

The Cell—Anatomy and Division

Anatomy of the Composite Cell

1. Define the following:

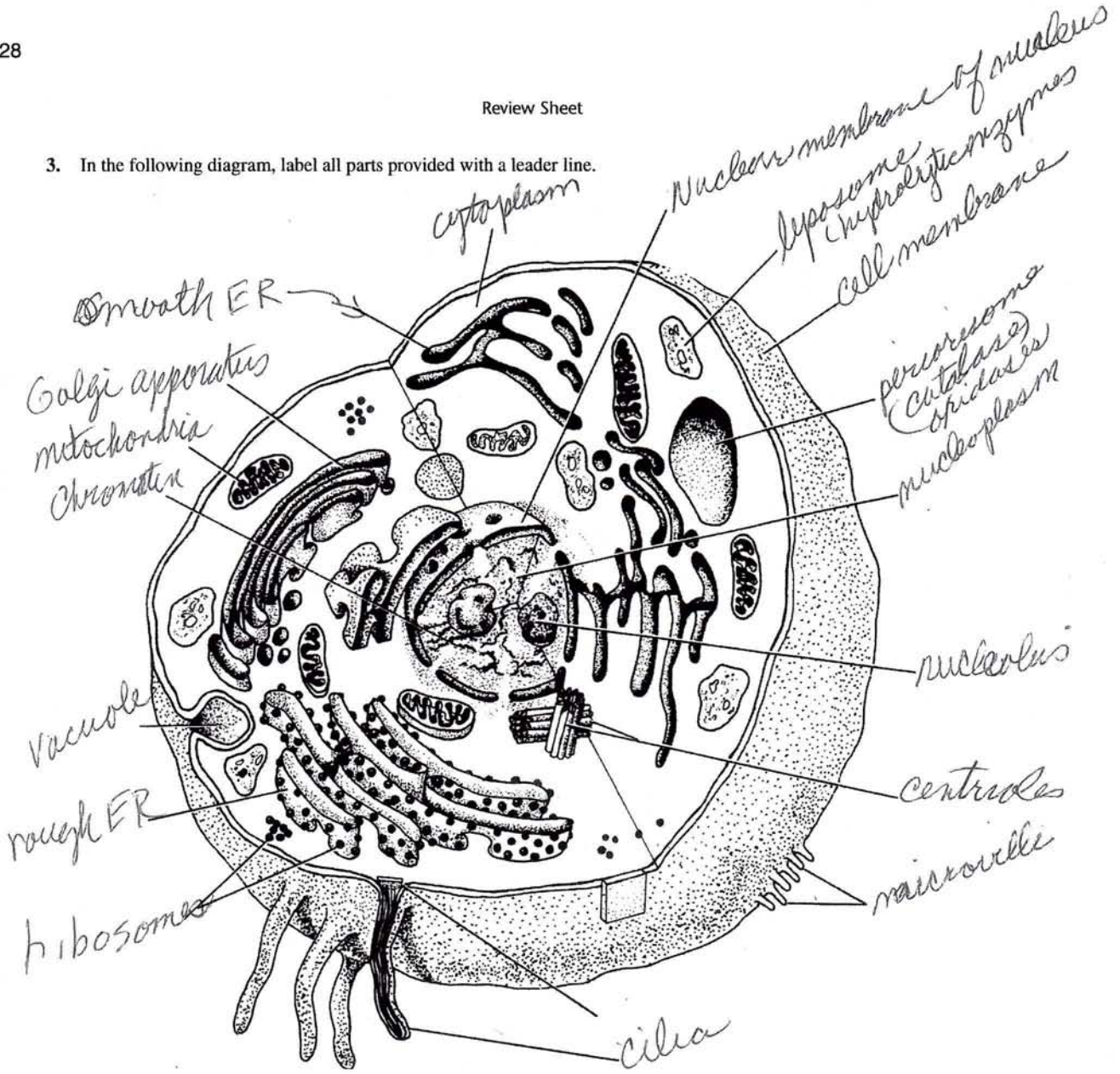
Organelle: Highly organized intracellular structure that perform a specific (metabolic) function for the cell

Cell: the basic structural and functional unit of living organisms

2. Identify the following cell parts:

- plasma membrane 1. external boundary of cell; regulates flow of materials into and out of the cell
- 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; the basis of cilia
- nucleolus 9. dense, darkly staining nuclear body; packaging site for ribosomes
- microfilaments 10. contractile elements of the cytoskeleton
- endoplasmic reticulum 11. membranous system that has "rough" and "smooth" varieties
- ribosomes 12. attached to membrane systems or scattered in the cytoplasm; synthesize proteins
- chromatin 13. threadlike structures in the nucleus; contain genetic material (DNA)
- peroxisome 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

1. 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. | cells fit closely together like floor tiles |
| | b. | often a lining or covering tissue |
| sperm | a. | has a tail or flagellum |
| | b. | allows sperm to move to egg |
| smooth muscle | a. | cells have an elongated shape |
| | b. | a long axis allows for a greater degree of shortening |

Review Sheet

- red blood cells
- anucleated, disc-shaped / less weight
 - large surface area; more room to carry hemoglobin

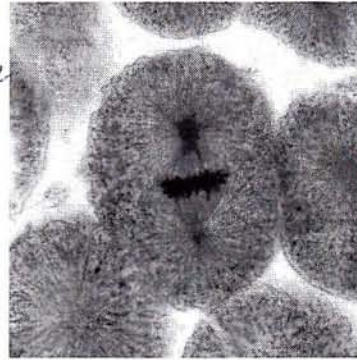
2. What is the significance of the red blood cell being anucleate (without a nucleus)?
limited lifespan; the nucleus is gone so cell can't produce new proteins
- Did it ever have a nucleus? Yes When? in bone marrow

Cell Division: Mitosis and Cytokinesis

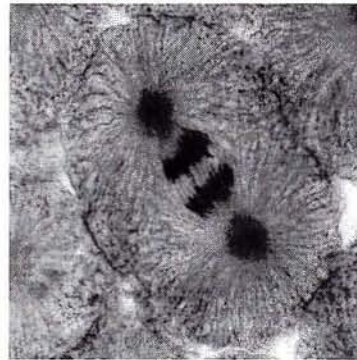
1. Identify the three phases of mitosis shown in the following photomicrographs, and select the events from the key choices that correctly identify each phase. Write the key letters on the appropriate answer line.

Key:

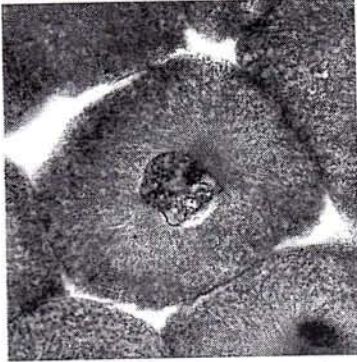
- Chromatin coils and condenses, forming chromosomes. prophase
- The chromosomes (chromatids) are V-shaped. anaphase
- The nuclear membrane re-forms. telophase
- Chromosomes stop moving toward the poles. telophase
- Chromosomes line up in the center of the cell. metaphase
- The nuclear membrane fragments. prophase
- The spindle forms. prophase
- DNA synthesis occurs. interphase
- Chromosomes first appear to be double. prophase
- Chromosomes attach to the spindle fibers. prophase
- The nuclear membrane(s) is absent. anaphase, metaphase



1. Phase: metaphase, k
 Events: chromosomes lined up at equator
replicated



2. Phase: anaphase
 Events: replicated chromosomes
sister chromatids are separated
b, k



3. Phase: prophase

Events: d, f, i, j

2. What is the importance of mitotic cell division?

Provides cells for body growth and for repair of damaged tissue

Credits

PHOTOGRAPHS

2. © Ed Reschke