

- ← Robert Hooke- early microscopists in 1665 discovered the cell by shaving a piece of cork and named it
 - Used a simple microscope- made the microscope by hand
- ← Anton van Leeuwenhoek- first person to see living cells through algae from pond water
 - Later observations lead to the idea that all living things have cells
- ← Matthais Schleiden (1804- 1881)- a botanist (looked at plant cells)
- ← Theodore Schwann (1810-1882)- a physiologist (looked at animal cells)
 - Over a couple bottles of wine realized that both cells had nucleus
- ← Cell theory
 - All organisms are composed of one or more cells
 - Cells are only produced by the division of pre-existing cells
 - Cells are the smallest units that perform all vital functions
- ← Rudolf Virchow- a physician (studied human tissues) studied pathology
 - Came to conclusion that all living thing are composed from cells
- ← Two types of cells
 - Sex cells- germ cells that are derived from the testis or ovary
 - Somatic cells- all other kinds of cells
- ← Light microscopic (compound microscope)
 - Uses a visible light source
 - Some sort of glass (a mirror?)
 - Can magnify 1000x

- ← Electron Microscope
 - Metal cylinder **has a vacuum**
 - High power of current that displays the electrons
 - Specimen is extremely thin and in something really hard like plastic so it doesn't vaporize away
 - Cooling apparatus to reduce the heat
 - Can magnify 100,000x
- ← Cell environment
 - Plasmalemma- thin membrane that separates the extracellular space from the inside
 - Phospholipid bilayer- heads on the outside (hydrophilic) and tails on the inside (hydrophobic)
 - Cytoplasm- fluid medium inside the cell
 - Extracellular fluid- cations
 - Membrane has two proteins
 - Integral proteins- through the membrane
 - Peripheral proteins- either inside or outside the membrane
- ← Permeability- the membrane controls what goes through and what doesn't
 - Some just pores that let all through
 - Some are specific and only let some through
 - Involves both active and passive processes
 - Passive transport
 - No energy needed to complete
 - Simple diffusion

- Goes from high concentration to low concentration
 - o Osmosis
 - Same as diffusion but in water
 - o filtration
 - o Facilitated diffusion
- Active transport
 - o Energy needed in form of ATP
 - o Independent of concentration gradients
 - o Involves transporter protein or carrier (linked to an ATP motor)
 - o Endocytosis
 - Brings ECF into cell with a vesicle
 - Pinocytosis- fluids
 - Phagocytosis- engulfs foreign bodies into cell to break down and then remove by exocytosis
 - Receptor mediated endocytosis
 - Has coated vesicle and meet and fuse with a lysosome
 - Uses what is needed and removes the rest
 - Needs ligands
 - Exocytosis- removing ECF from the cell
- ← Cytoplasm- combo if ICF (cytosol) limited by the plasma membrane.. look it up has organelles
- ← Two types of organelles
 - Nonmembraneous organelles