic examination of the external auditory canal revealed a red, swollen eardrum, and her throat was inflamed. Her condition was described as mastoiditis with secondary labyrinthitis (inflammation of the labyrinth). Describe the most likely route of infection and the infected structures in Sally's case. Also, explain the cause of her dizziness and falling.
8. If you look directly at a dim star in the night sky, it disappears, and if you look slightly away from it, it reappears. Why?

## **The Endocrine System**

2. 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?
23. A patient has hyperparathyroidism and produces excessive amounts of parathyroid hormone. What effect would this hormone have on bones? Would administration of large doses of vitamin D help the situation? Explain.

## **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.
6. Explain, specifically, how liver dysfunction can cause bleeding disorders.

## **The Circulatory System**

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?
14. Who would have a higher pulse pressure: a resting athlete or a resting couch potato. Why?

## **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. 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?

## **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.
6. A decrease in blood pressure triggers a baroreceptor reflex that leads to increased ventilation. What is the possible advantage of this reflex?

## **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?
6. Lotta Bulk, a muscle builder, wanted to increase her muscle mass. Knowing that proteins are the main components of muscle, she consumed very large amounts of proteins daily. Explain why this strategy will or will not work.

## **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.
1. Explain how emphysema and congestive heart failure can lead to acid-base imbalances.

## **The Reproductive System**

3. Diane has peritonitis (an inflammation of the peritoneum), which her physician says resulted from a urinary tract infection. Why could this situation occur more readily in females than in males?
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?