Instructors may assign a portion of the Review Sheet questions using Mastering A&P™

EXERCISE 4

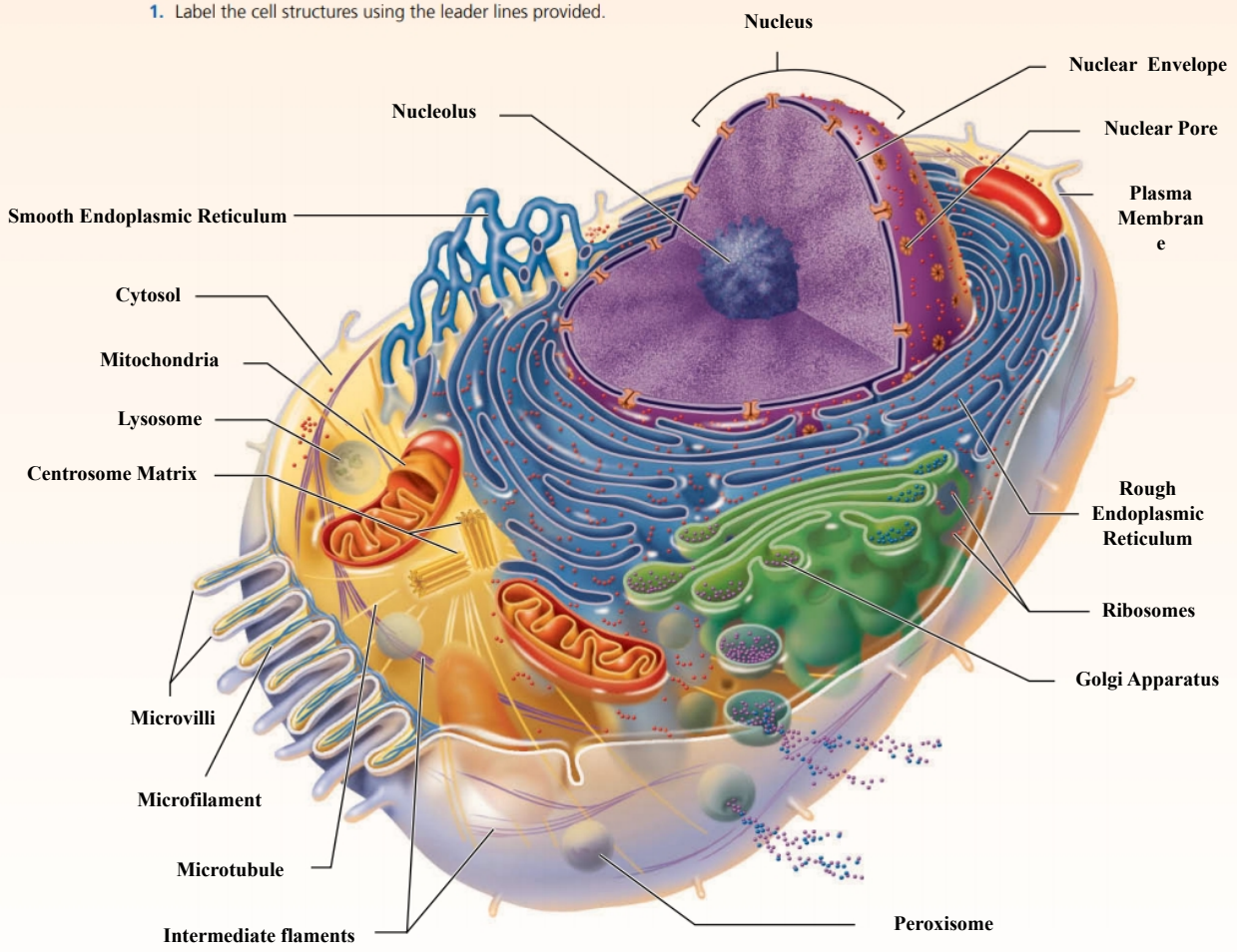
REVIEW SHEET

The Cell: Anatomy and Division

Name Trevor Wright Lab Time/Date _____

Anatomy of the Composite Cell

1. Label the cell structures using the leader lines provided.



2. Match each cell structure listed on the left with the correct description on the right.

f	1. ribosome	a.	main site of ATP synthesis
h	2. smooth ER	b.	encloses the chromatin
a	3. mitochondrion	c.	sac of digestive enzymes
b	4. nucleus	d.	examples include glycogen granules and ingested foreign materials
j	5. Golgi apparatus	e.	forms basal bodies and helps direct mitotic spindle formation
c	6. lysosome	f.	site of protein synthesis
e	7. centriole	g.	forms the external boundary of the cell
k	8. cytoskeleton	h.	site of lipid synthesis
d	9. inclusion	i.	packaging site for ribosomes
g	10. plasma membrane	j.	packages proteins for transportation
i	11. nucleolus	k.	internal cellular network of rodlike structures

Differences and Similarities in Cell Structure

3. Choose the specimen observed in Activity 5 (squamous epithelium, sperm cells, smooth muscle, or human red blood cells) that fits the description below.

1. sperm cells cell has a flagellum for movement
2. smooth muscle cells have an elongated shape (tapered at each end)
3. squamous epithelium cells are close together
4. red blood cells cells are circular
5. squamous epithelium cells are thin and flat, with irregular borders
6. red blood cells cells are anucleate (without a nucleus)
7. smooth muscle longest cell

Cell Division

4. What is the function of mitotic cell division? _____

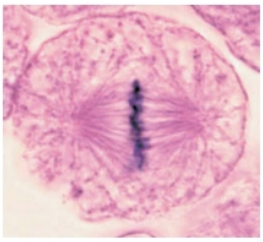
The function of mitotic cell division is for cellular repair and growth.

_____

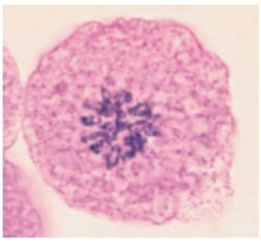
5. Identify the four phases of mitosis shown in the following photomicrographs, and select the events from the key that correctly identify each phase. On the appropriate answer line, write the letters that correspond to these events.

Key:

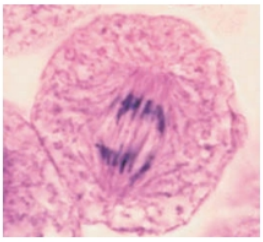
a. The nuclear envelope re-forms.
b. Chromosomes line up in the center of the cell.
c. Chromatin coils and condenses, forming chromosomes.
d. Chromosomes stop moving toward the poles.
e. The chromosomes are V shaped.
f. The nuclear envelope breaks down.
g. Chromosomes attach to the spindle fibers.
h. The mitotic spindle begins to form.



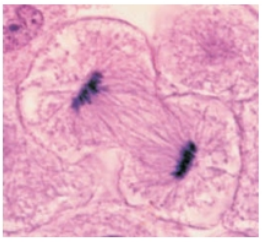
1. Phase: metaphase
   Events: b



2. Phase: prophase
   Events: c,f,h



3. Phase: anaphase
   Events: e,g



4. Phase: telophase
   Events: a,d

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

7. Describe the events that occur during interphase.

During interphase the cell carries out its normal metabolic activities and grows. The DNA-containing material is in the form of chromatin. The nuclear envelope and one or more nucleoli are intact and visible.

• There are three distinct periods of interphase: G1: The centrioles begin replicating. S: DNA is replicated. G2: Final preparations for mitosis are completed, and centrioles finish replicating.

8. 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. Three cell populations in the body that do not routinely undergo cell division are __8__, __9__, and __10__.

1. **nucleus**
2. **cytoplasm**
3. **coiled/condensed/shortened**
4. **centromeres**
5. **multinucleated cell**
6. **spindle**
7. **interphase**
8. **skeletal muscle**
9. **cardiac muscle**
10. **mature nuerons**

9. Plasma cells are key to the immune response because they secrete antibodies. Given that antibodies are made of protein, which membrane-enclosed cell organelle would you expect the plasma cells to have in abundance? Why? _____

10. Name which organelle you would expect to play the largest role in decomposition of the human body. Why? _____

11. Some antifungal medications work by blocking DNA synthesis in the fungal cell. Describe where in the cell cycle such a medication would halt the fungal cell and the consequences of this early termination of the cycle. _____