

Sept. 4-5

- Reactions
 - Condensations
 - Hydrolysis
- Carbohydrates
 - Polysaccharides
- Lipids
 - Fats
 - Steroids



Polymers

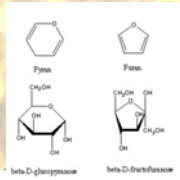
- Most Macromolecules are Polymers
 - Polymers are made up of monomers
 - Many polymers are formed by Condensation
 - Two monomers are combined
 - One water molecule is lost
 - Also called dehydration reaction
 - Polymers can be broken down by the reverse
 - Hydrolysis
 - Both are enzyme catalyzed

Carbohydrates

- Most common are 6-carbon (hexose) 5-carbon (pentose) and triose sugars
- Sugars typically cyclize (form rings) in solution
- Sugars are often found as monomers (monosaccharides) dimers (disaccharides) or polymers (polysaccharides)

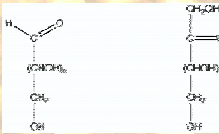
Cyclized Sugars

- A six – Carbon sugar can form a five or six membered ring



Sugars can be Aldehydes or Ketones

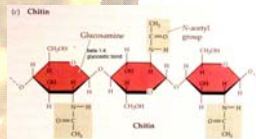
- Sugars differ by whether they contain an aldehyde (left) or a ketone (right)



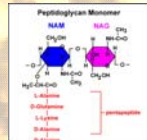
Also referred to as aldoses and ketoses

Other Polysaccharides

- Chitin (insects, shellfish)

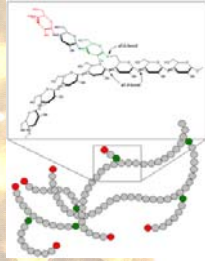


- Gram Negative bacterial cell wall



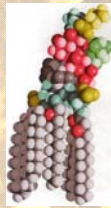
Not all Polymers are Linear

- Glycogen is the storage form of glucose
- Found in Liver and Muscle
- Structural polymers tend to be linear
 - Starch
 - Cellulose



Lipids

- Also called fats
- Store energy
- Form membranes
- Transmit signals
- Can be polar or nonpolar
- Can be combined into larger structures

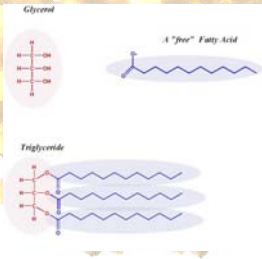


Lipids – Polymers of Polymers

- Fatty Acids are the simplest lipids
 - Formula $\text{CH}_3(\text{CH}_2)_n\text{COOH}$
 - Malonyl and acetyl CoA polymer
 - COOH Carboxyl Group
 - Acidic – readily ionizes
- Fatty acids are usually found esterified to glycerol to make a triacylglycerol

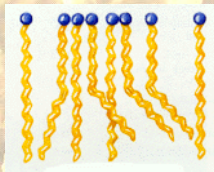
Triacylglycerol

- Formed by esterification of three fatty acids onto glycerol



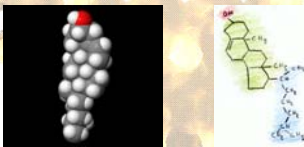
Saturation

- Fatty acids can be saturated (no double bonds) or unsaturated

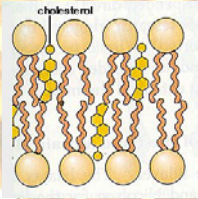


Cholesterol

- Cholesterol is a major component of your membranes



- Cholesterol stabilizes membranes by intercalating with the acyl chains



Steroid Structure

- Steroids share a common structure with Cholesterol

