

The Cell—Anatomy and Division

Anatomy of the Composite Cell

1. Define the following:

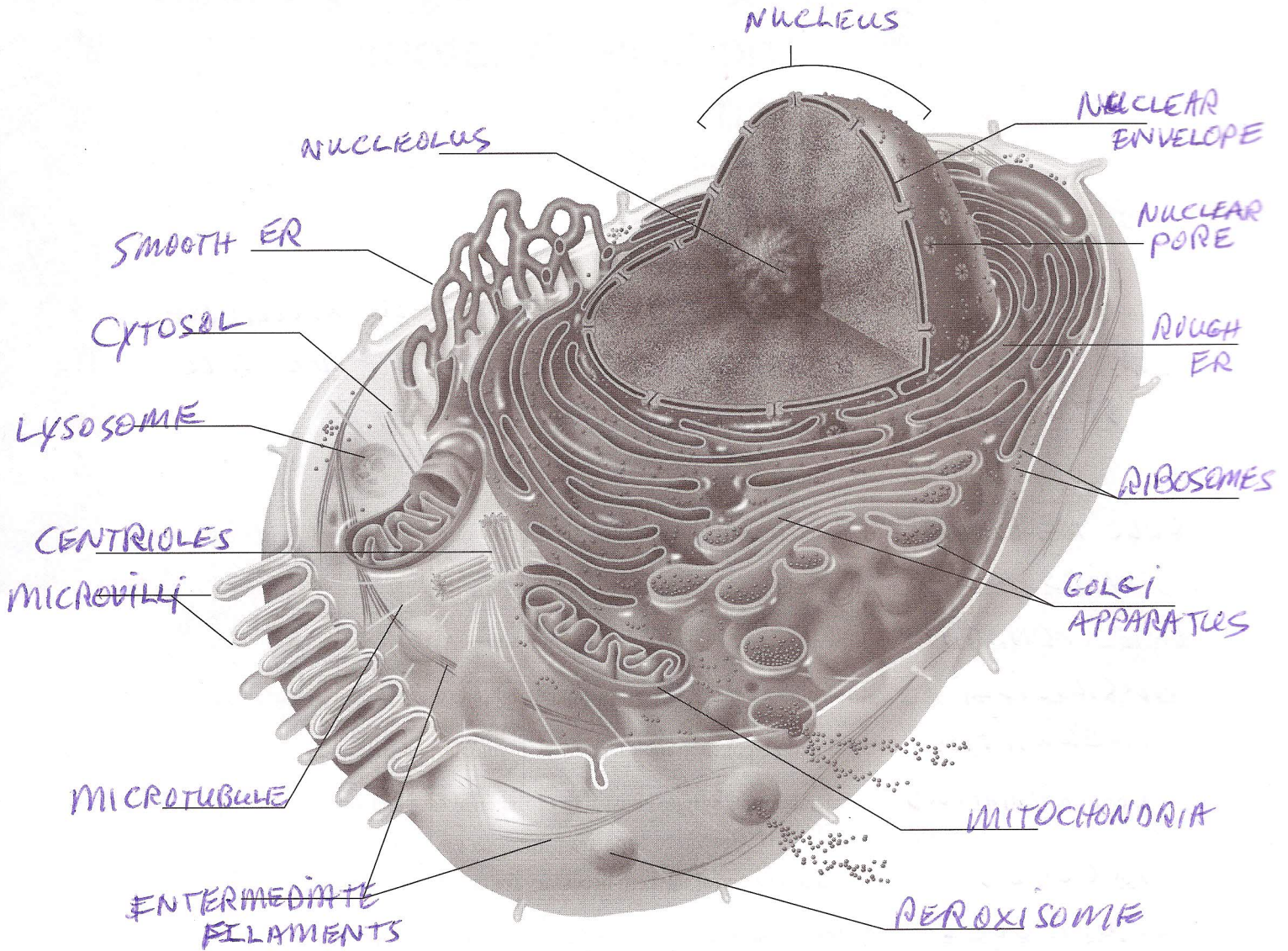
Organelle: SMALL ORGANS & AREAS OF THE CELL WALLED OFF FROM OTHER AREAS; DO METABOLIC REACTIONS OF THE CELL

Cell: STRUCTURAL & FUNCTIONAL UNITS OF LIFE

2. Identify the following cell parts:

- | | |
|------------------------------|--|
| <u>CELL MEMBRANE</u> | 1. external boundary of cell; regulates flow of materials into and out of the cell |
| <u>LYSOSOME</u> | 2. contains digestive enzymes of many varieties; "suicide sac" of the cell |
| <u>MITOCHONDRIA</u> | 3. scattered throughout the cell; major site of ATP synthesis |
| <u>MICROVILLI</u> | 4. slender extensions of the plasma membrane that increase its surface area |
| <u>INCLUSIONS</u> | 5. stored glycogen granules, crystals, pigments, and so on |
| <u>GOLGI APPARATUS</u> | 6. membranous system consisting of flattened sacs and vesicles; packages proteins for export |
| <u>NUCLEUS</u> | 7. control center of the cell; necessary for cell division and cell life |
| <u>CENTRIOLES</u> | 8. two rod-shaped bodies near the nucleus; the basis of cilia |
| <u>NUCLEOLUS</u> | 9. dense, darkly staining nuclear body; packaging site for ribosomes |
| <u>MICROFILAMENTS</u> | 10. contractile elements of the cytoskeleton |
| <u>ENDOPLASMIC RETICULUM</u> | 11. membranous system that has "rough" and "smooth" varieties |
| <u>RIBOSOMES</u> | 12. attached to membrane systems or scattered in the cytoplasm; synthesize proteins |
| <u>CHROMATIN</u> | 13. threadlike structures in the nucleus; contain genetic material (DNA) |
| <u>PEROXISOMES</u> | 14. site of detoxification of harmful chemicals |

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



Differences and Similarities in Cell Structure

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

- | | |
|---------------------|---|
| squamous epithelium | a. <u>FLAT & THIN</u> |
| | b. <u>COVERS SURFACES, PROTECTION</u> |
| sperm | a. <u>FLAGELLA</u> |
| | b. <u>PROPELS SPERM FORWARD</u> |
| smooth muscle | a. <u>FORMS BANDS AROUND TUBES</u> |
| | b. <u>MOVES MATERIALS THROUGH TUBES</u> |

red blood cells

- a. BICONCAVE DISC
- b. TOUGH + INCREASES SURFACE AREA

5. What is the significance of the red blood cell being anucleate (without a nucleus)? IT IS NOT ALIVE; NEED TO BE REPLACED OFTEN

Did it ever have a nucleus? YES When? URING DEVELOPMENT

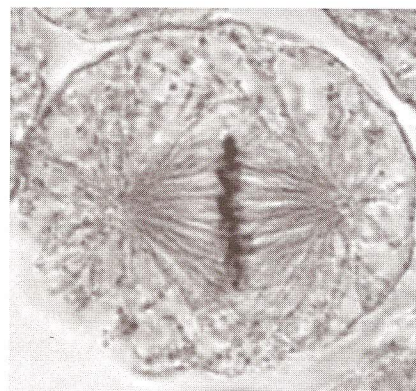
Cell Division: Mitosis and Cytokinesis

6. What is the importance of mitotic cell division? ALLOWS FOR PRODUCTION OF TWO IDENTICAL DAUGHTER CELLS FROM ONE PARENT CELL

7. Identify the three phases of mitosis shown in the following photomicrographs, and select the events from the key choices that correctly identify each phase. Write the key letters on the appropriate answer line.

Key:

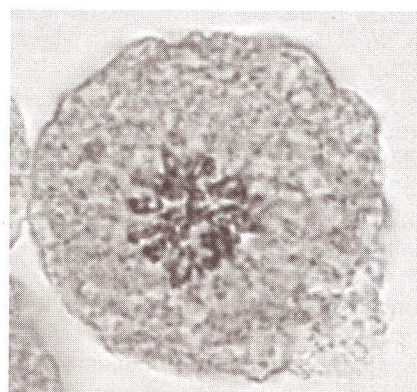
- a. Chromatin coils and condenses, forming chromosomes.
- b. The chromosomes (chromatids) are V-shaped.
- c. The nuclear envelope re-forms.
- d. Chromosomes stop moving toward the poles.
- e. Chromosomes line up in the center of the cell.
- f. The nuclear envelope fragments.
- g. The spindle forms.
- h. DNA synthesis occurs.
- i. Chromosomes first appear to be double.
- j. Chromosomes attach to the spindle fibers.
- k. The nuclear envelope(s) is absent.



1. Phase: METAPHASE
 Events: e, k.



2. Phase: ANAPHASE
 Events: b, d, k.



3. Phase: PROPHASE
 Events: a, f, g, h, i, j, k.