

Chapter 2c

Four Classes of Biomolecules

Outline

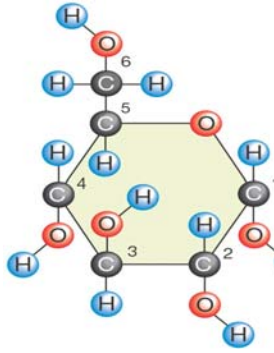
1. Overview of Biomolecules
2. Carbohydrates
3. Fats
4. Proteins
5. Nucleic Acids

4 Biomolecules

<u>Biomolecule</u>	<u>Polymer</u>	<u>Monomer</u>
Carbohydrate	Polysaccharide	Monosaccharide
Fat	Triglyceride	Fatty Acid
Protein	Polypeptide	Amino Acid
Nucleic Acid	DNA and RNA	Nucleotides

Functions?

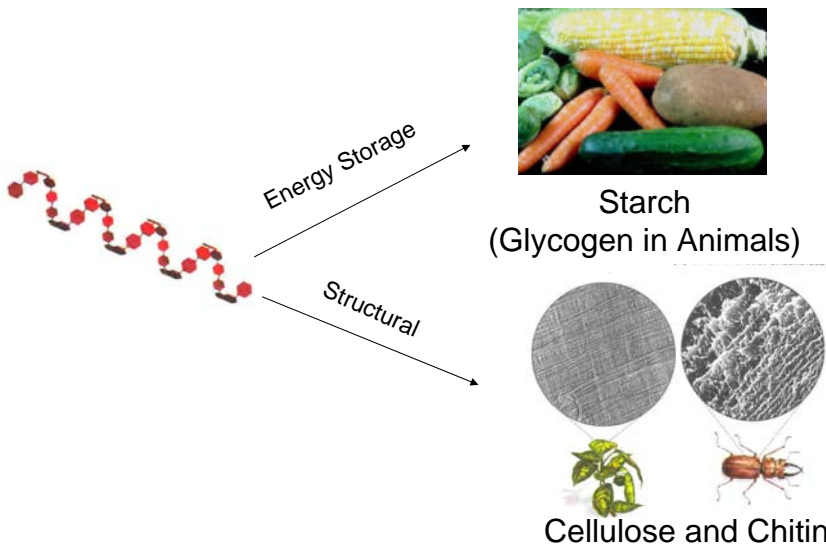
Carbohydrate Monosaccharides



Glucose

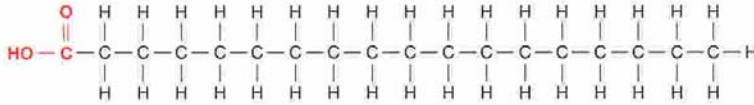
- Simple Sugar
- 1:2:1 ratio
Carbon:Hydrogen:Oxygen
- Source of Carbon and Energy in cells
- Other simple sugars
 - Fructose
- Disaccharides
 - Maltose and Sucrose

Function of Polysaccharides



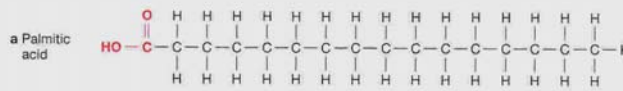
Fats

Fatty Acids

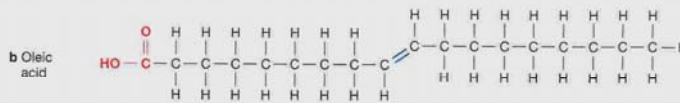


Amphipathic

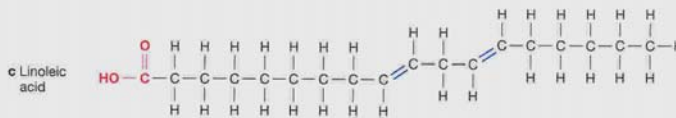
Saturated/Desaturated Fatty Acids



Saturated
(no double bonds)

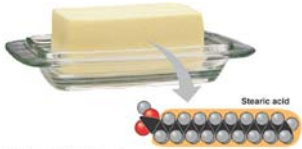
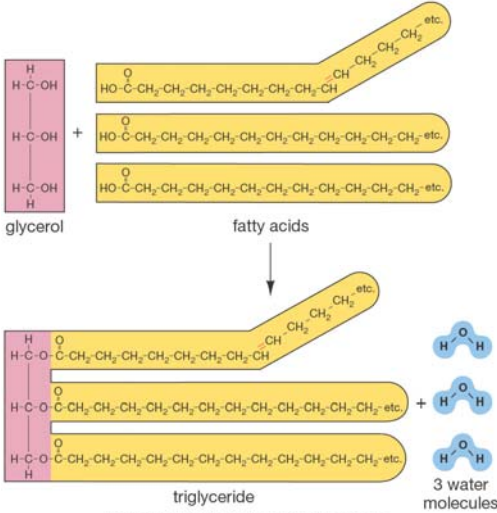


Monounsaturated
(one double bond)

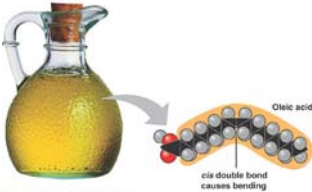


Polyunsaturated
(more than one double bond)

Triglycerides



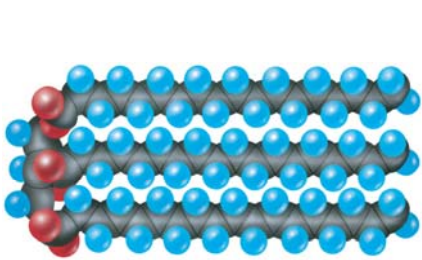
(a) Saturated fat and fatty acid



(b) Unsaturated fat and fatty acid

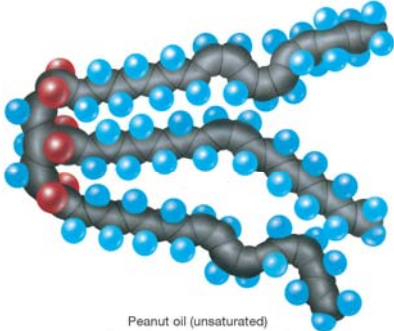
cis double bond causes bending

Saturation and Melting Temperature



Beef fat (saturated)

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Peanut oil (unsaturated)

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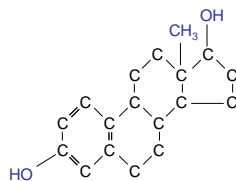
Effect of Triglycerides on Health

- Saturated Fats – LDL raised
- Polyunsaturated – LDL unchanged
HDL lowered
- Monounsaturated – LDL and HDL unchanged
- Polyunsaturated omega-3
- reduces heart disease

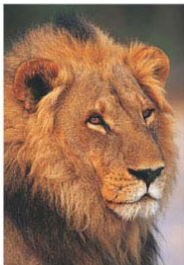
Steroids



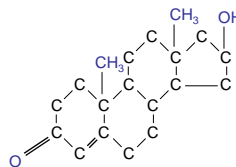
Female lion



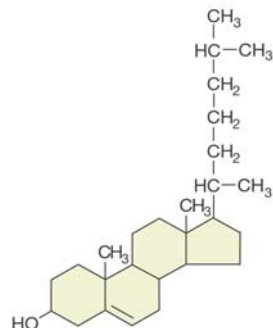
Estrogen



Male lion

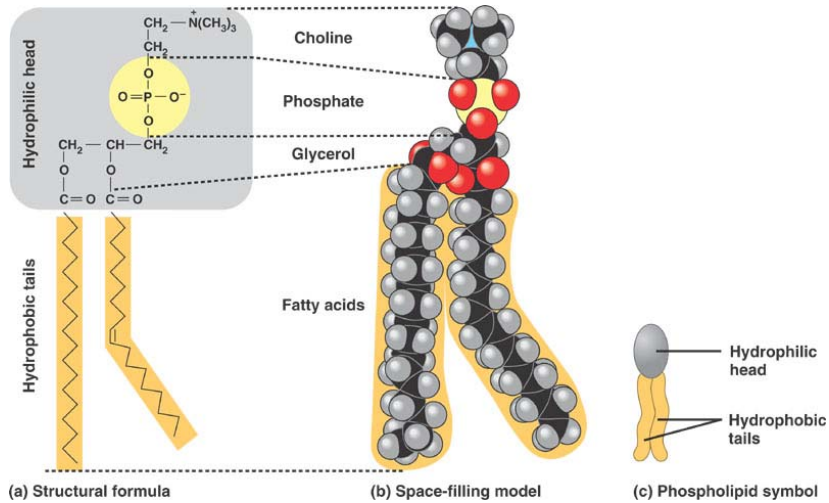


Testosterone



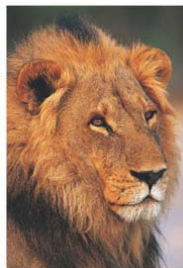
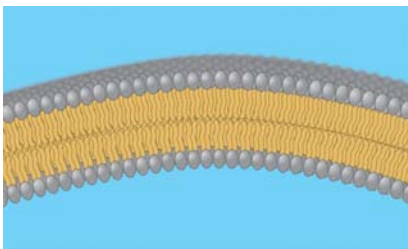
Cholesterol

Phospholipids

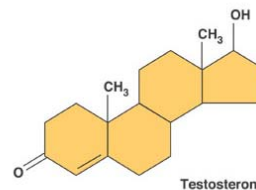


Lipid Functions

- Membranes – phospholipids, steroids
- Energy Storage – triglycerides
- Hormones - steroids

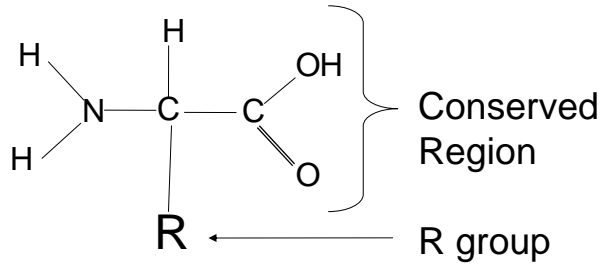


Male lion



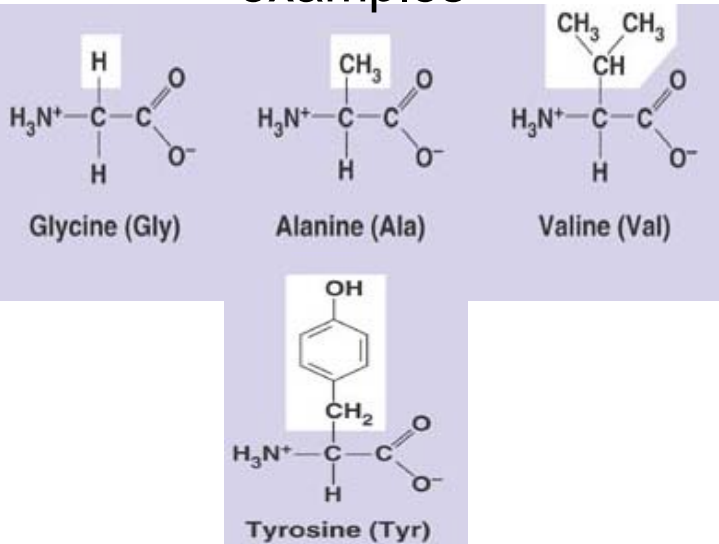
Proteins

Amino Acids

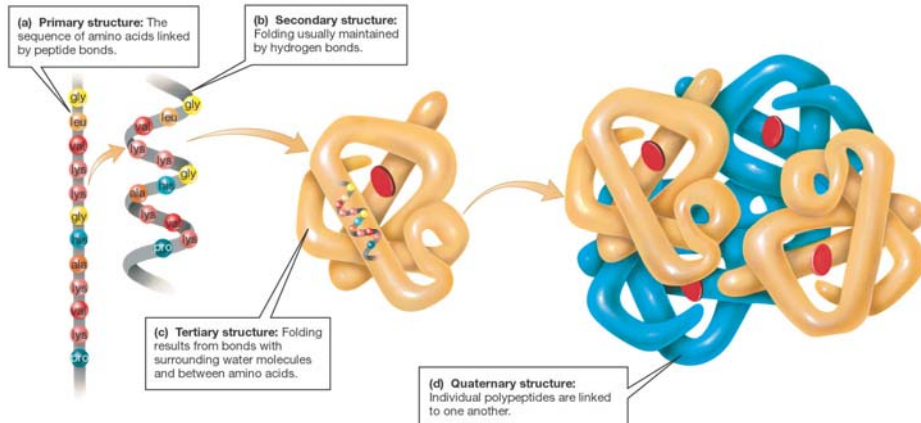


20 Amino Acids

examples



Protein Structure



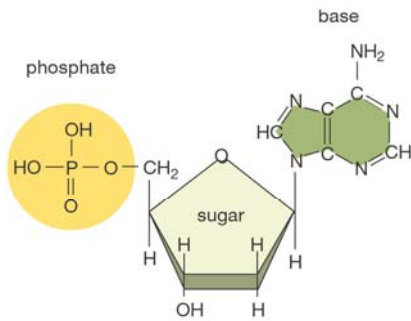
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Primacy of Proteins

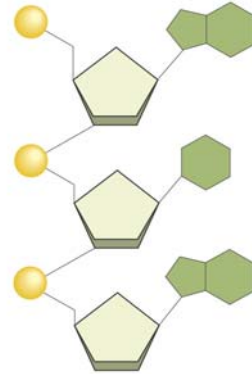
<u>Function</u>	<u>Example</u>
Enzymes	Amylase hydrolyzes starch
Structural	Silk fibers spun by spiders, Keratin in nails
Storage	Ovalbumin in egg white
Transport	Hemoglobin in red blood cells
Hormones	Insulin, growth hormone
Receptors	Receptors for neurotransmitters
Movement	Actin and myosin, Flagella
Defensive	Antibodies



Nucleic Acid Nucleotides



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Nucleic Acid Functions

- ATP - nucleotide energy carrier in cell
- DNA (Deoxyribonucleic acid) – genetic material
- RNA (Ribonucleic Acid) – gene expression machinery

ATP

