

Name Gabriela Ortiz

Lab Time/Date 03/04/21
Bio2311: (24722)

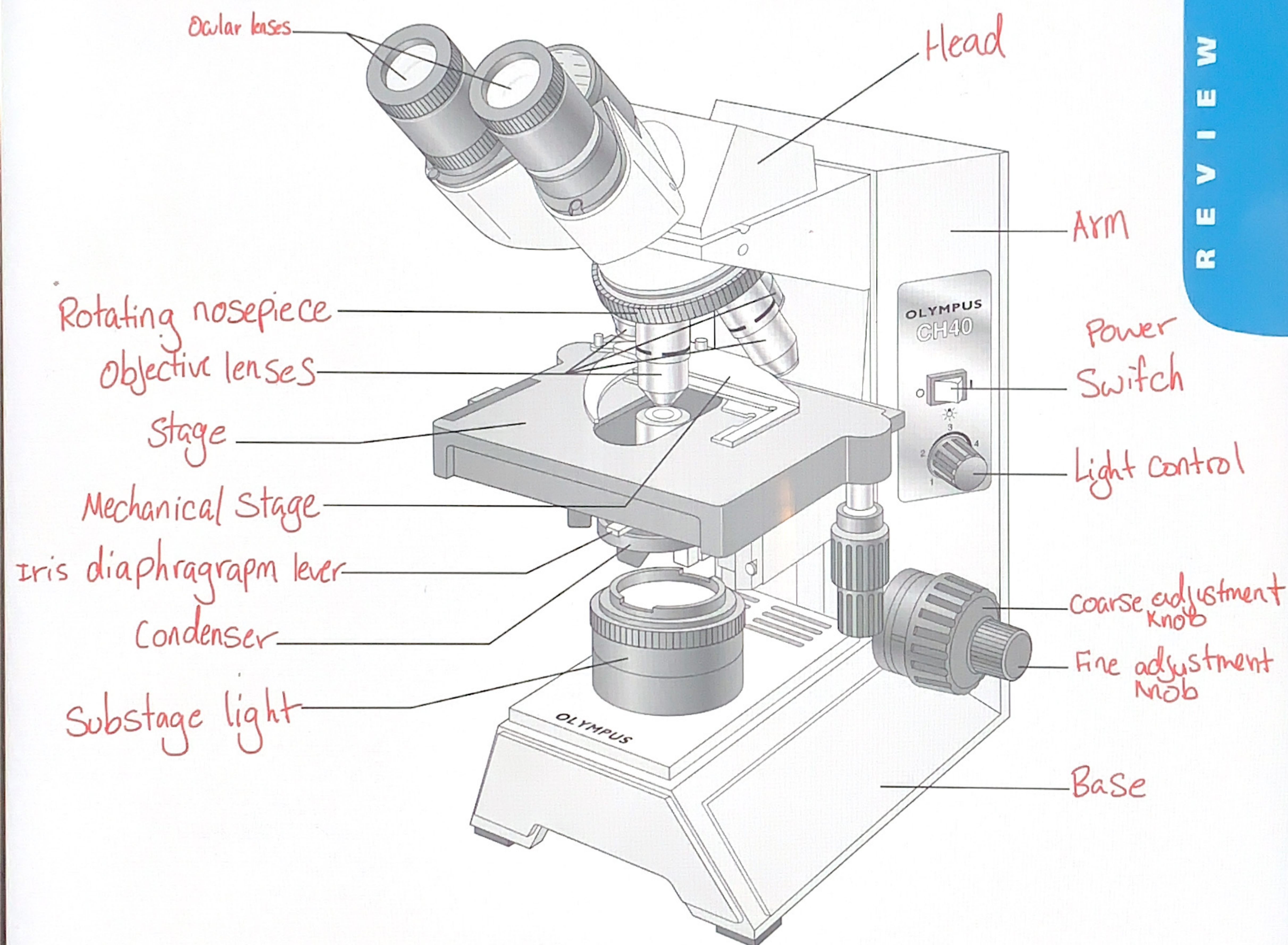
EXERCISE 3

REVIEW SHEET

The Microscope

Care and Structure of the Compound Microscope

1. Label all indicated parts of the microscope.



2. Explain the proper technique for transporting the microscope.

To hold the microscope properly is by holding it with both hands, one hand under the base and the other on the arm.

3. The following statements are true or false. If true, write *T* on the answer blank. If false, correct the statement by writing on the blank the proper word or phrase to replace the one that is underlined.

- Special Grit-free lens paper 1. The microscope lens may be cleaned with any soft tissue.
- Lowest Power objective 2. The microscope should be stored with the oil immersion lens in position over the stage.
- T 3. When beginning to focus, use the lowest-power lens.
- away from 4. When focusing, always focus toward the specimen.
- only with wet mounts 5. A coverslip should always be used with wet mounts and the high-power and oil lenses.

4. Match the microscope structures in column B with the statements in column A that identify or describe them.

Column A

- J 1. platform on which the slide rests for viewing
- D 2. used to increase the amount of light passing through the specimen
- I 3. secure(s) the slide to the stage
- B 4. delivers a concentrated beam of light to the specimen
- C 5. used for precise focusing once initial focusing has been done
- F 6. carries the objective lenses; rotates so that the different objective lenses can be brought into position over the specimen

Column B

- a. coarse adjustment knob
- ~~b. condenser~~
- ~~c. fine adjustment knob~~
- ~~d. iris diaphragm~~
- e. mechanical stage
- ~~f. nosepiece~~
- g. objective lenses
- h. ocular
- ~~i. spring clips~~
- ~~j. stage~~

5. Define the following terms.

virtual image: The position of an image seem to be upside down.

resolution: used to distinguish different objects.

Viewing Objects Through the Microscope

6. Complete, or respond to, the following statements:

- Working distance 1. The distance from the bottom of the objective lens to the specimen is called the _____.
- Left 2. Assume there is an object on the left side of the field that you want to bring to the center (that is, toward the apparent right). In what direction would you move your slide? _____
- Field 3. The area of the specimen seen when looking through the microscope is the _____.
- 95 4. If a microscope has a 10× ocular and the total magnification at a particular time is 950×, the objective lens in use at that time is _____ ×.
- To focus on the cell 5. Why should the light be dimmed when looking at living (nearly transparent) cells?
- Parfocal 6. If, after focusing in low power, only the fine adjustment need be used to focus the specimen at the higher powers, the microscope is said to be _____.
- 0.75mm 7. If, when using a 10× ocular and a 15× objective, the field size is 1.5 mm, the approximate field size with a 30× objective is _____ mm.

0.67

8. If the size of the high-power field is 1.2 mm, an object that occupies approximately a third of that field has an estimated diameter of _____ mm.
7. You have been asked to prepare a slide with the letter *k* on it (as shown below). In the circle below, draw the *k* as seen in the low-power field.



8. Figure out the magnification of fields 1 and 3, and the field size of 2. (Hint: Use your ruler.) Note that the numbers for the field sizes below are too large to represent the typical compound microscope lens system, but the relationships depicted are accurate.

5 mm
1. → ○ ←
_____ ×

_____ mm
2. → ○ ←
100 ×

0.5 mm
3. → ○ ←
_____ ×

} I don't know

9. Say you are observing an object in the low-power field. When you switch to high-power, it is no longer in your field of view.

Why might this occur? By switching to high power

What should be done initially to prevent this from happening? By viewing the subject and slowly switching the magnifier.

10. Do the following factors increase or decrease as one moves to higher magnifications with the microscope?

resolution: Increase

amount of light needed: Increase

working distance: Decrease

depth of field: Decrease

11. A student has the high-dry lens in position and appears to be intently observing the specimen. The instructor, noting a working distance of about 1 cm, knows the student isn't actually seeing the specimen.

How so? At this short distance, oil is needed to see details

12. Describe the proper procedure for preparing a wet mount.

The specimen is placed on a slide, and a drop of oil or saline is added on top of it. A coverslip is dropped on top of the wet specimen at 45° angle to avoid bubbles in the end product.

13. Indicate the probable cause of the following situations arising during use of a microscope.

a. Only half of the field is illuminated: won't be able to see the object correctly.

b. Field does not change as mechanical stage is moved: If not clipped on the field the specimen will be hard to see.

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EXERCISE 4

REVIEW SHEET

The Cell: Anatomy and Division

Anatomy of the Composite Cell

1. Define the following terms:

organelle: The compartment of a structure that has a specific function in the cell.

cell: the basic organization 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?

They reproduce & grow.

3. Identify the following cell parts:

plasma 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

inclusions

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

microfilaments

10. contractile elements of the cytoskeleton

Rough Endocrine

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

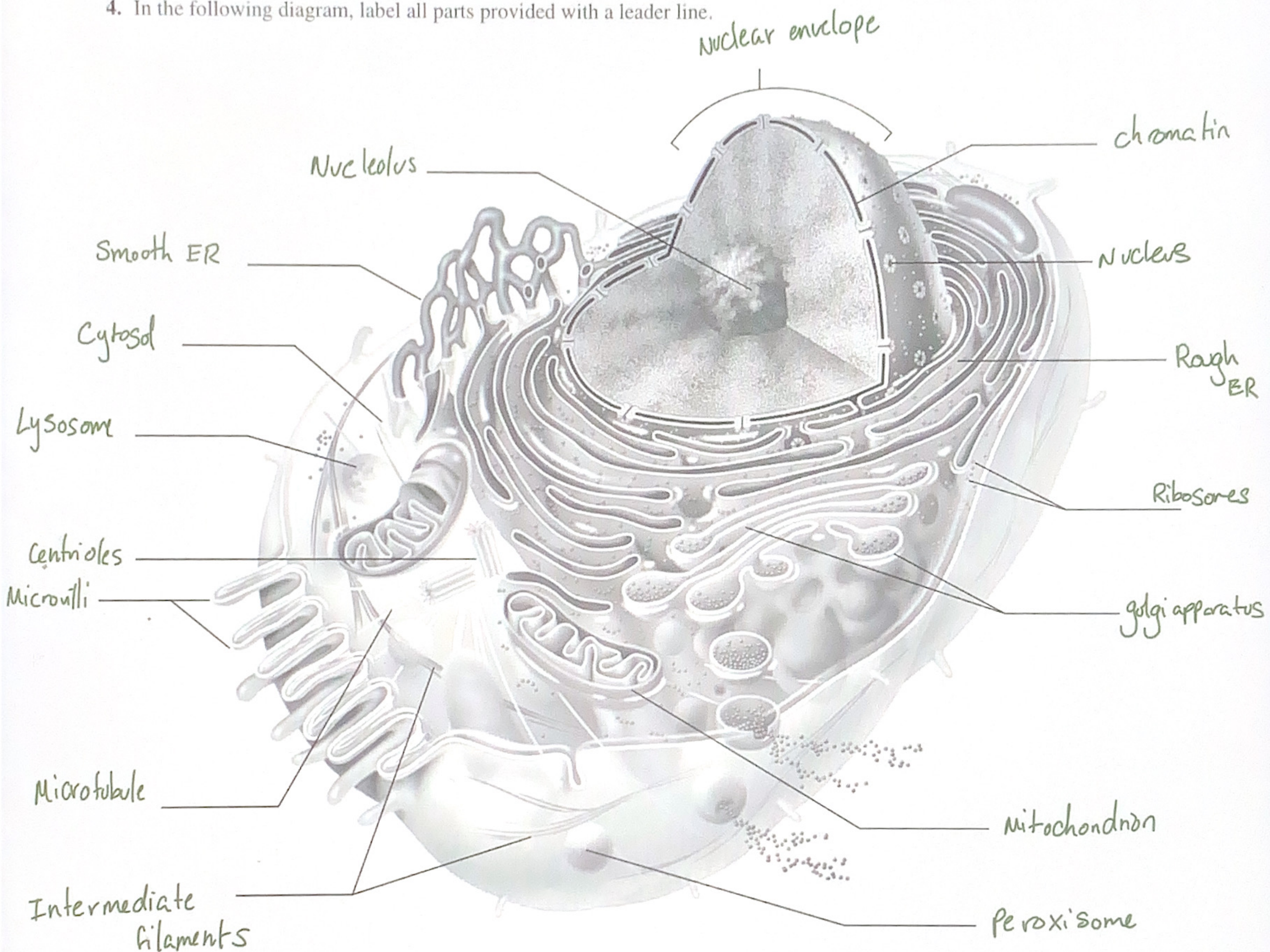
Chromatin threads

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

peroxisome

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. scale shaped
- b. Lines the inner surface of all blood vessels.

sperm

- a. Has a tail
- b. allows sperm to reach the egg.

smooth muscle

- a. spindle shaped
- b. Contraction

red blood cells

- a. biconcave disk
- b. large area to carry hemoglobin

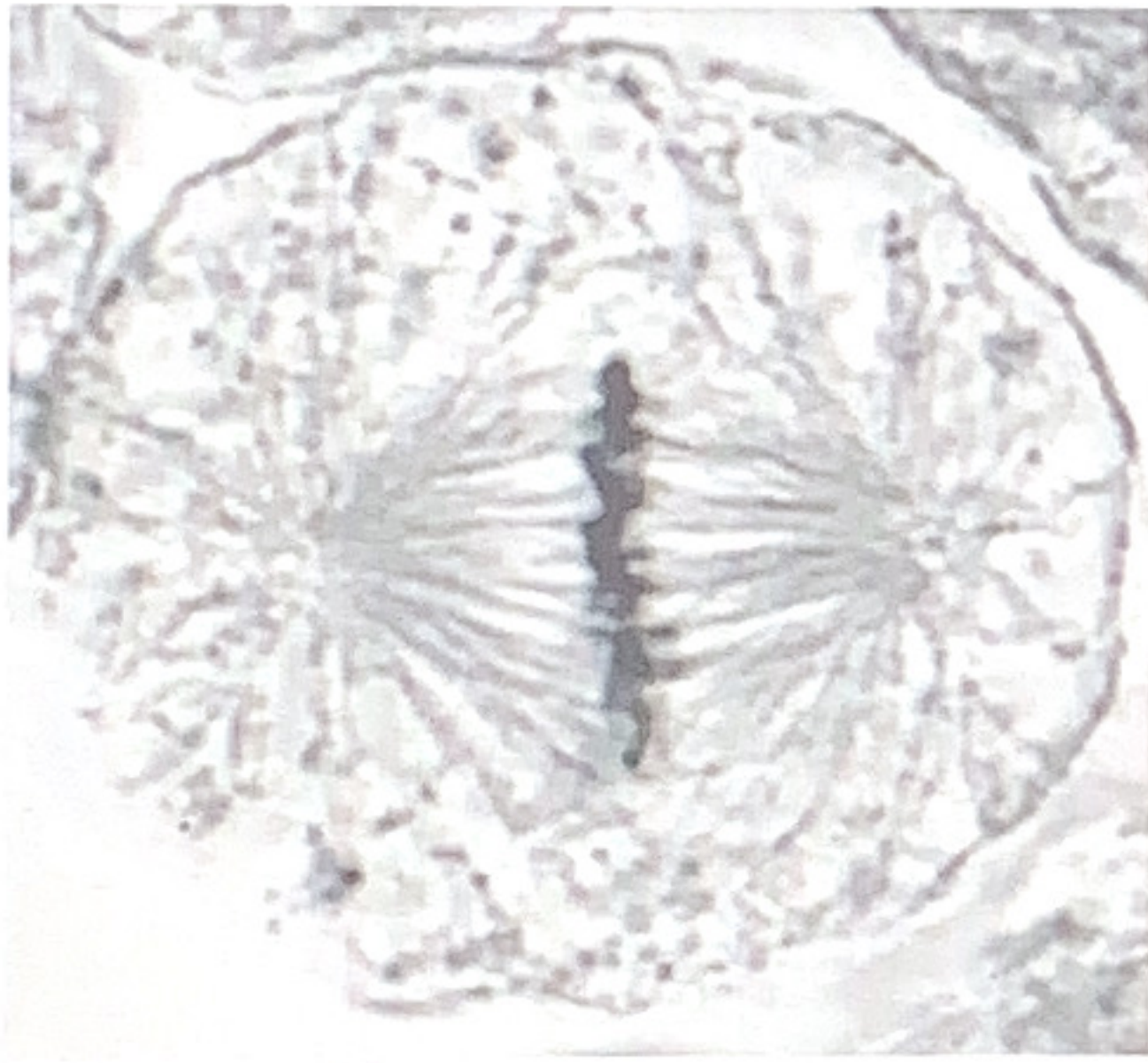
6. What is the significance of the red blood cell being anucleate (without a nucleus)? It would contain more room to increase the hemoglobin oxygen.

Did it ever have a nucleus? (Use an appropriate reference.) yes If so, when? Before the release into the bloodstream.

7. Of the four cells observed microscopically (squamous epithelial cells, red blood cells, smooth muscle cells, and sperm), which has the smallest diameter? sperm Which is longest? squamous epithelial

Cell Division: Mitosis and Cytokinesis

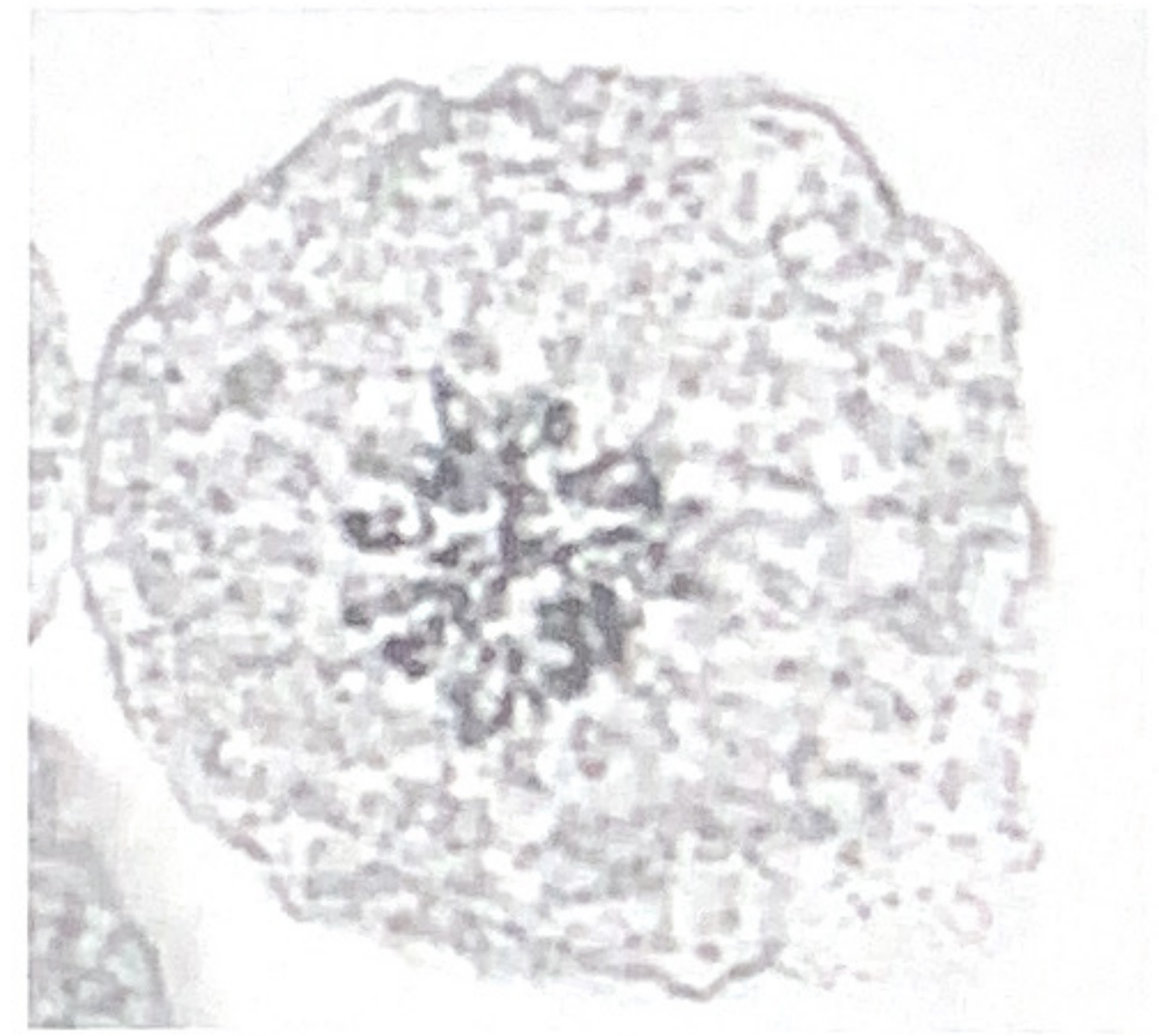
8. Identify the three phases of mitosis in the following photomicrographs.



a. metaphase



b. anaphase



c. prophase

9. What is the importance of mitotic cell division? for growth and replicates.

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. nucleus
2. cytoplasm
3. condensed
4. centromeres
5. binucleate cell
6. spindle
7. interphase
8. neurons
9. skeletal

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

- | | |
|-------------------|---|
| <u>prophase</u> | 1. Chromatin coils and condenses, forming chromosomes. |
| <u>Anaphase</u> | 2. The chromosomes are V shaped. |
| <u>telophase</u> | 3. The nuclear envelope re-forms. |
| <u>Telophase</u> | 4. Chromosomes stop moving toward the poles. |
| <u>metaphase</u> | 5. Chromosomes line up in the center of the cell. |
| <u>prophase</u> | 6. The nuclear envelope fragments. |
| <u>prophase</u> | 7. The mitotic spindle forms. |
| <u>Interphase</u> | 8. DNA synthesis occurs. |
| <u>Interphase</u> | 9. Centrioles replicate. |
| <u>prophase</u> | 10. Chromosomes first appear to be duplex structures. |
| <u>prophase</u> | 11. Chromosomal centromeres are attached to the kinetochore fibers. |
| <u>telophase</u> | 12. Cleavage furrow forms. |
| <u>anaphase</u> | and <u>prophase</u> 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?
