

## ***Biochemistry Test Review*** ***Ch. 1 & 2***

### ***Resources:***

1. Read Textbook Ch. 1 & 2
2. Intro to Bio Notes
3. Biochemistry Notes

### ***Key Concepts:***

#### Metric Conversions

Examples: km → m  
g → kg  
kL → dL  
hectometers → meters

#### Themes of Biology

- 1. cell structure & function***
- 2. stability & homeostasis***
- 3. reproduction & inheritance***
- 4. evolution***
- 5. interdependence of organisms***
- 6. matter, energy & organization***

#### Safety procedures

***View basic practices***

#### Scientific Theory

***Comprehensive statement of what is believed to be true, supported by experimental evidence resulting from many tests of related hypotheses.***

#### Hypothesis

***As statement that can be tested experimentally***

#### Control

***Variable for normal conditions***

#### Dependent vs. independent variable

***Dep. Variable being observed***  
***Indep. variable being changed***

#### Characteristics of living organisms

- 1. Cells - membrane bound structure that is the basic unit of life.***

**2. Organization – living things are highly organized at both the molecular & cellular levels.**

**3. Energy Use – all living things use energy in a process called metabolism, which is the sum of all of the chemical processes that occur in the organism. Organisms require energy to maintain their molecular & cellular organization as well as to grow and reproduce.**

**4. Homeostasis - the stable internal conditions of a living thing. Cells work to keep their internal environment stable.**

**5. Growth – all living things grow.**

**A.) Cell division – the formation of two cells from an existing cell.**

**B.) Development – the process by which an adult organism arises.**

**6. Reproduction – all organisms produce new organisms.**

Levels of organization

*Atomic particles, atom, molecule, organelle, cell, tissue, organ, organ system, organism*

Abiotic vs. biotic *nonliving and living*

~~Ronal Ross~~

~~*hypothesis of Laveran and Manson that mosquitoes are connected with the propagation of the disease.*~~

Scientific Method

*Process of designing an experiment to test a hypothesis*

Homeostasis

*the stable internal conditions of a living thing. Cells work to keep their internal environment stable.*

Phospholipids

*Cell membranes are composed of two layers of phospholipids, which are referred to as the lipid bilayer.*

Hydrophobic *water fearing*

Hydrophilic *water loving*

### Lipids

*large, nonpolar organic molecules that do not dissolve in water (fats & oils).*

### Carbohydrates and different types

*organic compounds composed of carbon, hydrogen and oxygen in a ratio of about two hydrogen atoms to one oxygen atom. The number of carbon atoms in a carbohydrate varies. Carbohydrates exist as monosaccharides, disaccharides or polysaccharides.*

### Proteins

*Made of amino acids and share a common structure*

### Activation energy

*Energy required to start a reaction*

### Amino Acids

*Building block of proteins, monomer; R-Group different between AA*

### Ionic Bonds

*Bond formed by the loss or gain of an electron generating an ion*

### Covalent Bonds

*Sharing of electrons between two or more atoms*

### Carbon and how it bonds

*Four bonds forms a tetrahedron a VERY stable atom*

### Saturated Fats (saturated in hydrogens)

*Fatty acid chain with **NO** double bonds, animal product and solid at room temperature*

### Unsaturated Fats

*Fatty acid chain containing double bonds, plant produce and liquid at room temperature*

### Nucleic Acids

*Very large and complex organic molecules that store important information in the cell examples: DNA & RNA*

### Benedict's solution test on carbohydrates

*Heated in boiling water, positive test is **ORANGE** to **RUST** color change*

### Iodine Solution test on carbohydrates

*Starch is stained dark blue to black in the presence of Iodine*

DNA

*Deoxyribonucleic acid; forms chromosomes & contains genetic code!*

RNA

*RNA; stores and transfers information that is essential for the manufacturing of proteins.*

Monosaccharides & examples

*a simple sugar. Contains carbon, hydrogen, and oxygen in a ratio of 1:2:1. Examples: Glucose, Fructose, Galactose*

Disaccharides & examples

*double sugar; two monosaccharides combined. (Ex: sucrose, common table sugar)*

Polysaccharides & examples

*complex molecule composed of three or more monosaccharides. Examples: Animals store glucose in the form of the polysaccharide glycogen. Plants store it as starch (cellulose in cell walls)!*

Atoms

*Smallest building block of an element*

Protons, Neutrons & Electrons

*Subatomic particles of an atom*

Element

*pure substances that cannot be broken down chemically into simpler kinds of matter.*

Compounds

*a pure substance that is made up of atoms of two or more elements (Ex: Water, contains hydrogen & oxygen; Salt, contains sodium & chlorine atoms).*

Solution

*is a mixture in which one or more substances are uniformly distributed in another substance (ex: plasma – the liquid part of blood).*

Mixture

*is a mixture in which one or more substances are NOT uniformly distributed in another substance (ex: plasma – the liquid part of blood).*

Solute

*is the substance dissolved in the solution. (ex: sugar water – sugar is the solute)*

Solvent

*is the substance that is doing the Dissolving (ex: sugar water; solvent = water).*

Ecology

*the study of interactions of organisms with one another and with their environment.*

SI Units

*System International of measurement aka Metric System*

Dimensional Analysis (Factor Labeling Method)

*Process for converting one unit into another*

Properties of carbon

*Forms four covalent bonds, very stable b/c tetrahedral shape*

Exergonic reactions

*chemical reactions that involve a net release of free energy (ex: heat, light, etc.)*

Endergonic reactions

*reactions that involve a net absorption of free energy.*

pH

*a measure of hydrogen ion concentration equal to  $-\log[H^+]$  and ranging from 0 to 14.*

Acid

*a solution is an acid when the number of hydronium ions ( $H_3O^+$ ) in a solution is greater than the number of hydroxide ions ( $OH^-$ ).*

Base

*a base is a solution that contains more hydroxide ions ( $OH^-$ ) than hydronium ions ( $H_3O^+$ ).*

Polarity or Polar Molecule Example: Water

*An oxygen atom has eight protons (+) in its nucleus and therefore eight positive charges to attract electrons (-), whereas a hydrogen atom has only one proton and therefore one positive charge. With its greater positive charge, the nucleus of the oxygen atom pulls the shared electrons toward its nucleus and away from the nucleus of the hydrogen atom. As a result, the electrical charge is unevenly distributed.*

*This uneven distribution of electrical charge causes the water molecule to have a bent formation, making it a polar compound.*

### Glycogen

*See Polysaccharide*

### Photosynthetic organisms

*Plants, algae, and some bacteria*

### Properties of water and importance to biological systems

### Various functions of proteins