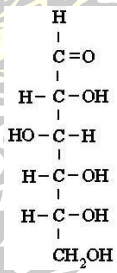
CARBOHYDRATES & LIPIDS

CARBOHYDRATES

- Source of Energy
- Compounds containing C, H, and O
  - sugars
- General Formula
  - $C_xH_yO_x$

GLUCOSE

- $C_6H_{12}O_6$
- Simple sugar

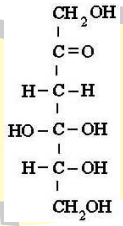


GLUCOSE

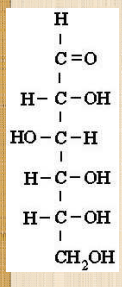
- Cells use it for energy
- Main product in photosynthesis
- Starts cellular respiration

FRUCTOSE

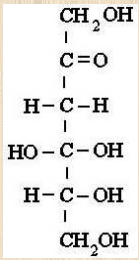
- $C_6H_{12}O_6$
- Same as glucose, but different arrangement



Glucose



Fructose



$C_6H_{12}O_6$

ISOMER

Same formula, but different structure

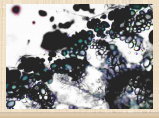
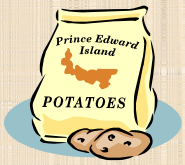
SUCROSE

- Glucose + Fructose
  - Double sugar
- Water released

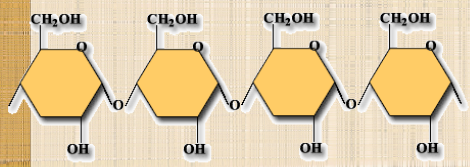



STARCH

- When a plant has an excess of glucose it forms…..
- Bonding of many sugars (glucose) to form starch (and release water)
- Plants store food in starch
  - Potato
    - leucoplasts

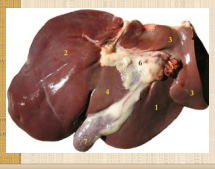



Starch Molecule

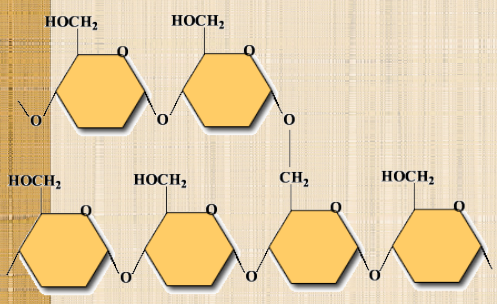


GLYCOGEN

- Animals store chains of sugars in the form of glycogen
  - More highly branched than starch
- Stored in the liver & can quickly convert to glucose to provide energy

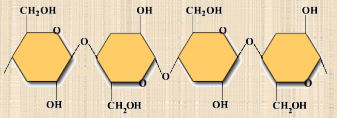



GLYCOGEN

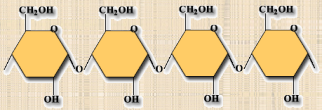


CELLULOSE

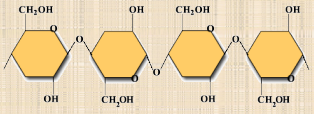
- Similar to starch, except –OH's alternate on both sides
  - Allows for strong bonding
    - Good building materials
- Makes up 50% of dry part of wood



Starch

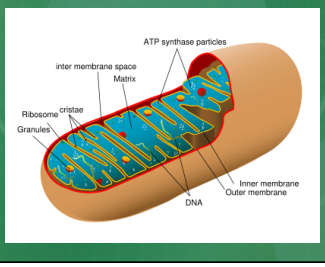


Cellulose



Where are carbohydrates being converted to energy?

In the Mitochondria, of course!



MONOSACCHARIDE

- Single sugar
- Building blocks of carbohydrates
- Ex) glucose, fructose

DISSACCHARIDE

- Double sugars
- 2 monosaccharides joined
- Ex) sucrose

POLYSACCHARIDE

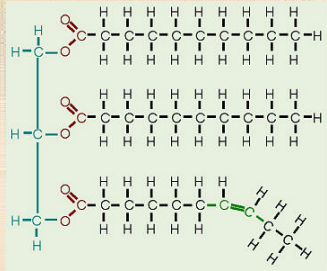
- Macromolecule (large molecule)
- Made of smaller molecules
- Ex) glycogen, starch, cellulose

LIPIDS

- Don't dissolve in water
- Fats, oils, waxes, cholesterol, steroids

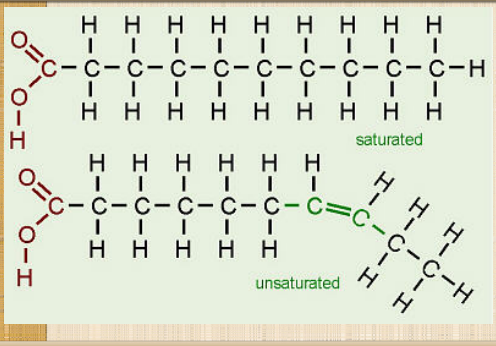
LIPIDS

- Fat is formed by glycerol and 3 fatty acids

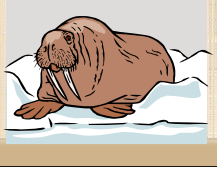


Types of Fat

- Saturated Fats
  - No double bonds between carbons
  - Solids (produced by animals)
    - butter
- Unsaturated Fats
  - Contains double bonds
  - Liquids (produced by plants)
    - Corn oil

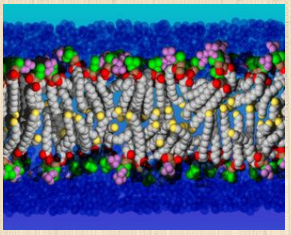


- Fats have more C-H bonds = more energy than carbohydrates
- Use fat when sugar fuel is gone
  - Animals used stored fat
    - Mammals-fat protects heart and kidneys
    - Blubber-protects mammals from cold water



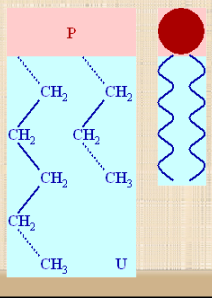
PHOSPHOLIPIDS

- Major component of cell membrane



PHOSPHOLIPID

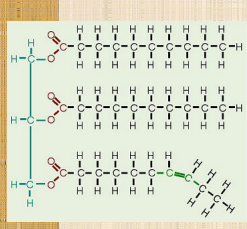
- Glycerol molecule bonded to 2 fatty acids and a phosphate group

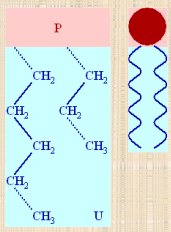


Waves

- Found on insects, fruits and leaves
- Helps repel water due to ***hydrophobic*** characteristics of lipids

- Fats, phospholipids and waves are lipids with chain structures

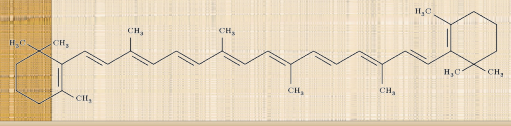




B-Carotene

- Orange color in plants
  - Carrots and egg yolk

- Helps plant grow to light
- Metabolizes to vitamin A for skin and night vision



Cholesterol

- In cell membrane
- Surrounds nerve lining
- Can block blood vessels in large amounts
- Raw material of certain hormones
  - *Testosterone*
  - *Estrogen*