

BIOL 1103 LECTURE NOTES

- Historical Figures in Science
 - Aristotle is very first person to write about spontaneous generation
 - Believed in abiogenesis → "life from non-life"
 - Theophrastus Paracelsus was Swiss medical philosopher
 - Van Helmont was a physician and alchemist
 - Experimented with how to produce (draw) mice with a dirty shirt in a vessel
 - Francisco Redi was first scientist to really emphasize biogenesis (as opposed to abiogenesis) → life comes from previous life
 - To determine biogenesis, experimented with decaying fish
 - Put decaying fish in vessel, uncovered, and flies appeared (life from life); put decaying fish in vessel and covered with clay and no flies appeared
 - Believers in abiogenesis believed that the clay was trapping the 'soul' of the fly out and thereby not allowing it to reproduce
 - Redi put sheath cloth over vessel with decaying fish to let the flies' 'soul' in → still no flies appeared
 - This experiment is considered to have debunked abiogenesis theory
 - Van Leeuwenhoek is the inventor of the microscope
 - First person to find: bacteria, free-living and parasitic microscopic protists, sperm cells, blood cells
 - Leeuwenhoek, contradictory to Redi's experiment, thought that these microbes arised from spontaneous generation
 - 1860: French Academy of Science offered reward to anyone who could prove one way or another about spontaneous generation
 - T. Schwann experimented to show biogenesis of microorganisms in 1837
 - Louis Pasteur experimented with spontaneous generation
 - Used a swan-necked flask experiment (diagram in book)
 - Won reward from French academy and officially disproved abiogenesis
- Cell Theory
 - Cell theory → all life is made of cells and all cells come from previously existing cells
 - Atoms → the smallest particle of any element
 - Subatomic particles → protons, neutrons, electrons
 - Atoms has never been seen

- o Atomic number → number of protons; this number is always equal to the number of electrons
- o Atomic mass → mass of protons, neutrons, and electrons (though electrons have practically no mass)
- o Electrons occur in pairs in stable atoms
- o Molecule → combo of atoms, such as: water, methane, glucose
- Bonds
 - o Bond → connection of one atom to another
 - Covalent (strongest), ionic, and hydrogen bonds
 - o Louis Dot model created to show covalent bonds by using dots instead of usual dashes
 - o Valence [electrons] → how many pairs of electrons are shared (covalence)
 - Hydrogen has 1 valence
 - Oxygen has 2 valences
 - Nitrogen has 3 valences
 - Carbon has 4 valences
 - o Ionic bond → results from gain or loss of an electron
 - Ion → atom that's gained or lost an electron and now has a charge
 - o Covalent bonds → share electron pairs

