

**PowerPoint Lecture Outlines
to accompany**

**Hole's Human
Anatomy and Physiology
Tenth Edition**

Shier ♦ Butler ♦ Lewis

Chapter 3

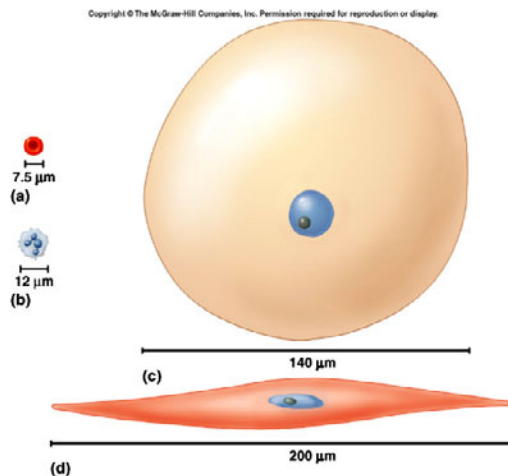


Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

3-1

**Chapter 3
Cells**

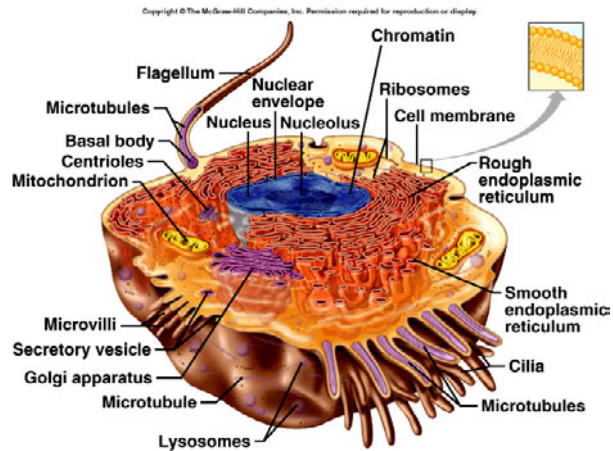
- vary in size
- vary in shape
- measured in micrometers



3-2

A Composite Cell

- hypothetical cell
- major parts
 - nucleus
 - cytoplasm
 - cell membrane



3-3

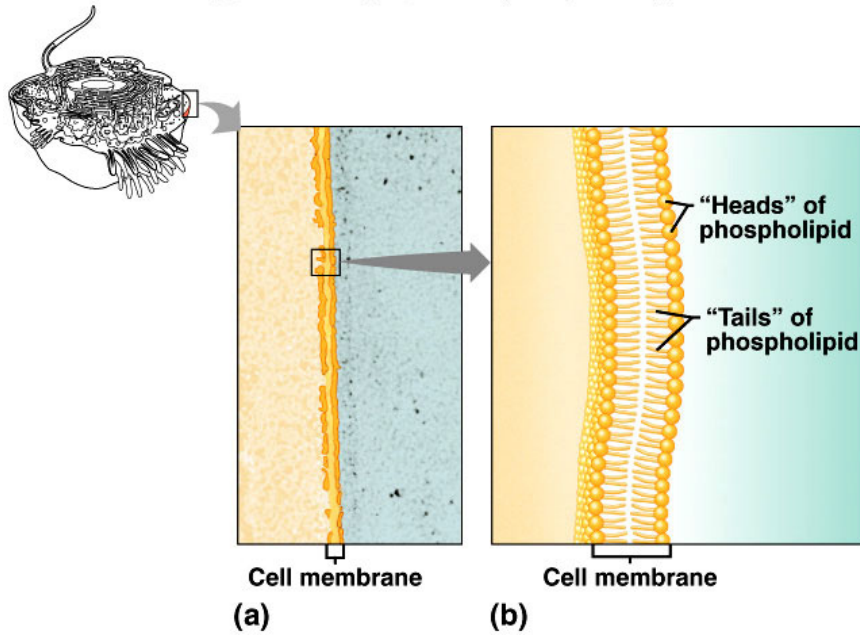
Cell Membrane

- outer limit of cell
- controls what moves in and out of cell
- selectively permeable
- phospholipid bilayer
 - water-soluble “heads” form surfaces
 - water-insoluble “tails” form interior
 - permeable to lipid-soluble substances
- cholesterol stabilizes the membrane
- proteins
 - receptors
 - pores, channels, carriers
 - enzymes
 - CAMS
 - self-markers

3-4

Cell Membrane

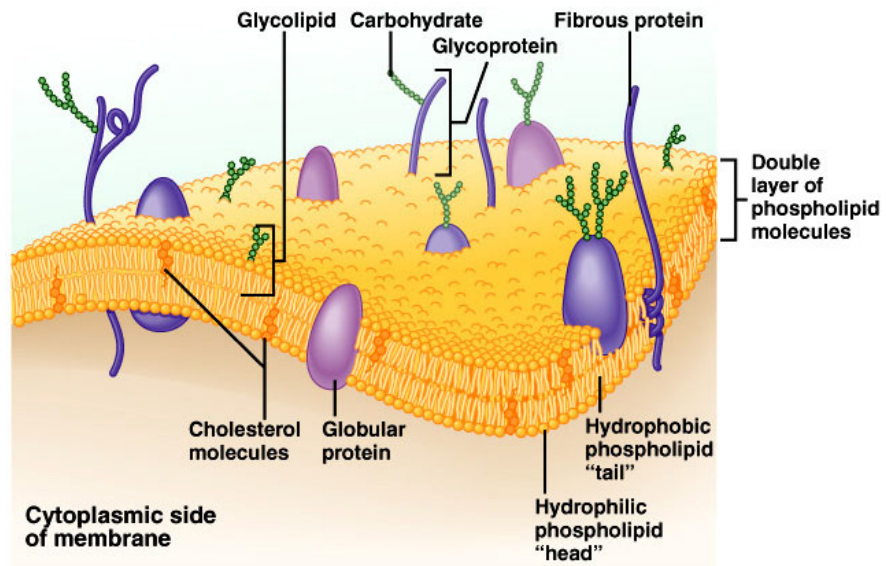
Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



Cell Membrane

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

Extracellular side of membrane



Intercellular Junctions

Tight junctions

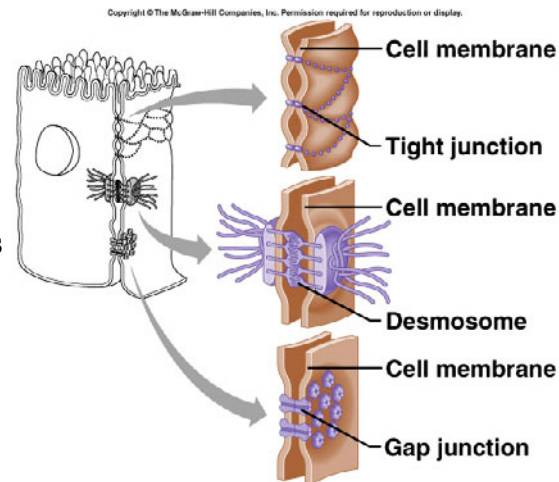
- close space between cells
- located among cells that form linings

Desmosomes

- form “spot welds” between cells
- located among outer skin cells

Gap junctions

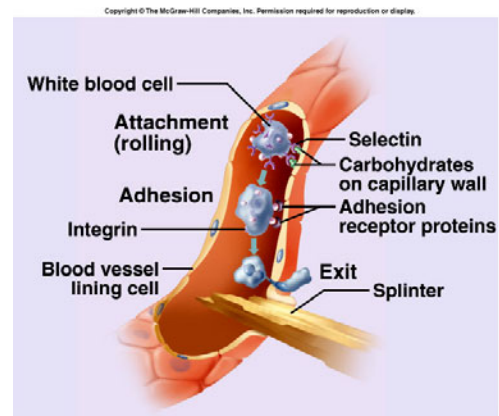
- tubular channels between cells
- located in cardiac muscle cells



3-6

Cell Adhesion Molecules

- guide cells on the move
- selectin – allows white blood cells to “anchor”
- integrin – guides white blood cells through capillary walls
- important for growth of embryonic tissue
- important for growth of nerve cells

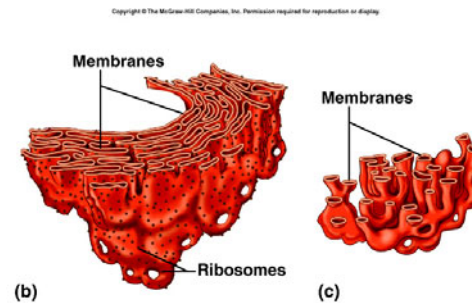


3-7

Cytoplasmic Organelles

Endoplasmic Reticulum

- connected, membrane-bound sacs, canals, and vesicles
- transport system
- rough ER
 - studded with ribosomes
 - protein and lipid synthesis
- smooth ER
 - lipid synthesis
 - break down of drugs



Ribosomes

- free floating or connected to ER
- site of protein synthesis

3-8

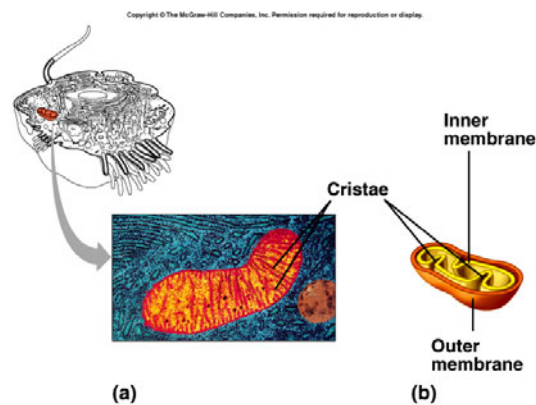
Cytoplasmic Organelles

Golgi apparatus

- group of flattened, membranous sacs
- packages and modifies proteins

Mitochondria

- membranous sacs with inner partitions
- generate energy



3-9

Cytoplasmic Organelles

Lysosomes

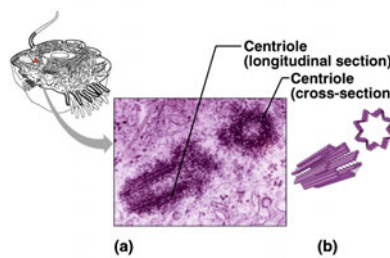
- enzyme-containing sacs
- digest worn out cell parts or unwanted substances

Peroxisomes

- enzyme-containing sacs
- break down organic molecules

Centrosome

- two rod-like centrioles
- used to produce cilia
- distributes chromosomes during cell division



3-10

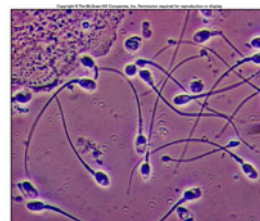
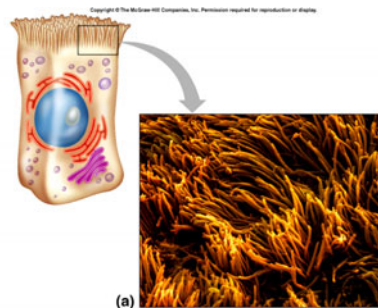
Cytoplasmic Organelles

Cilia

- short hair-like projections
- propel substances on cell surface

Flagellum

- long tail-like projection
- provides motility to sperm



3-11

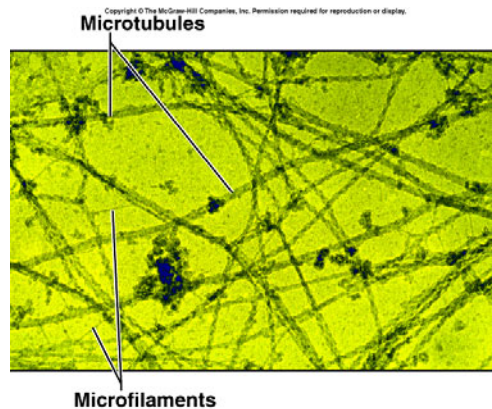
Cytoplasmic Organelles

Vesicles

- membranous sacs
- store substances

Microfilaments and microtubules

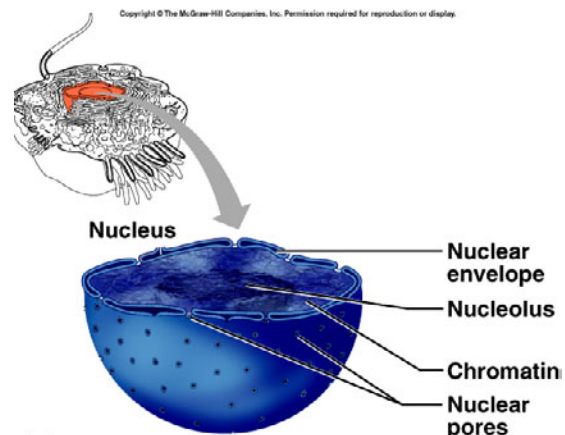
- thin rods and tubules
- support cytoplasm
- allows for movement of organelles



3-12

Cell Nucleus

- control center of cell
- **nuclear envelope**
 - porous double membrane
 - separates nucleoplasm from cytoplasm
- **nucleolus**
 - dense collection of RNA and proteins
 - site of ribosome production
- **chromatin**
 - fibers of DNA and proteins
 - stores information for synthesis of proteins



3-13