Chapter 5

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- There are four main macromolecules:
    1. Carbohydrate
    2. Lipids
    3. Proteins
    4. Nucleic Acids
- Proteins are the most complex out of the four molecules
- There are two forms of macromolecules:
    1. Monomer − The smallest unit of a macromolecule
    2. Polymer − A larger molecule made up of smaller monomers
- Dehydration Synthesis − Two hydrogen and one oxygen are removed from smaller molecules, allowing bonds to form more complex molecules
- Hydrolysis − Reverse of Dehydration Synthesis, -lysis ending means breaking. Water is required for this
- Carbohydrates:
    1. These are sugars and starches
    2. Monomers made up of C, H, and O (1:2:1 ratio)
    3. Short-term energy storage and structures
    4. Monomer − Monosaccharides
        (a) Examples: Glucose, Galactose, & Fructose
        (b) Combination of two forms Disaccharides, created through dehydration synthesis (Glucose + Glucose = Maltose, Glucose + Fructose = Sucrose, Glucose + Galactose = Lactose)

5. Polymer − Polysaccharide
    (a) Glucose polymers have two main functions: Energy Storage for short term, amylose in plants and glycogen in animals, and Structural support, mostly in plants, as cellulose
    (b) Starch vs Cellulose − Starches are alpha linked, whereas cellulose is beta linked
6. Herbivores:
    (a) Termites − Symbiotic relationship with a protist, which lives in the termite's gut. This protist digests cellulose
    (b) Ruminants − Cows are an example. Cows have bacteria that break down the cellulose, while the cow keeps regurgitating it
    (c) Caecophores − Bunnies are an example. They process the cellulose by eating some of their cecal (pre-fecal) matter, as the cellulose is only partly digested before it comes out
7. Chitin − A modified polysaccharide that exits in fungi, arthropod exoskeletons, and dissolving stitches

- Lipids:

1. Exist as fats, oils, and waxes
2. Made up with C, H, O
3. Used for long-term storage and insulation
4. No polymers
5. Three groups: Triglycerides, Phospholipids, and Steroids
    (a) Triglycerides are made of one glycerol & 3 fatty acids
    (b) Triglycerides are connected by dehydration synthesis three times
    (c) Saturated Fat − No double bonds between carbons
    (d) Unsaturated Fat − At least one double bond (kinked), this influences the properties of the lipid. Unsaturated stay liquid at room temperature.
    (e) Phospholipids are a modified version of the triglyceride, but with a phosphate rather than a fatty acid
    (f) Phospholipids have a polar and non-polar region
    (g) Big part of cell membranes, arranged in a bi-layer
    (h) Steroids are made up of cholesterol and some types of hormones
    (i) Steroids' structures are shaped as fused rings
    (j) Have a variety of functions (functional groups)