

### Adhesion:

- The attachment of molecules to the walls of conducting tubes, as in plants.
- Property of water
- When similar particles cling together based on what surface they are on.  
Basically it is not a water-water interaction.

### Archean eon:

- Spanned for about 20 levels in the 72 floor building analogy.
- 3700 Ma - Photosynthesizing bacteria
- 3500 Ma - Oldest fossils
- 3400 Ma - Small continents form
- 3100 Ma - Continents begin shifting
- 2700 Ma - First eukaryotes
- 2600 Ma - Bacteria on land
- 2500 Ma - Banded iron formations
- Organic molecules assemble themselves into the 1<sup>st</sup> living cell, surrounded by a bilipid layer. They are called the archea
- Known to be able to live in extreme anaerobic conditions; possibly one of the first organisms to split protons off water, thus creating oxygen in the atmosphere.

### Biomonomers:

- Smallest possible unit of a macromolecule. Contains the basic functional group of the type of macromolecule, and the ability to form polymers is in its ability.
- Identical or nearly identical. Form polymers due to polymerization

### Biopolymers:

- Combined subunits of identical or nearly identical molecules that combine together with polymerization.
- Contains proteins, nucleic acids, carbohydrates, and lipids.

### Carbon:

- Element that has four possible bonding sites thus making central to life. CO<sub>2</sub> is considered inorganic, and other carbon molecules with oxides, everything else is considered organic with carbon
- Monomers that contain carbon are always a good source of fuel, whether it be for cellular respiration or combustion purposes.

### Central Dogma:

- Dogma means principle
- Central dogma of biology includes the process of DNA replication, transcription, and translation. From DNA to RNA to protein.
- It is the way genetic information is shared in order to synthesize proteins and build structures in the body.

### Chemical evolution:

- A factor in the origin of life in the hadean era.

- Origins of organics: Prebiotic soups, Hydrothermal vents, \_\_\_\_\_, \_\_\_\_\_, . Started off as monomers of course. The polymerization effect would be considered as chemical evolution.
- Chemical evolution can be referred to:  
Nucleosynthesis(formation of chemicals with regards to the big bang), Molecular evolution(evolution at the scale of molecules), gas evolution. (process of creating oxygen through a molecular reaction)

#### Cohesion:

- Property of water. High resistance of separation of water molecules.
- Intermolecular attraction between like molecules.
- Reason why water will always take the shape of it's container.

#### Crystal Lattice of water:

- When water is turned into a solid (ice) The molecules are shaped into a crystal lattice arrangement ( hexagonal polymer of water)
- Decreases density by 10% as water as a liquid is more packed together.
- Crystal lattice of water and the diminishment of density is a special property of water, not common in other elements.

#### Emergence:

- More than the sum of the parts
- A good example would be H<sub>2</sub>O, Where its ion/element subunits do not have similar properties to the combined molecule, the following characteristics of water surfaced as the two combined. This is an example of emergence.
- Living things become more and more complex with the combination of cells, elements, macromolecules, etc. Large factor in evolution.

#### Evaporation:

- When a element/compound in a liquid state is heated past it's specific heat capacity as a liquid and thus is transformed into gas.
- Rapid movement of molecules in this state.
- Only occurs on the surface of a liquid. It is vaporization.

#### Geological time scale:

- Hadean 4600-3800Ma
- Archean Eon 3800-2500Ma
- Protozean 2500-543Ma
- Phaneorozeic Eon 543-Present
  1. Paleozoic era 543-251 Ma
  2. Mesozoic era 251-65 Ma
  3. Cenozoic era 65-present

P m c

**Happiness is partly multiple choice**

#### Green House Gases:

- Gas in the atmosphere that absorbs and emits radiation within the thermal infrared range.
- Fundamental cause of greenhouse effect.
- The primary greenhouse gases in the Earth's atmosphere are water vapour, carbon dioxide, methane, nitrous oxide, and ozone.
- The burning of fossil fuels increase CO<sub>2</sub> emissions by about 30% , obviously possibly causing global warming.

#### \*\*Hadean eon:

- 4600-3800Ma
- Formation of the solar system,galaxies and planets. Ends with traces of life In rocks
- Byproducts of the chemistry of life is found in rocks.
- Inhabitable parts of the solar system
- Included a building phase and a \_\_\_\_\_ phase

#### Hydrogen bond:

- Noncovalent bond formed by unequal electron sharing between hydrogen atoms and oxygen,nitrogen and sulfur atoms. Known to be the second weakest type of bond.
- Water is held together by polar covalent bonds, but they are attached to other water molecules by hydrogen bonds.

#### Hydrophilic:

- Property found in macromolecules/elements that makes them attracted to water, or able to react with water.
- A hydrophilic **molecule** or portion of a molecule is one that is typically charge-polarized and capable of **hydrogen bonding**, enabling it to dissolve more readily in water

#### Hydrophobic:

- When a molecule has a non polar terminus in its composition thus it cannot react with water and form a hydrogen bond between its molecules.
- Prime example: water and oil.

#### Hydrothermal Vents:

- Is one of the factors of the origins of organics
- Fissure in the planets surface which geothermically heated water issues.
- Hot springs,fumaroles,geysers

#### Interstellar organic compounds:

- Organic compounds found in outer space. Looking at the

monomer/polymer unit of stars,galaxies,etc.

- Interstellar means: Occuring or situated between stars.

#### Micelles:

- Small version of liposomes
- Sphere composed of a single layer of lipid molecules
- When two water soluble micelles interact with eachother, (A+B) they become insoluble as a product. They will start to grow and even divide. This is a mechanical process.

#### Miller Experiment:

- Miller-Urey experiment consisted of designing a laboratory simulation of the reducing atmosphere believed to have existed early on Earth.
- After a week, miller found a large assortment of organic compounds: urea, amino acids, lactic,formic, and acetic acids. 15% of the carbon ended up in molecules in living organisms today
- This apparatus simulates primordial earth.

#### Nonpolar compound:

- A compound that is not polar.
- Does not form hydrogen bonds with polar molecules; does react with non polar molecules with vandeerwaals forces.
- Good example would be a hydrocarbon.

#### Panspermia:

- In biotic chemistry, Panspermia is a factor (how?)
- Is the [hypothesis](#) that life exists throughout the Universe, distributed by [meteoroids](#), [asteroids](#) and [planetoids](#)
- Suggests that life seeds came from outer space and planets. Panspermia means seeds everywhere.

#### Phanerozoic Eon:

- Multicellular organisms start to appear.
- Protozoic, Cenozoic, and Mesozoic era are all included in the Phanerozoic Eon.
- The whole eon included:
- Dinosaurs disappearing, mammals and birds -M (251-65Ma)
- Flowering plants, dinosaurs, even more insects-P (543-251 Ma)
- Marine invertebrates,algae “Cambrian explosion” first land plants/insects.

#### Polar compound:

- A chemical compound that is polar
- Water is a prime example.
- Polar compounds attract to each other.

#### Prebiotic Soup:

- Said to be an origin of organics

- Life began in a pond or ocean as a result of the combination of chemicals from the atmosphere and some from outer space and planets.

#### Proteins First hypothesis:

- Assumed proteins were the first used biological molecule used to transfer information between organisms.
- RNA first hypothesis is more accepted than this.
- Protein world is the term used to refer to proteins being the first biological molecules, but it is known that RNA is the most likely candidate.

#### Proterozoic Eon:

- Oxygen atmosphere began to form
- Single celled organisms began to develop.
- 2500-543 Ma

#### Protocells:

- Sub-unit of protobionts.
- Bubble hypothesis implies that protobionts can be made by shaking macromolecules together. Vinaigrette salad dressing is an ideal example of this.
- Composed of a fatty acid membrane and RNA ribozymes that are encapsulated.

#### Reducing Atmosphere:

- is an **atmospheric** condition in which **oxidation** is prevented by removal of **oxygen** and other oxidising gases or vapours, and which may contain actively reducing gases such as **hydrogen**, **carbon monoxide** and gases that would oxidize in the presence of oxygen, such as **hydrogen sulfide**.
- Early earth had a reducing atmosphere

#### RNA world:

- Hypothesis that concludes that the earth's first biological molecule for replication and genetic information would be RNA.
- They are self replicating thus must be precursors to life.
- Ribozymes would be the first type of RNA, and then from ribozymes, we start with RNA, then RNA that makes protein, then RNA that makes proteins which make DNA.

#### Specific Heat:

- Every element/compound has a specific heat capacity, in other words, how many degrees does it take to change a substance's temperature by an amount. Water's SHC is 100 degrees Celsius, after this it turns into a gas.

#### Spontaneous origins:

- is an obsolete body of thought on the ordinary formation of living organisms without descent from similar organisms.
- Every evolutionary theory of life is based on spontaneous generation.
- The first alive organism was probably the largest factor of spontaneous generation.

### Surface Tension:

- The force that places surface water molecules under tension, making them more resistant to separation than the underlying water molecules
- Allows some insects to be able to float on water, and things like paper clips can float on water.

### Surfactant:

- Compounds that lower the surface tension of a liquid, the interfacial tension between two liquids or a liquid and solids.
- Detergents, wetting agents, emulsifiers, foaming agents are all surfactants.

### Vesicles:

- A small, membrane-bound compartment that transfers substances between parts of the endomembrane system.
- Found in animal, plant cells.
- Small bubble within a cell. Enclosed by a lipid bilayer. Type of organelle.

### Volcanic outgassing:

- Release of gases into the atmosphere during volcanic eruptions. A lot of our atmosphere (water vapor, argon, nitrogen) came from outgassing.
- Thus the first atmosphere was greatly formed by this.