

Exercise 7: Mitosis

1. Define the following terms:

Cell cycle:

Mitosis:

Cytokinesis:

Chromosomes:

Spindle fibers:

Equator plane:

Sister-chromatids:

Kinetochores:

Centromere:

Cell plate:

Cleavage furrow:

2. List the different phases of the cell cycle. What happens in each stage?
3. What is the difference between mitosis and cell cycle?
4. List the different phases of mitosis. What happens in each stage? What are the number of chromosomes and the physical state of chromosomes in each stage?
5. What is cytokinesis? Describe the difference between animal and plant cytokinesis.
6. What is the difference between mitosis and cytokinesis?

Answer all questions in pages 8-9 of Lab Exercise 7

1. Why are the onion root tip and the whitefish blastula useful tissue for the study of cell division?
2. Distinguish between mitosis and cytokinesis.
3. If a cell has 16 chromosomes when it is in G1, how many chromosomes will there be in each daughter cell following a mitotic cell division?
4. What are the genetic consequence of mitotic cell divisions for the resulting daughter cells?
5. How do plant and animal cells differ in the execution of cytokinesis? Why don't plant cells undergo cytokinesis in the same manner as animal cells?
6. List several important values or attributes that mitotic cell division provides to multicellular life. In other words, in what ways is mitotic cell division useful for life?
7. List the 4 stages of the cell cycle and describe the primary cellular activity in each stage?

Very Important: You should be able to identify the stages (shown under microscope) of cell cycle/mitosis in an onion root tip and whitefish blastula.

Exercise 11: Plant Cells, Tissues and Organs

1. Define Tissue:
2. Define organ
3. Identify root system, shoot system, stem, leaves, node, internode, blade and periole.
4. How does a tap root differ from a diffuse root?
5. What are the four major plant tissues? Describe their functions.
6. Distinguish between a longitudinal section and a cross section.
7. Identify the different parts of a longitudinal section of a growing root.
 - A. What is the function of root cap? What kind of tissue is the root cap made of?
 - B. What is the function of region of cell division? What kind of tissue is this region made of?
8. Identify and describe the functions of different parts of cross section of a root: epidermis, cortex, vascular cylinder, xylem, phloem, endodermis, parenchyma cells.
9. Identify and describe the functions of different parts of cross section of a woody dicot stem: pith, xylem, annual ring, vascular ray, vascular cambium, phloem, cortex periderm.
10. What can we tell about from the annual ring?
11. How are annual rings formed?
12. Identify and describe the functions of different parts of a leaf cross section: upper epidermis, lower epidermis, guard cell, stomata, veins, palisade layer, spongy layer, mesophyll.
13. In which epidermis layer are stomata more prevalent?
14. What types of gases move in and out of the leaf through the stomata?

Exercise 12: Animal Cells and Tissues

1. Describe the functions of the 4 types of animal tissues.
2. Identify and describe the functions of following tissues and structure of trachea: pseudostratified ciliated columnar epithelium, goblet cells, cartilage, chondrocytes, matrix.
3. What is the matrix of cartilage made of?
4. Identify and describe the functions of Haversian system, Haversian canal, osteocytes, canaliculated, lacuna, matrix in bone.
5. What are the major cells in blood?
6. Identify muscle fibers, striation, nuclei in a cross section of striated muscle.
7. What is the function of striated muscle?
8. Identify and describe the functions of different cells in nervous tissue.
9. Identify the following parts of a neuron: cell body, axon, dendrites, nucleus.