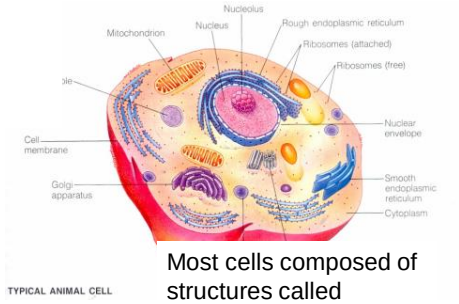
# Life Science

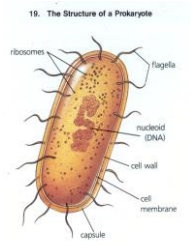
# Chapter 1
# Part 1

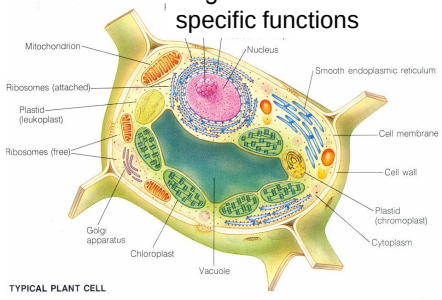
## The Cell Theory

- All living things are composed of cells.
- Cells are microscopic & are the basic unit of structure.
- Living cells come from other cells.



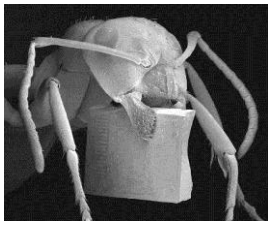

Most cells composed of structures called "organelles" that have specific functions

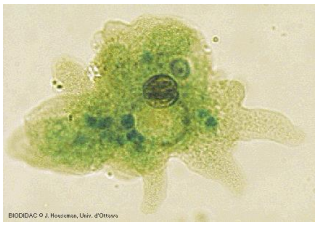


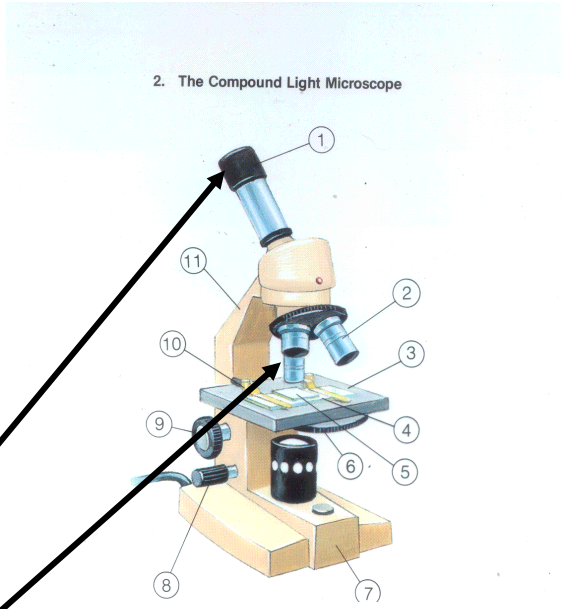
# Types of Microscopes

- Light Microscope
  - Simple: one magnifying lense
  - Compound: two or more magnifying lens
- **Electron Microscope**
  - **Uses a beam of electrons bounced off of the specimen to form the image – higher resolution of image than light microscopes.**





## Parts of a Microscope



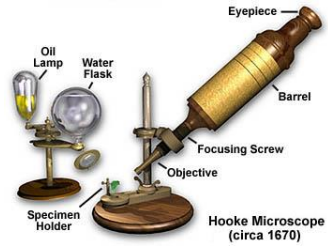

1. Eye piece (ocular)
2. Objective lens
3. Stage
4. Slide
5. Coverslip
6. Diaphragm
7. Base
8. Fine adjustment
9. Coarse Adjustment
10. Stage Clips
11. Arm

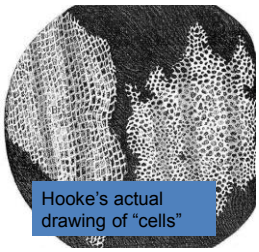
How much magnification? Simply multiply the magnification of the ocular lens (10x) & objective lenses (40x):

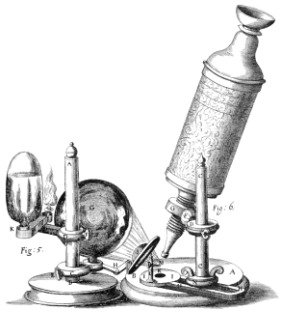
10 power x 40 power = 400 power magnification

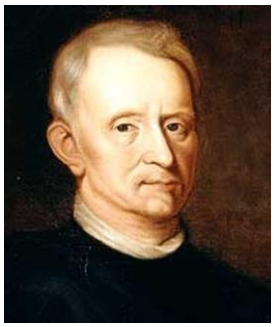
# Robert Hooke's Work

- English Scientist
- In 1663, he used a compound microscope
- Looked at tree bark – cork
- Called the structures "cells"





Hooke's actual drawing of "cells"



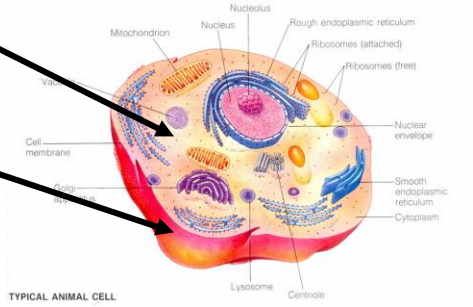


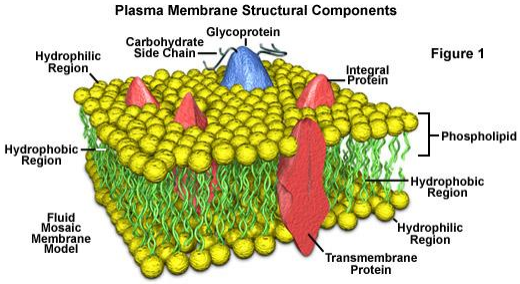
# Leeuwenhoek's Work

- Dutch scientist
- In 1683, he used Simple microscope
- Looked at pond water
- He saw single celled "animals" swimming in the water and called them "animicules"

# Parts of a typical animal cell

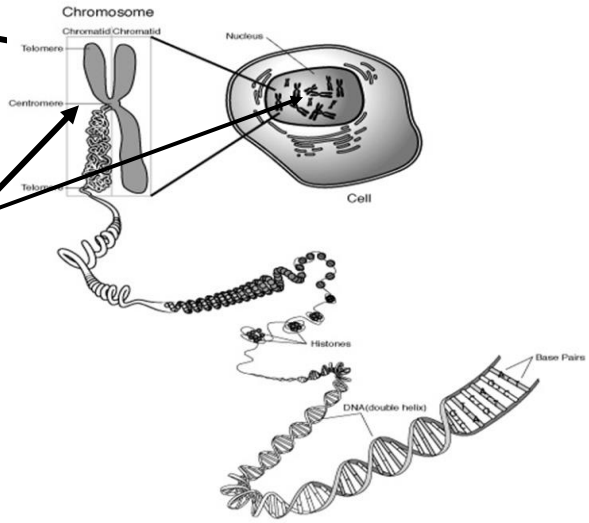
- **Cytoplasm – jelly-like gooey material that holds all of the cell structures**
- **Cell Membrane** Surrounding envelope , contains the contents of the cell.
- Semi permeable – acts like a gate -allows only certain things in & out.
- Biphospholipid layer –
  - Made of 2 layers of lipids (fats) w/ embedded proteins.
  - Proteins float on lipids like marshmallow in a cup of coco.
- Hydrophobic & hydrophilic ends of lipid molecule



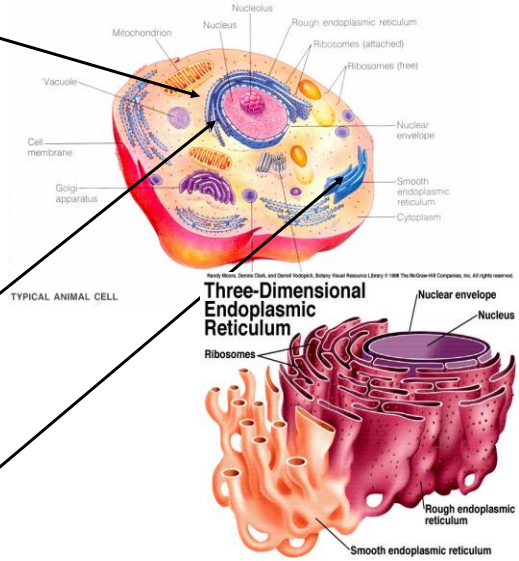

# Parts of a typical animal cell

- **Nucleus**
  - the brain – control center of the cell..
- 3 parts
  - Chromatin material (chromosomes)
  - Nuclear membrane – w/ nuclear pores
  - Nucleolus – makes ribosomes
- Chromosomes are rod-like structures used to direct the activity of the cells –
- Chromosomes – are coiled up very long strands of DNA



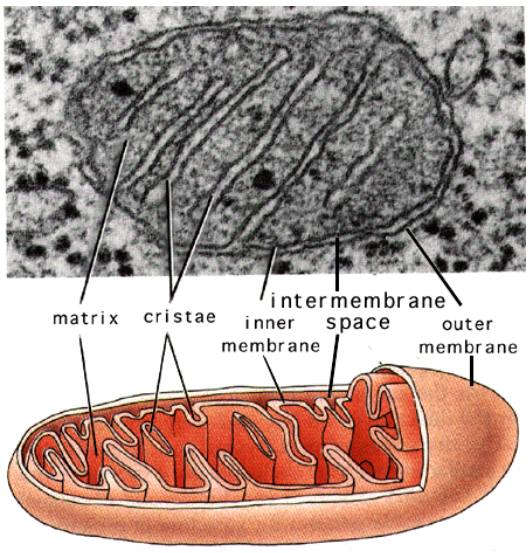
# Parts of a typical animal cell

- **Ribosomes – (the tiny dots) made in the nucleolus, move out into the rough ER and into the cytoplasm.**
- **ER - Endoplasmic Reticulum**
  - long "tube-like" highways that transport materials throughout the cell
- Two types:
  - Rough ER – ER w/ ribosomes attached
  - Smooth ER – ER W/out ribosomes attached



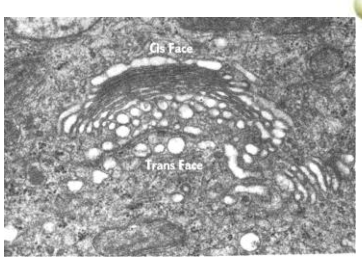

# Parts of a typical animal cell

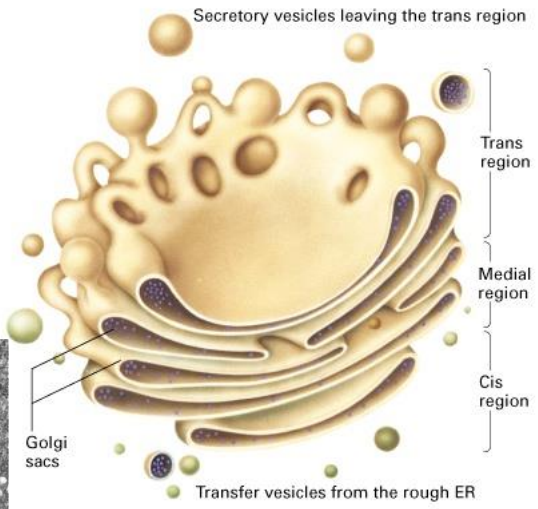
- **Mitochondria – "Powerhouse" of the cell.**
  - **Cristae – the many folds inside the mitochondria** Surrounding envelope , contains the contents of the cell.
  - **Matrix** – space between the cristae
- ATP molecules (adenosine triphosphate) store high amounts of energy that is released to the cell when needed.



# Parts of a typical animal cell

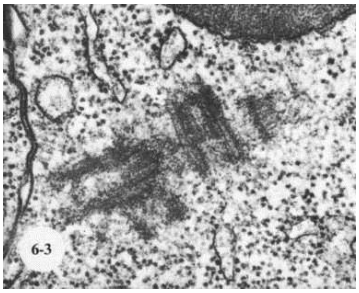
- **Goli Body, Golgi Complex Golgi Apparatus – all 3 are names for the same structure.**
- **The Cellular "Post Office"**
  - packages, stores & transports cellular materials (proteins) to areas of the cell.

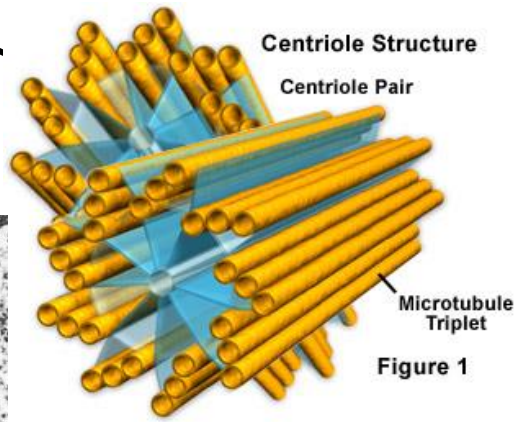



# Parts of a typical animal cell

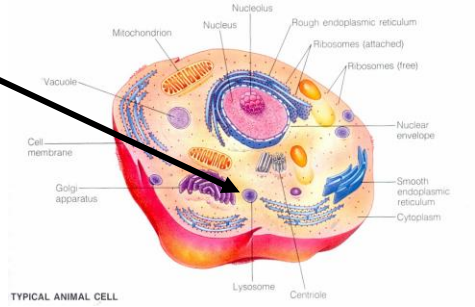
- **Centrioles – paired "churro-like" structures found only in animal cells – used in cell division**



# Parts of a typical animal cell

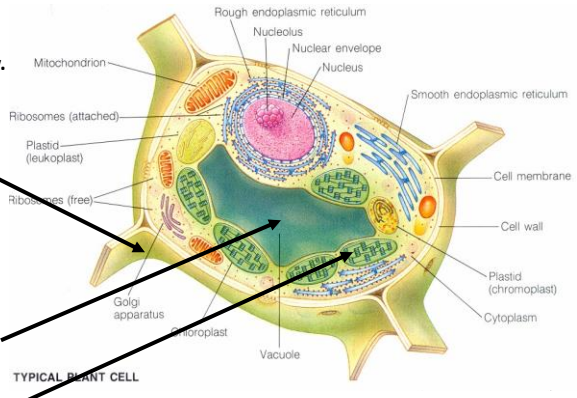
- **Lysosome – Spherical organelles that contain digestive enzymes that breakdown broken or damaged structures. The remaining pieces can be reused by the cell.**
- **Vacuoles**
  - Cellular containers
  - 3 types include
    - Food vacuoles
    - Water vacuoles
    - Waste vacuoles



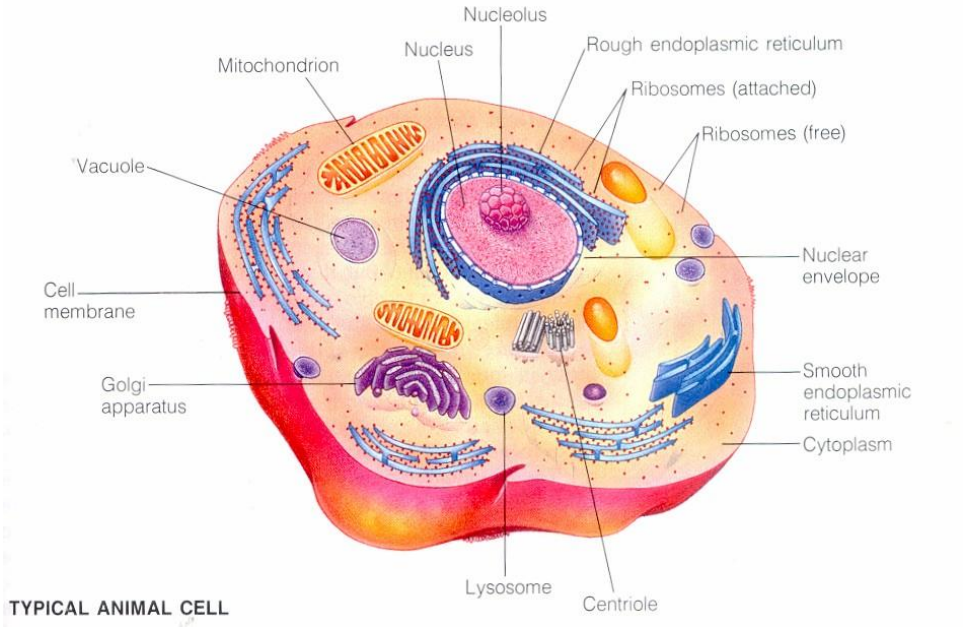

# Parts of a typical plant cell

- **Plant cells have basically the same types of organelles as animal cells EXCEPT for a few.**
- **Plant cells have….**

1. **Cell Wall – surrounds the outside of the plant's cell membrane.**
   - **A. Usually composed of cellulose or chitin.**
   - **B. Offers protection & support**
2. **Huge "Gigundo" Water Vacuoles – aids in the transport of water up the plant**
3. **Chloroplasts – contain chlorophyll used to convert sun's energy into chemical energy via photosynthesis**
4. **No Centrioles –** Plant cells have no centrioles & do not use them in cell division.



## Quiz time… fill-in the blanks




## Quiz time… fill-in the blanks