UNIT 1.2: Ultrastructure of Cells

Prokaryotic Cells

- organisms with cells that lack a nucleus
- belong to Kingdom: Monera and are in 2 domains:
  - Archaebacteria: extreme environments with high temperatures, salt concentrations/pH
  - Eubacteria: traditional bacteria (E. coli)

Prokaryotic Features:

- Cytoplasm
  - internal fluid component of the cell
- nucleoid
  - region of cytoplasms where DNA is located (circular)
- plasmids
  - autonomous circular DNA molecules that may be transferred between bacteria
- ribosomes
  - complexes of RNA and protein that are responsible for polypeptide synthesis (70S)
- cell membrane
  - semi-permeable and selective barrier surrounding the cells
- cell wall
  - rigid outer covering made of peptidoglycan; maintains shape and prevents bursting (lysis)
- slime capsule
  - thick polysaccharide layer used for protection against desiccation and phagocytosis
- flagella
  - long, slender projections containing a motor protein that enables movement
- pili
  - hair-like extensions that enable adherence to surfaces
- binary fission form of asexual production used by prokaryotic cells
- in the process:
  - circular DNA is copied
  - two DNA looks attach to membrane
  - membrane elongates and pinches off (cytokinesis), forming 2 cells

Eukaryotic Cells

- organisms with cells that have a nucleus
- more complex and believed to have evolved from prokaryotes
- divided into 4 kingdoms:
  - protista: unicellular/multicelluar organisms without specialized tissue
  - fungi: cell wall made of cellulose and obtain nutrition via heterotrophic absorption
  - plantar: cell wall made of cellulose and obtain nutrition autographically via photosynthesis
  - animalia: no cell wall and obtain nutrition via heterotrophic ingestion

Organelles:

- specialized substructures within a cell that serve a specific function
- prokaryotic cells do not typically possess any membrane-bound organelles, whereas eukaryotic cells possesses them

In Both Types of Cells:

- Ribosomes
  - structure: two subunits made of RNA and protein; larger in eukaryotes (80S) than prokaryotes (70S)