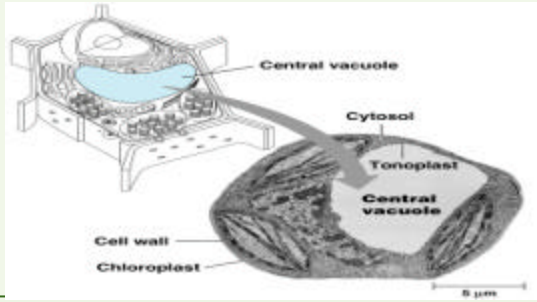
Vacuole :

- Single-membraned fluid filled temporary storage areas for H_2O, excess food, waste products, other materials needed by the cell.
- Can be formed by merging several vesicles.
- Nickname: Stomach, storage bin

Vacuole :

- Can be food vacuoles, central vacuoles, or contractile vacuoles.
  - Food: food storage
  - Central: store H_2O and nutrients (full=rigid, empty=wilted)
  - Contractile: stores and pumps excess H_2O out of the cell
- In Plant cells:
  - Single vacuole per cell (usually)
  - Large (up to 90% of the volume of the cell)
- In Animal cells:
  - Many per cell
  - Small

Vacuole:



Vesicle:

- Small transport compartment.
- Small spherical membrane-bounded compartments within the cytoplasm that transports materials throughout the cell .
- Small transport packages that pinch off the membrane of the ER and contain proteins etc. that it is transporting to the Golgi Apparatus for export from the cell or to other areas of the cell.

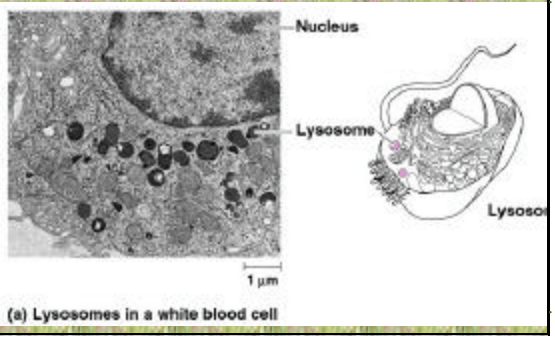
Ribosomes:

- Nickname: Protein Factories
- Combinations of RNA and proteins
- Sites where the cell assembles enzymes and proteins.
- Not bound by a membrane.
- Can be free floating (free ribosomes) or attached to Endoplasmic Reticulum (bound ribosomes.)
- The most numerous organelle in all cells
  - larger in eukaryotes than in prokaryotes

Lysosome:

- Nickname: Destroyer, Digestive Center
- Contains digestive enzymes which allow a cell to digest/break down foreign materials and old worn out cell organelles.
- The membrane surrounding this organelle prevents the digestive enzymes from destroying the rest of the cell.

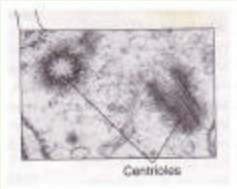
Lysosome:



(a) Lysosomes in a white blood cell

Centriole:

- A pair of cylindrical structures in animal cells that organize microtubule assembly and aide in cellular reproduction.



Cytoskeleton:

- Network of fibers extending throughout the cytoplasm.
- Provides support and maintains shape of the cell. provides anchorage for many organelles
- Is dynamic, dismantling in one part and reassembling in another to change cell shape
- Three main types of fibers in the cytoskeleton: **microtubules**, **microfilaments**, and **intermediate filaments**. (We will cover microtubules and microfilaments.)

Microtubules:

- Hollow cylinders that make up the spindle fibers in dividing cells, determine the direction of cell expansion, and, in plants, control the growth of the cell wall.
- Made of proteins.
- Part of the cytoskeleton which forms the cell shape and provides support.
- Part of the cytoskeleton that is important in motility (cilia/flagella.)

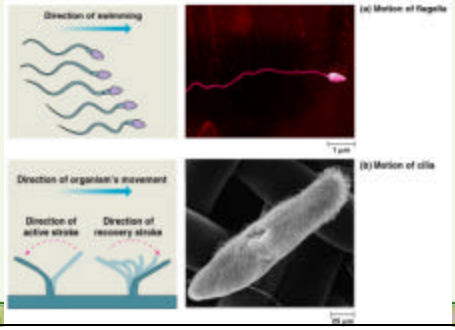
Microfilaments:

- Part of the cytoskeleton.
- Thin solid protein fibers that provide shape and support for the cell.
- AKA actin filaments

Locomotion:

- A cell moves forward by expanding and forcing the cytoskeleton to form a bulge in the plasma membrane (pseudopod- false foot) or by moving cilia (small hair-like structures) and flagella (long whip-like structures.)
- Flagella and cilia are about the same width but flagella are much longer and are made of a ring of microtubules.
- Cilia and Flagella move unicellular and small multicellular organisms by propelling water past the organism.
- Cilia are usually numerous per cell and their rapid beating is very coordinated.
- There are usually only one or two flagella per cell.

Cilia and Flagella:



Organization:

- Unicellular or multicellular
- Tissue: Group of cells that work together to perform a function. (Cells are linked together at cell junctions.)
- Organs: Groups of two or more tissues working together to perform some function.
- Organ system: A group of organs that work together to carry out major life functions.
- Organism: Living thing able to carry out all life processes.