

## **Biology Lab**

## **Study Guide for Lab Exam #3**

### **Lab Exercise #7A: Plant Structure**

Be able to tell the difference between monocots and eudicots by comparing seeds, root, stem, leaf and flower structures. Best way to tell the difference is to look at the arrangement of the vascular bundles/tissue in stem/root. Also looking at the distribution of structures in the leaf such as: upper epidermis, palisade mesophyll, spongy mesophyll, lower epidermis, stomata (pores), guard cells will help you determine what type of tissue it is and whether or not it is from monocot or eudicot. You will be expected to distinguish on figures on screen which structures come from monocot and which come from eudicots. Make sure you have accurate drawings of each.

What is vascular tissue? What is the function of xylem and phloem?

Be able to identify the guard cells, stomata and cell walls on a leaf peel and know the functions of each of those structures.

Know the part of the plant we commonly eat of certain spices and vegetables and the modifications that have been made (Table 7.2 in lab manual).

**Also, be able to correctly identify the organism/cell on screen. The organism/cell/structure will be displayed as you would have seen it under the microscope during the lab.**

### **Lab Exercise #8B: Plant Pigments**

Be familiar with the electromagnetic spectrum in your lab manual.

Which wavelengths of light have the most/least energy? At which wavelengths does photosynthesis work at?

What are the main pigments used for photosynthesis? How do pigments work? What is photosynthesis?

Be able to interpret an action spectrum of photosynthetic pigments. Which wavelengths of light give the highest rate of photosynthesis?

### **Lab Exercise #9A: Mitosis and Meiosis**

What is the eukaryotic cell cycle? What is interphase? What are the phases of interphase? Be able to identify the phases in the cell cycle and key events.

What is mitosis? What types of cells go through mitosis? What are the phases of mitosis? Be able to identify each phase on slides and in figures.

What are centrioles? What is the role in mitosis?

What are chromatids? What does an unduplicated chromosome look like? What does a duplicated chromosome look like?

What is the metaphase plate and when does it occur?

What is the spindle (fibers) apparatus and when does it occur? What is it made of?

What is cytokinesis? How does it occur in plant cells and animal cells?

What is cell plate formation? What is cleavage furrowing?

Be able to distinguish between a plant cell going through the cell cycle and an animal cell going through the cell cycle.

Does each new cell formed by mitosis have the same or different genetic material as each other?

Does each new cell have same or different genetic material as the original cell? Is the genetic material amount the same or different?

### **Lab Exercise #9B: Meiosis**

What is a karyotype? Why are autosomal trisomies or monosomies rare in humans?

What is meiosis? What type of cells go through meiosis?

What are the main differences between mitosis and meiosis?

What does it mean if an organism (or cell) is diploid? What does it mean if it is haploid?  
What are sister chromatids?  
What are gametes? What are female and male gametes called?  
What is fertilization? What is a zygote?  
What are the phases of meiosis? How many divisions occur? Is DNA replicated in each?  
What is crossing over and when does it occur?  
What is random alignment (independent assortment) and when does it occur?  
What do both crossing over and random alignment contribute to a new cell's DNA?  
Why is variation important?  
Are the gametes produced during meiosis diploid or haploid? Are they alike or varied from each other? Is each chromosome within a gamete duplicated or unduplicated?  
How many cells do you have after meiosis is complete?

### **Lab Exercise #9A: Bacteria and Archae**

What are the characteristics of bacteria and archae? What are representative organisms of each?  
Be able to identify all of the following structures in a prokaryotic (bacterial) cell: flagella, capsule, cell wall, plasma membrane, cytoplasm, ribosomes, DNA (know the function of each)  
What does it mean to be eukaryotic or prokaryotic? What does it mean to be heterotrophic, autotrophic? What is a photoautotroph? What does it mean to be decomposer, pathogen?  
What are the 3 shapes that bacteria can be found as? Be able to identify each under a microscope  
What is the Gram stain for? What special structure does it stain? What colors are visible and what do they mean?  
What type of organism is *Oscillatoria*?  
Make sure you know the bacteria name and the disease it causes (Table 9.2 in lab manual)

### **Lab Exercise #9B: Protists**

What are the characteristics of Protists? What are representative organisms?  
For each of the following organisms you need to be able to identify them and how they move: *Amoeba*, *Paramecium caudatum*, *Euglena*, *Trypanosoma brucei*, *Giardia lamblia*, *Trichomonas vaginalis*, *Plasmodium vivax*, dinoflagellates,  
Special features of each (which may not be found in all of them), contractile vacuole, nucleus, pseudopodia, cilia, flagella, spores

Archaeplastids: Which type of organisms make up this section? What special characteristics set them apart from the other protists?

Organisms to identify: *Euglena*, diatoms, dinoflagellates: *Ceratium* (what do they cause?), red algae, brown algae, green algae, including *Spirogyra*, *Volvox*

Rhizarians: foraminiferans, radiolarians

What are the main pigments found in the 3 different types of algae? What are they used for?

What are algin and agar and where do they come from and what is their use?

### **Hints for studying all the organisms in this section:**

Make a table with each of the organisms studied. You must know its scientific name (genus, species), the group it belongs to, how it moves, how it obtains nutrients, whether or not it causes human disease and the name of the disease and transmission, whether it contains any photosynthetic pigments and the types, and whether any useful products can be made from the organism.

**Also, be able to correctly identify the organism/cell on screen. The organism/cell/structure will be displayed as you would have seen it under the microscope during the lab.**