

Name Mia Genoves

Lab Time/Date \_\_\_\_\_

## EXERCISE

# 4

REVIEW SHEET

# The Cell: Anatomy and Division

## Anatomy of the Composite Cell

1. Define the following terms:

organelle: Structures with specific functions.

cell: The structural and functional unit of all living things.

2. Although cells have differences that reflect their specific functions in the body, what functions do they have in common?

Cells can metabolize, digest nutrients, dispose waste, grow, reproduce, move and respond to stimulus.

3. Identify the following cell parts:

cytoplasmic membrane

1. external boundary of cell; regulates flow of materials into and out of the cell; site of cell signaling

lysosome

2. contains digestive enzymes of many varieties; "suicide sac" of the cell

mitochondria

3. scattered throughout the cell; major site of ATP synthesis

microvilli

4. slender extensions of the plasma membrane that increase its surface area

inclusion body

5. stored glycogen granules, crystals, pigments, and so on

golgi apparatus

6. membranous system consisting of flattened sacs and vesicles; packages proteins for export

nucleus

7. control center of the cell; necessary for cell division and cell life

centrioles

8. two rod-shaped bodies near the nucleus; associated with the formation of the mitotic spindle

nucleolus

9. dense, darkly staining nuclear body; packaging site for ribosomes

filaments

10. contractile elements of the cytoskeleton

ER

11. membranous system; involved in intracellular transport of proteins and synthesis of membrane lipids

ribosomes

12. attached to membrane systems or scattered in the cytoplasm; site of protein synthesis

chromatin

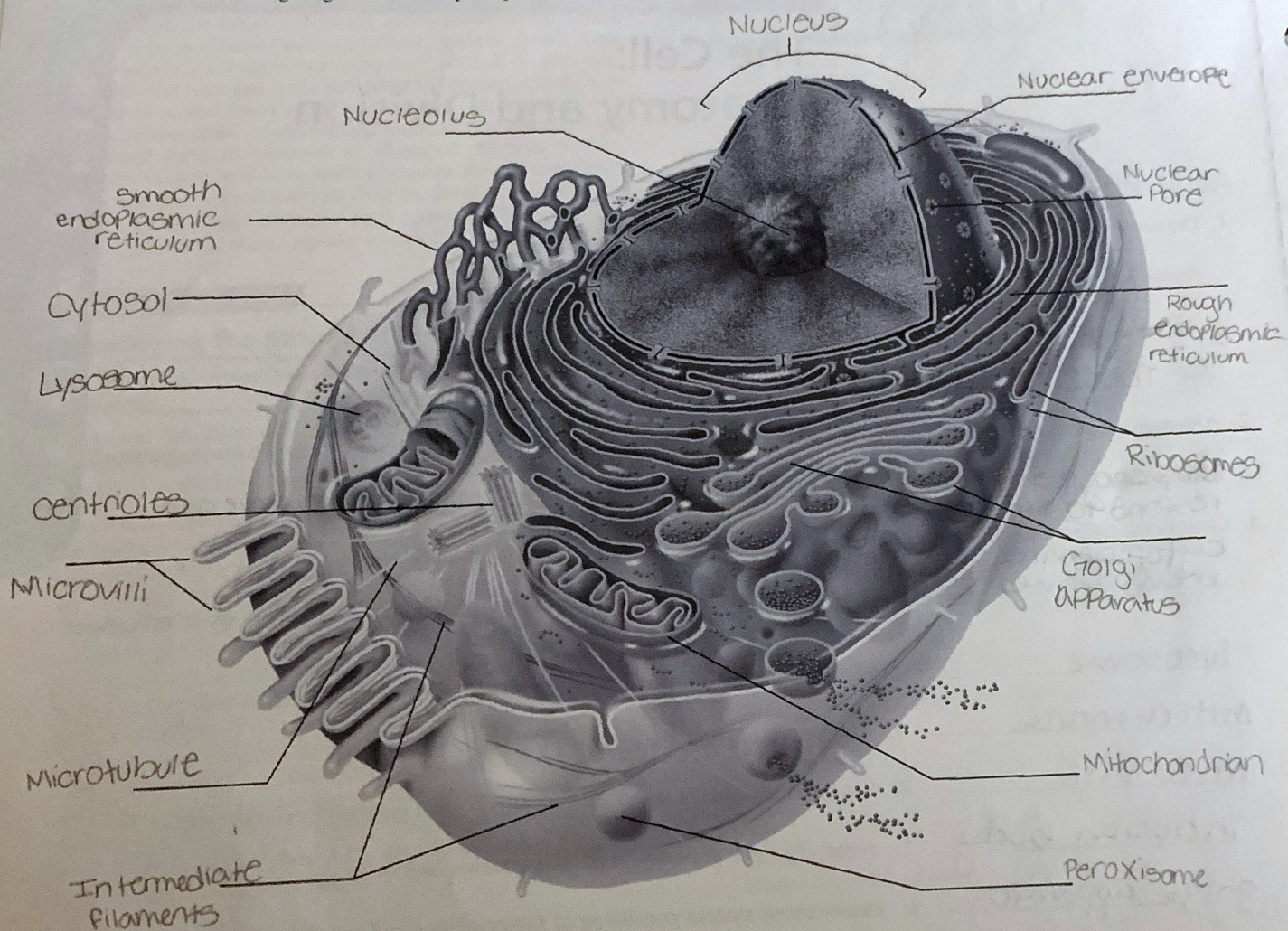
13. threadlike structures in the nucleus; contain genetic material (DNA)

peroxisomes

14. site of free radical detoxification



4. In the following diagram, label all parts provided with a leader line.



## Differences and Similarities in Cell Structure

5. For each of the following cell types, list (a) *one* important structural characteristic observed in the laboratory, and (b) the function that the structure complements or ensures.

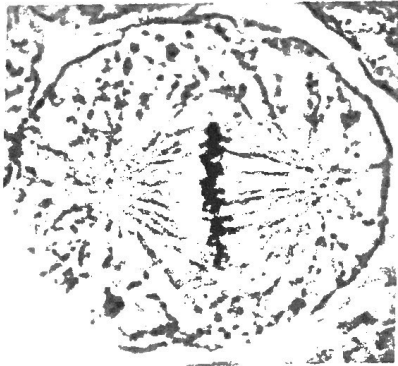
- |                     |   |
|---------------------|---|
| squamous epithelium | a. <u>fit together like floor tiles</u> |
|                     | b. <u>overlapping and layering</u>      |
| sperm               | a. <u>Flagellum</u>                     |
|                     | b. <u>allows sperm to travel to egg</u> |
| smooth muscle       | a. <u>long shaped cell</u>              |
|                     | b. <u>muscles tense and relax</u>       |
| red blood cells     | a. <u>Disc shape</u>                    |
|                     | b. <u>carries oxygen</u>                |



6. What is the significance of the red blood cell being anucleate (without a nucleus)? Red blood cells will have more hemoglobin that increases its efficiency to carry oxygen.
- Did it ever have a nucleus? (Use an appropriate reference.) yes If so, when? before it goes into blood stream
7. Of the four cells observed microscopically (squamous epithelial cells, red blood cells, smooth muscle cells, and sperm), which has the smallest diameter? RBC Which is longest? smooth muscle cells

## Cell Division: Mitosis and Cytokinesis

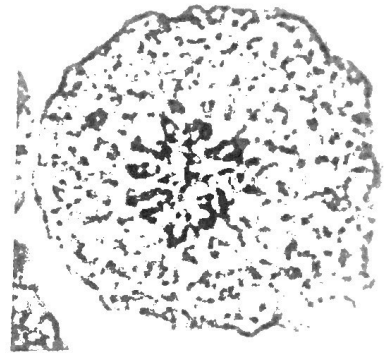
8. Identify the three phases of mitosis in the following photomicrographs.



a. Metaphase



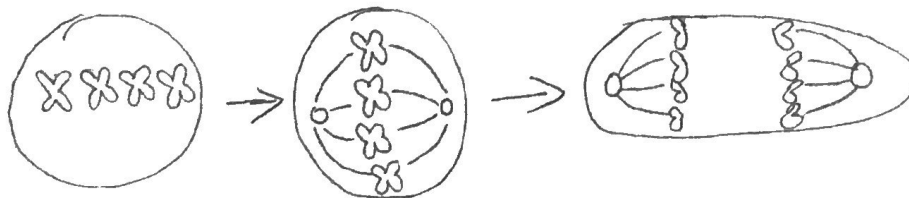
b. Anaphase



c. Prophase

9. What is the importance of mitotic cell division? To make more cells for repair and growth

10. Draw the phases of mitosis for a cell that contains four chromosomes as its diploid or  $2n$  number.



## 11. Complete or respond to the following statements:

Division of the 1 is referred to as mitosis. Cytokinesis is division of the 2. The major structural difference between chromatin and chromosomes is that the latter are 3. Chromosomes attach to the spindle fibers by undivided structures called 4. If a cell undergoes mitosis but not cytokinesis, the product is 5. The structure that acts as a scaffolding for chromosomal attachment and movement is called the 6. 7 is the period of cell life when the cell is not involved in division. Two cell populations in the body that do not routinely undergo cell division are 8 and 9.

1. Replicated DNA
2. Cytoplasm
3. shortened + condensed
4. Kinetochores
5. binucleate
6. spindle
7. interphase
8. Neurons
9. RBCs

## 12. Using the key, categorize each of the events described below according to the phase in which it occurs.

Key: a. anaphase b. interphase c. metaphase d. prophase e. telophase

- d 1. Chromatin coils and condenses, forming chromosomes.
- a 2. The chromosomes are V shaped.
- e 3. The nuclear envelope re-forms.
- e 4. Chromosomes stop moving toward the poles.
- c 5. Chromosomes line up in the center of the cell.
- d 6. The nuclear envelope fragments.
- d 7. The mitotic spindle forms.
- b 8. DNA synthesis occurs.
- b 9. Centrioles replicate.
- d 10. Chromosomes first appear to be duplex structures.
- d 11. Chromosomal centromeres are attached to the kinetochore fibers.
- e 12. Cleavage furrow forms.
- c and a 13. The nuclear envelope(s) is absent.

## 13. What is the physical advantage of the chromatin coiling and condensing to form short chromosomes at the onset of mitosis?

prevents tangling + breaking