

General Biology

Study Guide Exam #4

Write out the answers to these questions and turn it in on exam day for extra credit.

Tissues

1. Define the term tissue. Describe the four types of tissues. What is the primary function of each tissue type?
2. What types of cells are found in epithelial tissues? Where are epithelial tissues found in the body? What are the main functions of epithelial tissues?
3. What types of cells are found in muscle tissues? Where are muscle tissues found in the body? Describe the three subtypes of muscle tissues and where they are found.
4. What types of cells are found in connective tissues? Where are connective tissues found in the body? What do all connective tissues have in common? What are the subtypes of connective tissues? Give examples of the functions of connective tissues.
5. What types of cells are found in nervous tissues? Where are nervous tissues found in the body?

Digestion

1. A. Follow the path of food in the alimentary canal in humans (write out in order) and be able to identify them on a diagram. Also, be able to identify the accessory organs that aid in digestion.
2. A. Name and explain the functions(s) of each of the following structures: mouth/oral cavity, teeth, tongue, salivary glands B. Saliva contains the enzyme salivary amylase. What does this enzyme do? C. What types of digestion occurs in the mouth (mechanical/chemical)? Explain.
3. A. Where is the pharynx located? B. What does the epiglottis do when you swallow? C. Describe the structure and function of the esophagus. D. What is peristalsis?
4. A. What are two different functions of the stomach. B. What substances are produced by gastric glands and what are their functions? C. What is the approximate pH of gastric juice? D. Why doesn't your stomach digest itself? F. What is heartburn?
5. A. For each structure listed, explain what part it plays in chemical digestion of food in the small intestine (where it is and what it does/makes): liver, pancreas, gall bladder.
6. A. What is the primary function of the small intestine?
7. A. How do villi and microvilli aid with absorption? B. Draw and describe the structure of a villus. C. Show/describe where fat products are absorbed and where Amino acids and sugars are absorbed.
8. A. What is the main function of the large intestine? C. What leads to constipation? diarrhea?

Circulatory System and Blood

1. A. What are the functions of the circulatory system? B. Name and describe the main structures of the circulatory system.
2. A. What is the basic function of a heart? What is pulmonary circulation and what is its purpose? C. What is systemic circulation and what is its purpose?
3. A. Trace the path of blood (write out or diagram the structures) starting with the right atrium. Be able to trace the path from any point in the circulatory system. B. Put a check next to those structures that contain oxygenated blood.
4. A. What is the natural pacemaker of the heart and where is it located? B. Describe how the pacemaker works and how cardiac rhythm is maintained.
5. A. What is atherosclerosis? B. What causes a heart attack? How is this similar to a stroke?
6. Describe the following blood vessels in terms of location and/or direction of blood flow, relative sizes, and basic structure: arteries, veins, arterioles, venules, capillaries.
7. A. Define blood pressure. B. Explain what the two numbers represent when measuring someone's blood pressure (i.e. 120/80). C. Which is systolic and which is diastolic?
8. Blood: A. What is plasma? What is it composed of and what percent of the blood does it represent? B. Cellular components of the blood account for what percentage of blood volume? C. Name and describe the structures and functions of the three cellular components (RBCs, WBC's, Platelets) of blood.

Respiratory System

1. A. Name the major structures in the human respiratory system and give their functions B. Which are used for air transport and which for gas exchange? C. Be able to locate them on a diagram.
2. A. Name and explain some functions of the respiratory system as outlined in class.
3. A. Which blood gas concentration controls breathing? B. By what process is gas exchanged between the capillaries and the tissues of the body? C. Why does your breathing rate increase when you exercise? D. What structures expand or "move" to allow the chest cavity to expand during air intake?
4. Describe the following respiratory diseases: A. emphysema B. tuberculosis
5. A. What is cellular respiration? B. Where does it occur? C. What is the general formula for cellular respiration?

Musculoskeletal System

1. A. Which bones are part of the axial skeleton a. Appendicular skeleton?

2. A. Describe and give examples of the three types of joints: ball/socket, hinge, pivot. B. Describe how tendons are involved in muscle attachment to bone. C. How are ligaments involved?
3. A. What is periosteum? B. Draw a diagram of the microscopic structure of bone tissue. Label osteons, central canals, lacunae, osteocytes and hydroxyapatite.
4. A. How are actin and myosin involved in muscle contraction? B. Draw and label a diagram of a sarcomere. Be sure to label the thick and thin filaments and the Z-lines. What role does Calcium play in muscle physiology? What role does ATP play?
5. A: Describe the process of osteoporosis. B. What nutrients and macromolecules are involved in this pathology?

Nervous System

1. Which parts of the nervous system are responsible for the following functions of the nervous system: sensory input, integration and motor output. B. What are some other overall functions of the nervous system in relation to how the body functions.
2. What are the two major divisions (and their abbreviations) of the nervous system? B. What are these two divisions made up of physically (parts) C. What are the functions of these two divisions?
3. A. Draw and label a simplified example of a nerve cell (neuron) consisting of the four main parts of the neuron. B. For each of the four parts explain the function(s) of each. C. What is the myelin sheath of a neuron, where does it come from and what does it do for the neuron or nervous function?
4. A. What is meant by a "resting potential"? When does this occur and describe both sides of the plasma membrane during this time. B. What do sodium-potassium pumps do and how do they accomplish this? C. Why is the inside of the cell naturally negative (i.e. what kinds of negatively charged molecules are always inside cells?)
5. A. What is meant by an "action potential"? B. Describe what happens on either side of the membrane. C. How does an action potential move along the neuron? E. An action potential is said to be an "all or nothing" event - what is meant by this?
6. A. What is a synapse? B. How can a nerve signal continue when it encounters a synapse? C. What are neurotransmitters and how do they work?
10. A. Name and describe some of the structures that protect your CNS. B. What are some of the major functions of the spinal cord?
11. A Describe the structures and pathways involved in transmitting the impulses of each of the five special senses to the brain. B. What are the three main types of protein channel gates that initiate signals at the sensory receptors? Which sensors have which types?

Reproduction and Development

1. A. Briefly describe the function of the following human male reproductive structures: testes,

scrotum, epididymis, vas deferens, seminal vesicle, prostate gland, urethra, penis. Be able to locate these on a diagram.

2. A. What is semen and what are its contents? B. After meiosis occurs in the testes, are the products functional sperm cells? Explain why or why not. How are sperm cells modified for their function? C. Why are testes located outside the abdominal cavity? D. Why are so many sperm cells required for male fertility?

3. A. Describe the functions of the following human female reproductive structures: ovaries, oviducts (fallopian tubes), uterus, cervix, vagina. Be able to locate these on a diagram.

4. A. Why would you want to put all of the cytoplasm into one functional egg cell at the expense of the others during meiosis? B. What is ovulation?

5. A. Where does fertilization occur in the female reproductive tract (specifically)? And how long does it take for the fertilized egg to get to the uterus? B. When is the optimum time for fertilization in the woman's cycle? C. If the egg is not fertilized, what happens next?

6. Compare/contrast egg and sperm production given the following parameters: A. Name and location of the gonad. B. Name of the gamete. C. Number of gametes made per month. D. When does gamete production begin? E. Relative size of gamete.

Sexually Transmitted Diseases

1. A. List the three major groups of STD's and give some examples of each. B. Which groups are curable and which are not? C. Are any of these fatal if caught? D. What is PID?

2. A. For each of the following STDs, describe how it is transmitted, the symptoms, the causative agent, the treatments/cures (if any): Chlamydia, gonorrhea, syphilis, *trychamonas*, lice, HPV, HIV, HSV.

Parasites

1. Define each of the following terms: symbiosis, parasitism, mutualism, host, vector, reservoir. Give an example for each using the parasites we studied in class.

2. For each of the three general groups of parasites (protozoans, helminths, ectoparasites), describe their main characteristics and give an example for each.

3. Be able to recognize names of the three protozoan parasites discussed in class. For each describe associated pathologies/disease. *Trypanosomes*, *Plasmodium*, *Entamoeba*.

4. What are the three main groups of helminths? Be able to recognize the names the four helminths discussed in class. For each describe the disease/pathologies and any special information about the parasite.

5. Describe the primary characteristics of the ectoparasites discussed in class and give an example of one along with its mode of transmission and associated pathologies. How are these cured?

6. What does selective toxicity mean? Why is it an issue with parasites, but not so much a problem with bacterial pathogens?

Additional study for Final exam:

In addition to the recent material, please review your previous study guides for material that may show up on the cumulative portion of the final. As I told you in class, the cumulative questions will be general in nature and will focus on “big picture” concepts learned throughout the quarter. For example, don’t re-study all the different types of natural selection or all the details of protein expression. However, you should still understand how diffusion/osmosis works...how enzymes work and generally how genes ultimately determine phenotype. This is not a complete list, obviously, but hopefully will give you an idea of the depth you need to study for the cumulative portion of the exam. Good luck to all of you!!