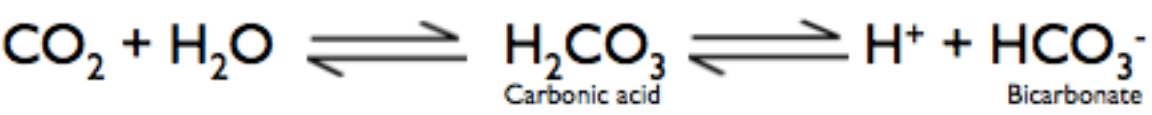
Monday, 8 January 2018

Exam Prep

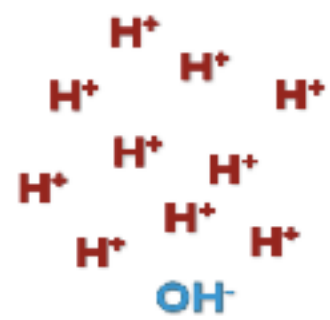
Exercise Physiology

Week 1: Intro to Ex Phys, Biochemistry & Energy

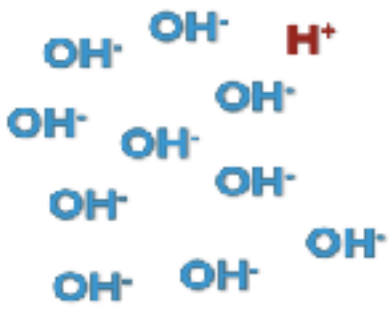
- **Homeostasis:** the existence and maintenance of a relatively constant internal environment."
  - Body Temp: 36.5 - 37.2 Degrees
  - Blood pH: 7.35 - 7.45
  - Blood glucose concentration-fasting: 3.9 - 5.5mmol.L
- **Atom:** the smallest particle of an element, composed of subatomic particles (proton, neutron and electron)
  - Electrically neutral when protons = electrons
  - Last shell = Valence Shell
- **Ions:** an atom or a molecule with unequal total number of electrons vs total number of protons
  - This therefore has a positive or negative electrical charge
  - **Cation:** loses/donates an electron therefore it has a **positive charge**
  - **Anion:** gains/accepts an electron therefore it has a **negative charge**
- **Electrolytes:** Cations and anions that dissociate in water
  - Dissociation:
    - Cations attracted to negative end of H20
    - Anions attracted to positive end of H20
- **Ionic Bonding:** Joining of anions and cations (oppositely charged ions attract)
- **Covalent Bonding:** Joining of atoms that share one or more pairs of electrons (eg. Hydrogen + Hydrogen = H2)
- **Molecule:** two or more atoms chemically combined to form a structure that behaves as an independent unit (eg. H2, O2, H2O)
- **Compound:** two or more chemically combined different types of atoms (eg. H20)
- All synthesis reactions in the body are called **anabolism,** sum of all decomposition reactions are called **catabolism**
- **Dehydration (condensation):** Synthesis whereby water is *produced*
- **Hydrolysis:** Decomposition whereby water is *depleted*



- **Reversible reaction:**
- **Oxidation-Reduction reactions:** chemical reactions resulting from exchange of electrons between reactants
  - **O**xidation is **L**oss (OIL)
  - **R**eduction is **G**ain (RIG)
- **Enzymes:** protein catalyst that speeds up the rate at which a chemical reaction occurs
  - Remains unchanged - does not deplete
  - Lock & Key: specific
- **Coenzymes:** Organic non-protein molecule that assist in the function of an enzyme:
  - Coenzyme Q10 (ubiquinone)
  - Acetyl Co-A
  - Nicotinamide adenine dinucleotide **(NAD)**
  - Flavin adenine dinucleotide **(FAD)**
- **Acid:** Proton donor/releaser
- **Base:** Proton acceptor/binder
  - Most bases function as proton acceptors by releasing hydroxide ions in solution



Many Hydrogen ions (H^+)
Low pH
Acid



Many Hydroxide ions (OH^-)
High pH
Alkali/Base

- **Organic Chemical Compounds:**
  - **Carbohydrate:** broken down to provide energy
  - **Lipid:** insulation, structure, energy
  - **Protein:** enzymes, transport, contraction, energy
  - **Nucleic acid (ATP):** potential energy