**Biological Macromolecules**

**Date: Student Mostly Made of Macromolecules:**

**By the end of the lesson you should be able to:**

* Recognize the structure of the 4 molecules of life
* State the function and give examples of the 4 biological macromolecules

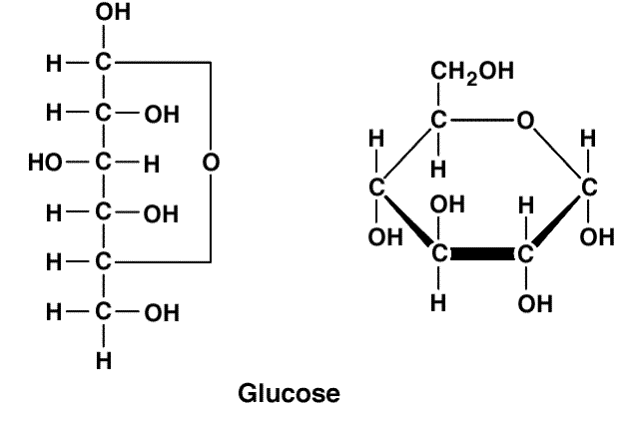
**4 Molecules of Life**

* Besides water, a cell is mainly made up of 4 types of molecules

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

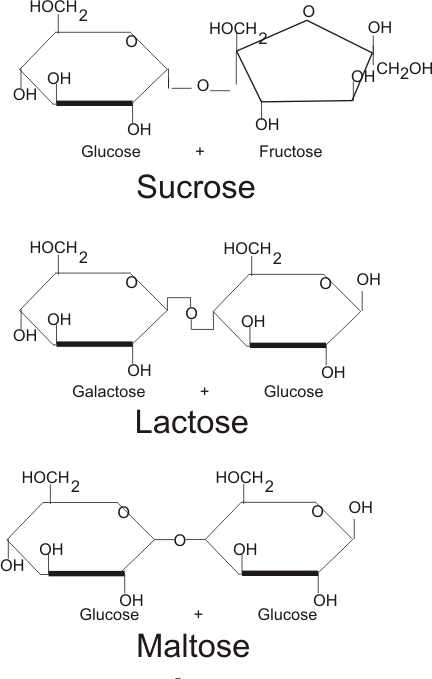
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**** 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

These molecules are composed mostly of four elements: C, H, O & N

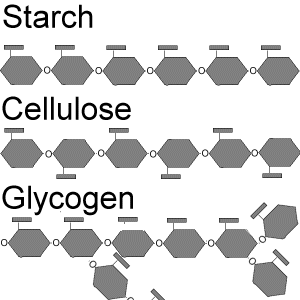


**Carbohydrates**

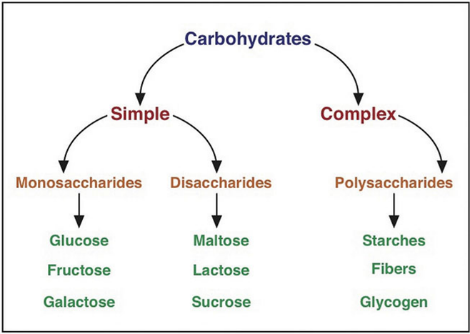
* Functions:
* **** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for cell
* short term energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* There are 3 types:

1. Monosaccharides

2. Disaccharides

**** 3. Polysaccharides

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are a single unit of sugar
* If two monosaccharides are combined together, the result is called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* If there are many monosaccharides combined, the resulting molecule is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an example of a structural carbohydrate at it forms \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Examples of Carbohydrates**

* Monosaccharides: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, fructose, galactose
* Disaccharides: sucrose, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, maltose
* Polysaccharides: starch, chitin, glycogen, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

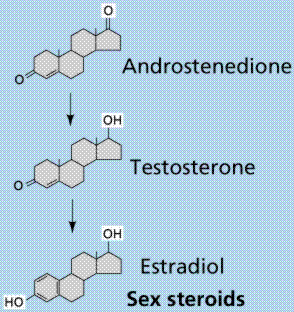
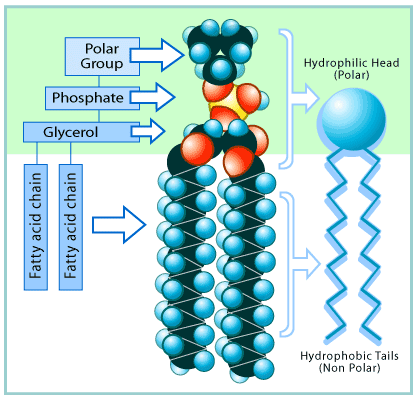
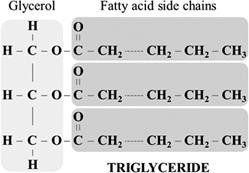
**Lipids (Fats)**

* Lipids are fatty, waxy, or oily compounds that are insoluble water
* There are 3 main types:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: long term energy storage

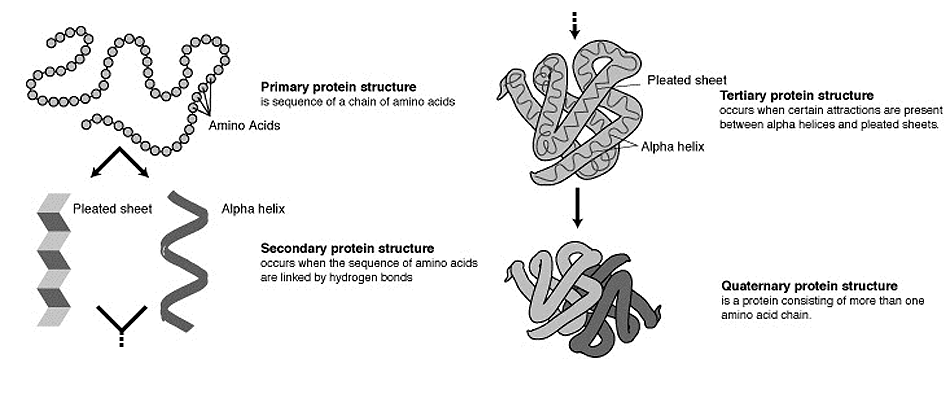
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: used to make cell membranes

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: hormones

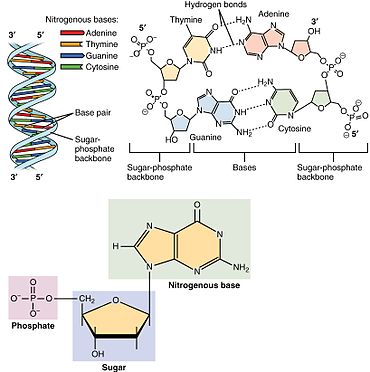
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**Proteins**

* Proteins are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for muscle, cell structures, enzymes, I immune system (antibodies), etc …
* Proteins are made up of smaller units called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Amino acids are located in the cytoplasm (jelly) of the cell \* remember for later! \*
* The amino acids link together to form a chain
* These long chains of amino acids \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The difference between proteins is the sequence of the amino acids and how they are folded up

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**Nucleic Acids**

* Nucleic acids contain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* There are two types of nucleic acids used for heredity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A nucleic acid is made up of small molecules called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which include a base (ACTG&U), a sugar and phosphate group.
* Nucleotides are found inside the nucleus of a cell in the nucleoplasm \* remember for later\*
* **Deoxyribonucleic Acid (DNA)**

Largest molecule on earth!

Contains all the genetic information (a

\_\_\_\_\_\_\_\_\_\_\_\_) to build a living organism

Fits into the nucleus and is twisted into a

double stranded helix

* **Ribonucleic Acid (RNA):** there are 3 main types

1. Messenger RNA (mRNA) a \_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the DNA

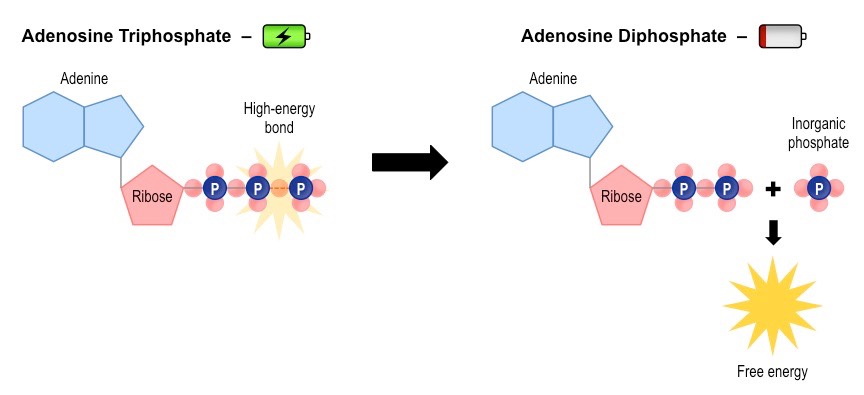
that exits the nucleus

2. Transfer RNA (tRNA) (Grade 12)

3. Ribosomal RNA (rRNA) (Grade 12 - makes ribosomes)

* + All are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and help DNA make proteins
  + Has a U base instead of the T base

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ATP)**



This is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecule of life

There are 3 phosphate molecules bonded together

The last two have a lot of energy \_\_\_\_\_\_\_\_\_\_\_\_

**Can You …**

… recognize the structure of the 4 molecules of life?

… state the function and give examples of the 4 biological macromolecules?