**Carbohydrates**

Definition: hydrates of carbon

Key groups
- Aldose
- Or ketose
- Hydroxyl groups

<table>
<thead>
<tr>
<th>Monosaccharides</th>
<th>disaccharides</th>
<th>polysaccharides</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 carbons – 6 carbons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ribose</td>
<td></td>
<td></td>
</tr>
<tr>
<td>glucose</td>
<td>maltose</td>
<td>starch</td>
</tr>
<tr>
<td>fructose</td>
<td>sucrose</td>
<td>glycogen</td>
</tr>
<tr>
<td>galactose</td>
<td>lactose</td>
<td>cellulose</td>
</tr>
</tbody>
</table>

Oxidation – to carboxylic acid – blood sugar test
Reduction – to alcohol – sugar alcohols

Glycosidic bond condensation vs. hydrolysis

Artificial sweeteners

Digestion – mouth and intestine
- Enzyme hydrolysis

Metabolism – ______________ broken down to 3 carbon sugar

**Lipids**

Definition – biological compounds that don’t dissolve in water

Functions
- Fatty acids
  - Split personality
  - Saturated vs. unsaturated
- Triacylglycerols/triglycerides
  - Esters – glycerol + fatty acid – condense to TAG
  - TAG – hydrolyze to glycerol + fatty acids
  - Energy storage – adipose tissue
  - Digestion – enzyme hydrolysis, intestines
  - Fats vs. oils
    - Hydrogenation – unsaturated to saturated
    - Trans vs. cis

**Saponification**
- Base hydrolysis – fatty acid salts

**Micelles**
- Emulsifying agent

Glycerophospholipids (or phospholipids)
- Similar structure to TAG – one less tail
- Split personality
- Bilayer membranes
Sphingolipids
  Structure – similar to phospholipids
  Split personality
  Nerve tissues
  Myelin sheaths
Prostaglandins
  Fatty acid – no ester formed
  Response molecules – created in response to trigger
  Inflammatory/ pain/ muscle contraction
  Aspirin, ibuprofen, cox inhibitors reduce production of these molecules.
Steroids
  Cholesterol – backbone of all steroids
  Bile salts
    Help in fat digestion – emulsifier
  Lipoproteins – contain fatty acids, TAGS, and cholesterol
    Formed during fat digestion
    Bad vs. good - LDL vs. HDL
Proteins
  Functions
  Polymer –
    Amino acids
      Essential vs. nonessential
    Peptide bond
    Dipeptide – polypeptide - protein
      Complete vs. incomplete protein
  Primary structure – peptide bonds , amide bonds
  Folding
    Forces involved
    Coils
    Sheets
  Folding – Final shape
    One chain or multiple chains
    Fibrous vs. globular
  Collagen – fibrous, coiled
    Skin, tendons
    Vitamin C
  Myoglobin vs. Hemoglobin - globular
  Sickle cell anemia
    Cause
    results
  Denaturation – unfolding of protein; loss of function
    Causes
      Digestion
        Denaturation in stomach
        Hydrolysis in intestines