

## First Flash Cards:

Functional groups:

Hydroxyl H- bond donor or acceptor **Interact with phosphates** to form high-energy covalent bonds

Amine H-bond donor or acceptor also can be positively charged

Carbonyl: H=bond acceptor (ketone or aldehyde)

Carboxyl acid can be negatively charged conjugate base

Alkyl group Hydrocarbon LD only hydrophobic

Phosphates: Interact with hydroxyls to form covalent high-energy bonds (used for other reactions)

## Chiral isomers or "handed" molecules

Mirror symmetric molecules. Only specific forms can interact with other molecules in your body (mostly proteins) which need to have all the bonding contacts in exactly the right place.

We can only use "D" sugars

## Polymers

Monomer- to polymer: Dehydration reaction. Water released. High-energy phosphate intermediate\

Polymer-to-monomer: hydrolysis (add water across the bond—this is the "spontaneous direction")

## Sugar polymers

Mono-saccharides Glucose (aldose) and Fructose (ketose) are examples of "hexose" (6-carbon sugar)

Common 5-carbon sugar is ribose (C<sub>5</sub>H<sub>10</sub>O<sub>5</sub>)

disaccharide, trisaccharide etc.

"oligosaccharide" is several (oligo means several)

Poly means "many" as in hundreds.

## Polysaccharides

Main polymer chain is linked via carbon 1 and carbon 4 of the next sugar.

Source	Storage (for glucose to consume for energy later) Always in the "alpha" 1-4 link	Structural use the "beta" 1-4 link
Plant	Amylose (not branched) and amylopectin (slightly branched)	Cellulose (no branching)
Animal	glycogen (highly branched)	Chitin (modified form of glucose: N-acetylglucosamine) found in chitin of insects etc.

Other properties of polymers of sugar:

Beta-1-4 links have numerous cross-linking H-bonds which makes the structure more rigid but slightly flexible as well as not making bonds with water much. Refers to the fact that carbon 1 is chiral in the cyclic form (pyranose). This is the "equatorial" form.

alpha 1-4 do not make multiple cross-links through H-bonds and interact with water well (like rice cooking up to get larger and softer as water is absorbed). Axial form