



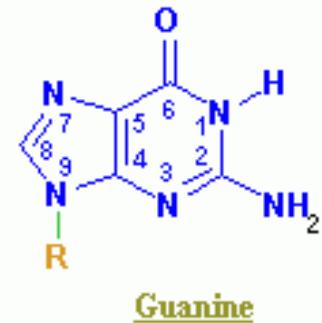
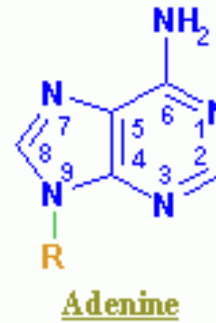
# Macromolecules

# Nucleic Acids

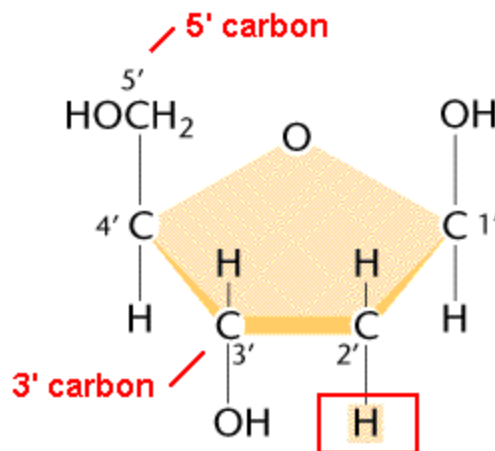
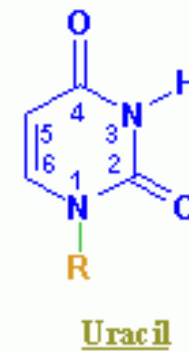
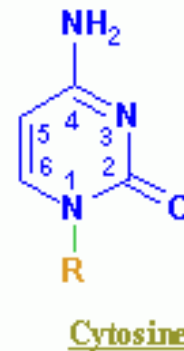
## Structural components

- Nitrogenous bases
- Pentose Sugar
- Phosphate

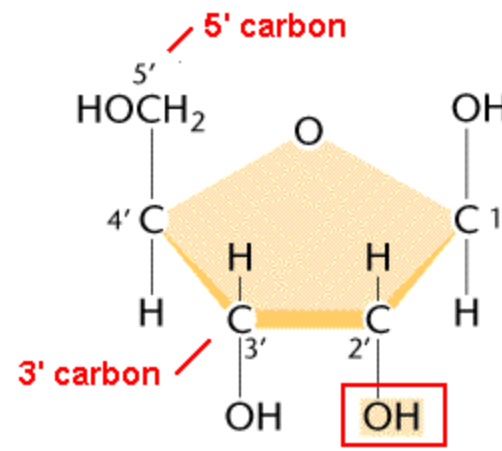
### Purines



### Pyrimidines

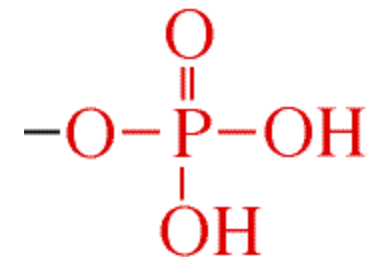


2-Deoxyribose



Ribose

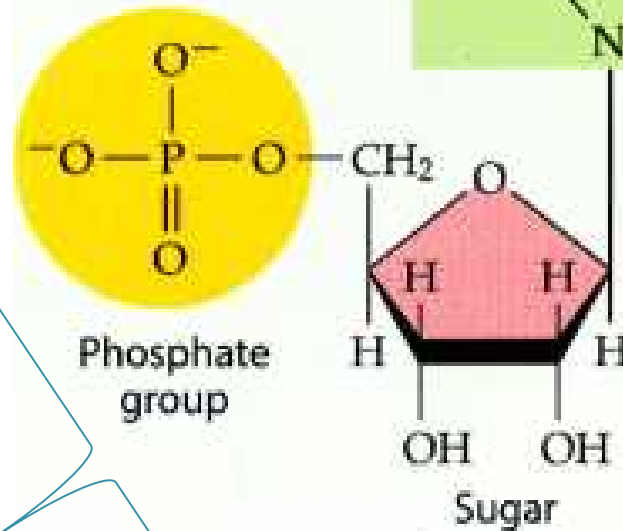
### Phosphate



# Nucleic Acids

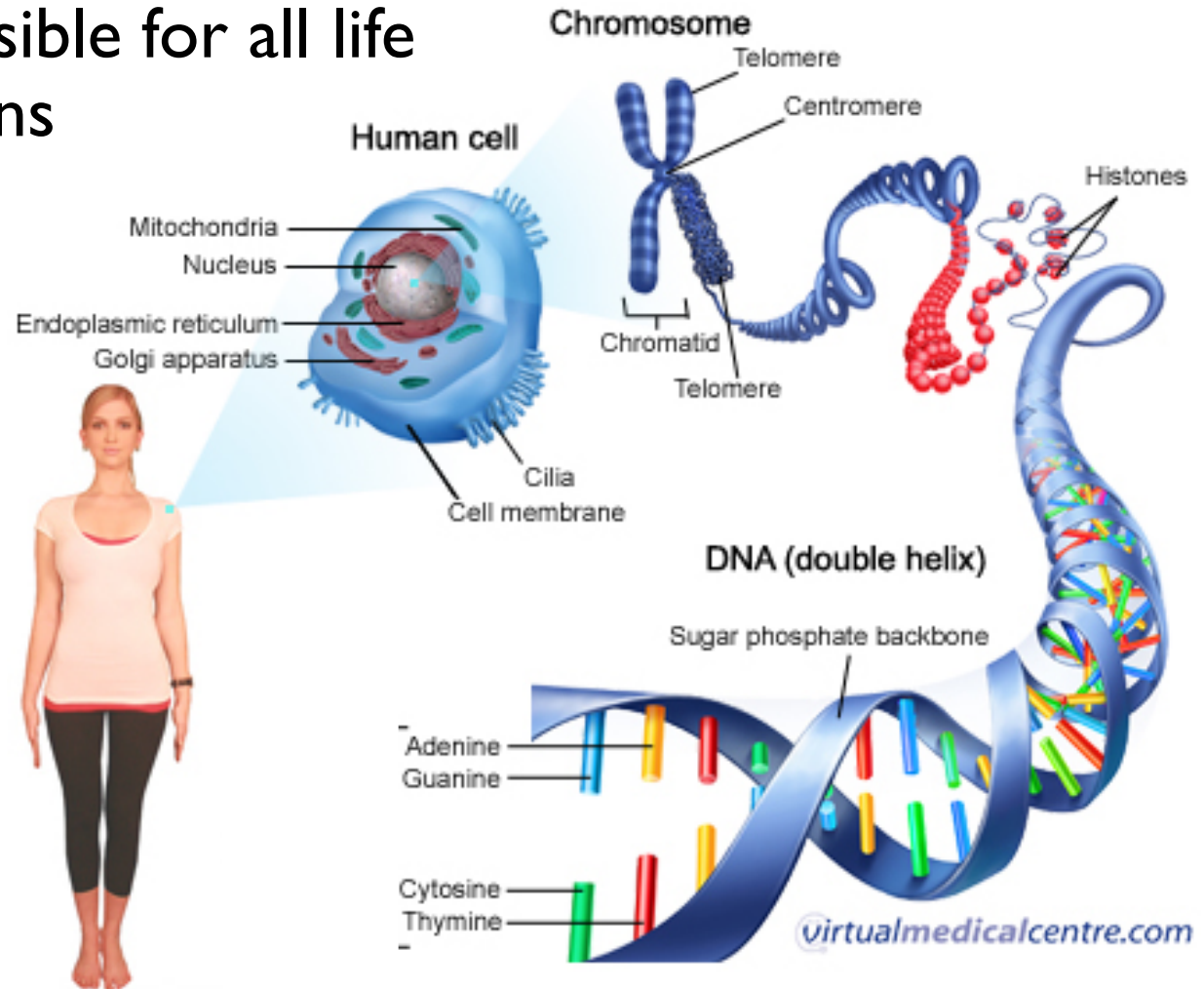
Building Block  
= Nucleotides

Sugar-Phosphate backbone



# Nucleic Acids

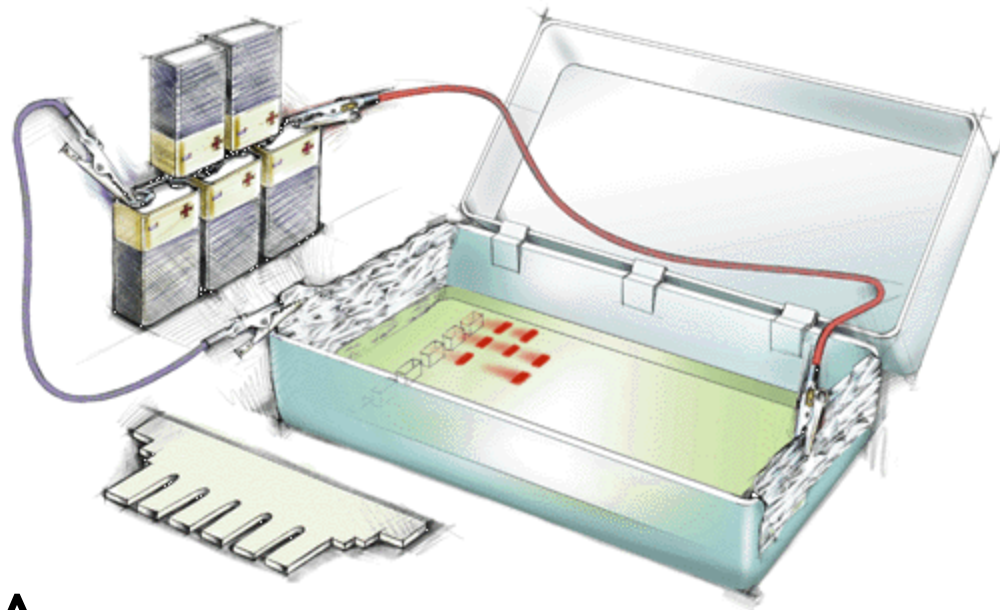
- Carry genetic information responsible for all life functions



# Nucleic Acids

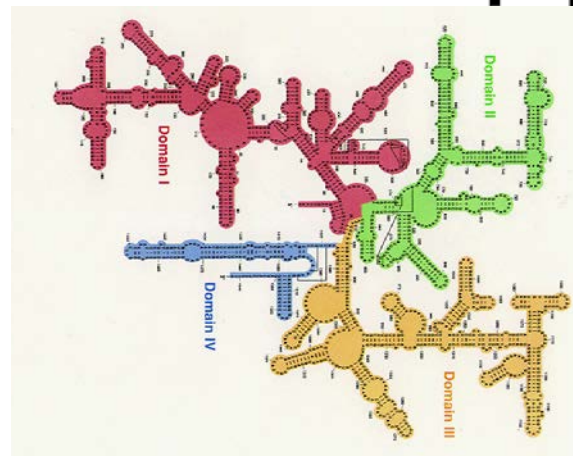
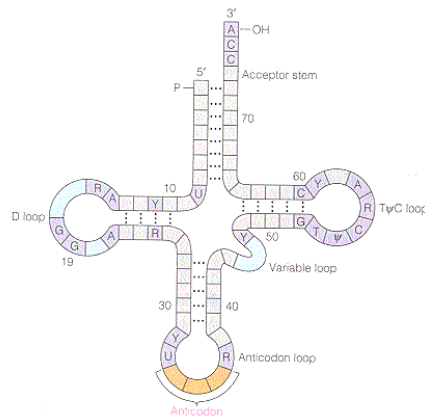
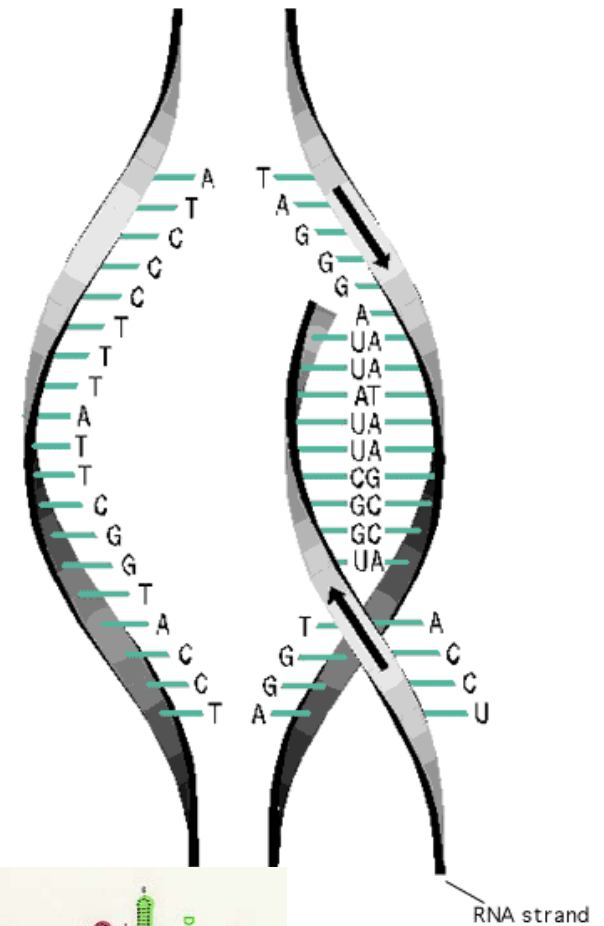
## Seeing DNA

1. Burst cells to release DNA
2. Separate DNA from protein & debris
3. Isolate & concentrate DNA
4. Separate into pieces w/ enzymes
5. Send through Electrophoresis



# Nucleic Acids

- Deoxyribonucleic Acid
- Ribonucleic Acid
  - Memory
  - Transfer
  - Ribosomal

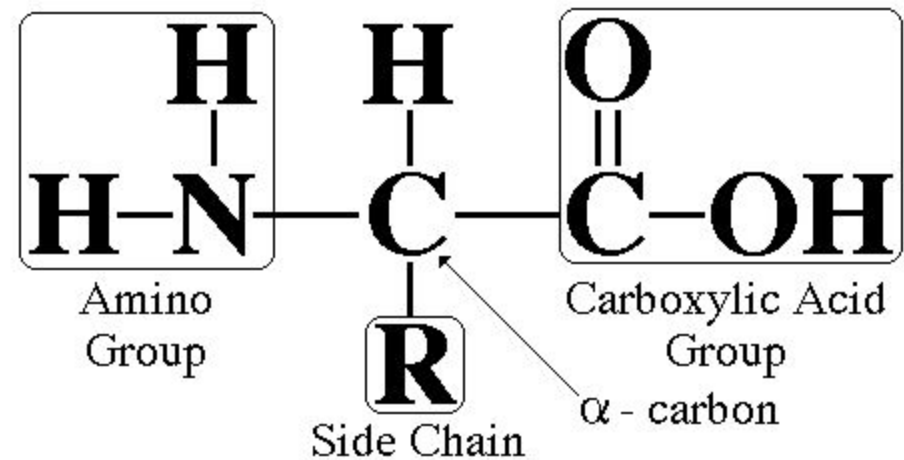


# Proteins

## Structural Components

- Amino group
- Carboxyl group
- Alpha Carbon
- **R-group**

## Amino Acid Structure

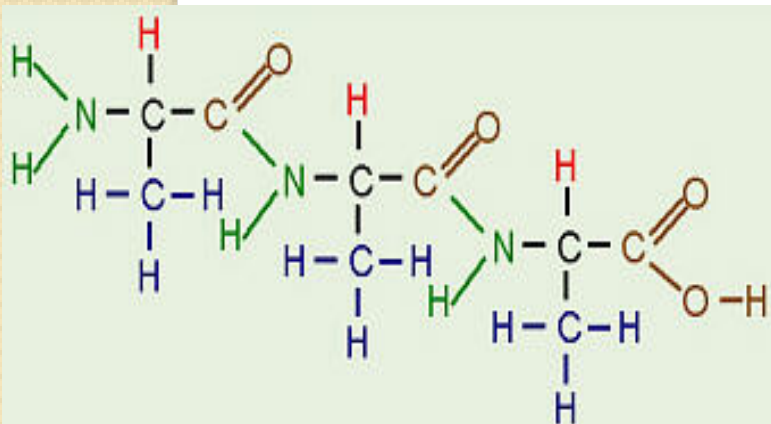
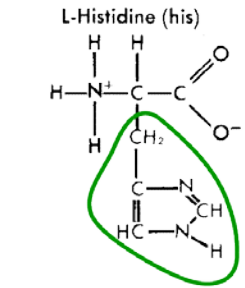
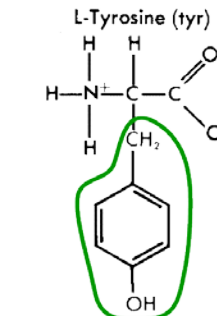
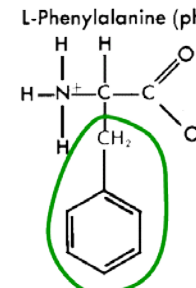
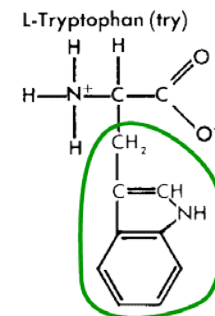
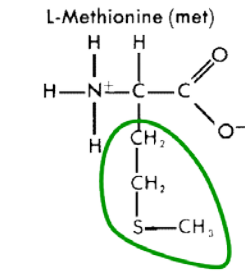
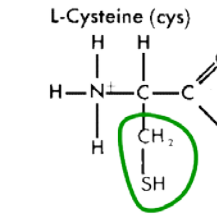
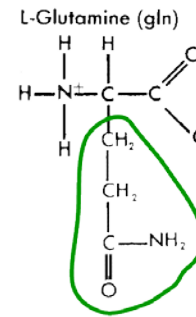
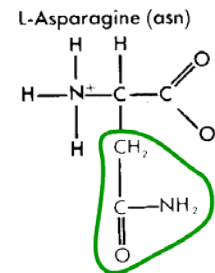
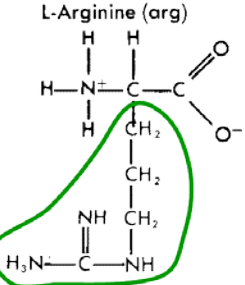
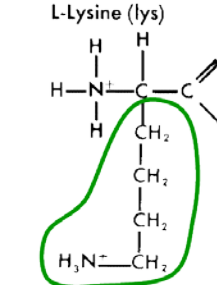
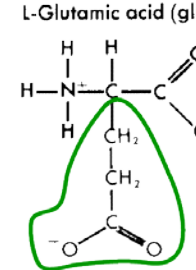
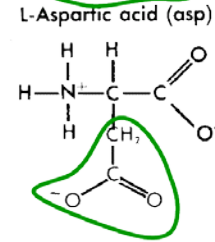
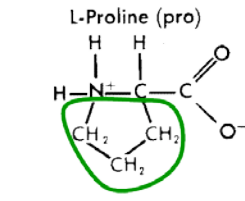
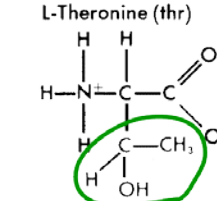
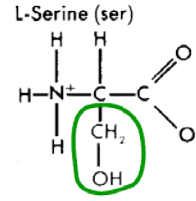
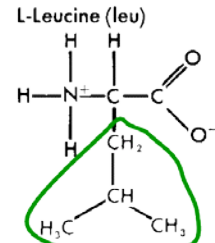
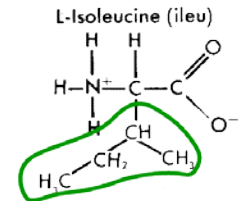
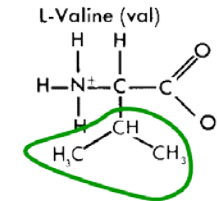
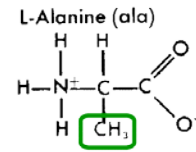
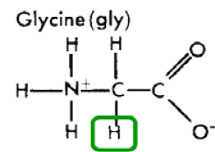


# Proteins

## Building Block

= amino acid (aa)

- There are 20 varieties of aa found in our bodies
- Linked by peptide bonds





# Proteins

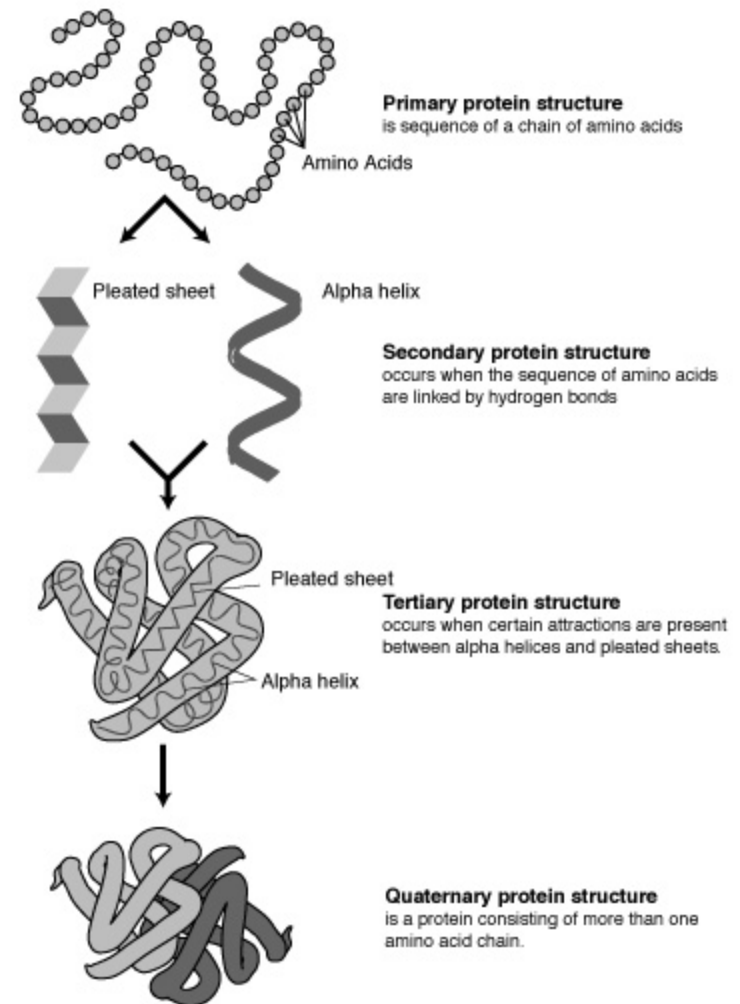
Shape is determined by:

1. The number and sequence of amino acids

- Could be 50 – 34,350 aa long

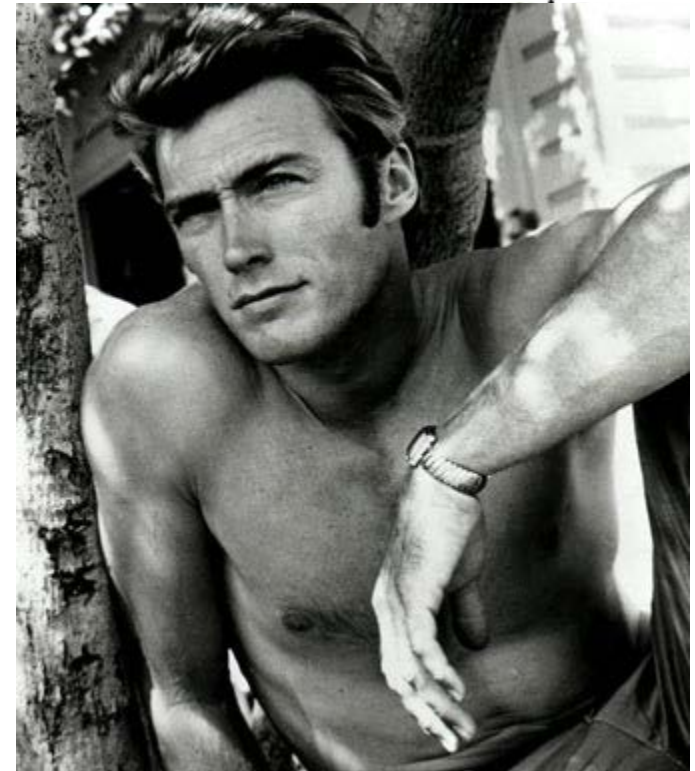
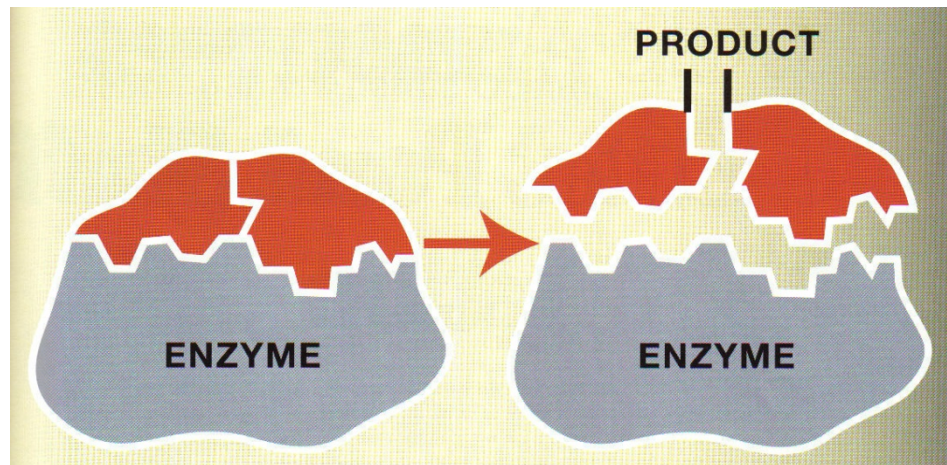
2. Folding due to interactions of R-groups

- Hydrogen bonds
- Ionic bonds
- Disulfide bonds
- Hydrophobic (Polar) interactions



# Proteins

- Provide structure in living things
- Speed up chemical reactions in the body as enzymes



# Proteins

Testing for the  
presence of protein

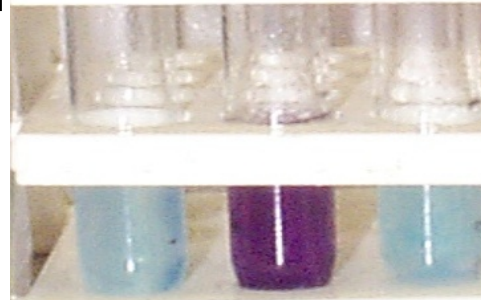
-Biuret reagent

Turns blue to violet in  
the presence of  
proteins,

blue to pink when  
combined with  
short-chain  
polypeptides



water      albumin      starch

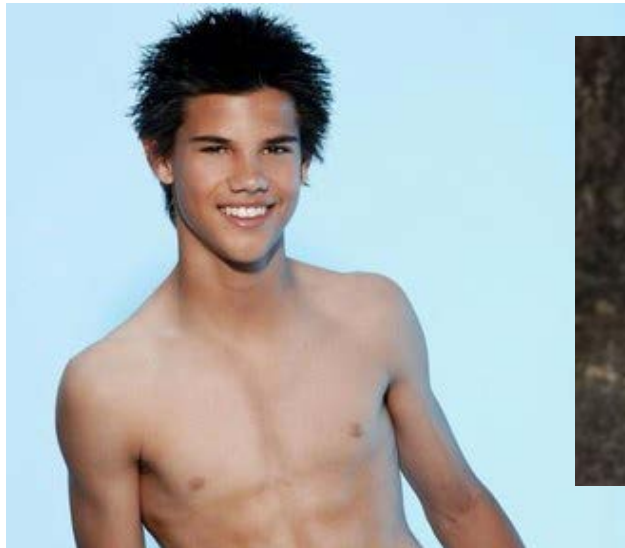


Deborah Spurlock



# Proteins

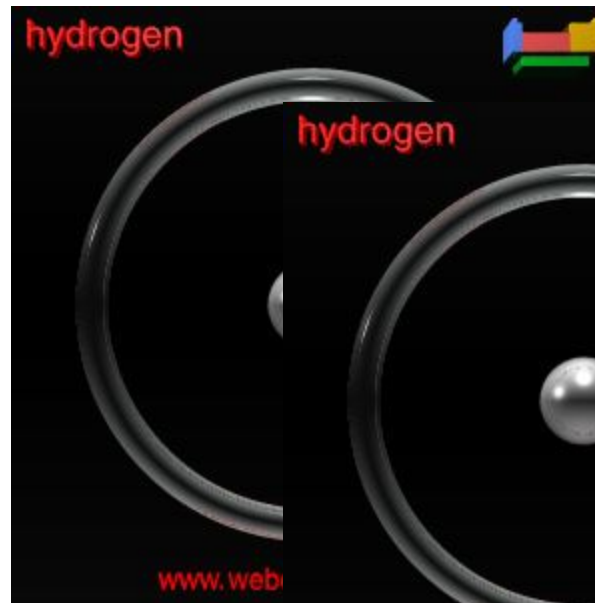
- Hair
- Nails
- Muscles
- Bones
- Skin
- Enzymes



# Carbohydrates

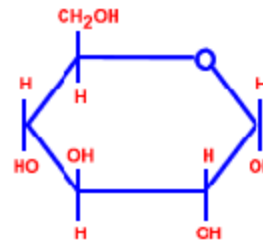
## Structural components

- 1 part Carbon
- 2 parts Hydrogen
- 1 part Oxygen

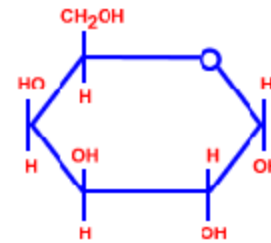


# Carbohydrates

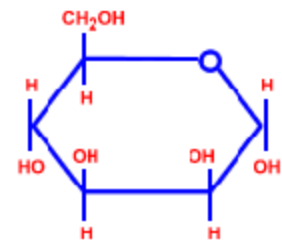
Building Block =  
monosaccharide  
(sugar)



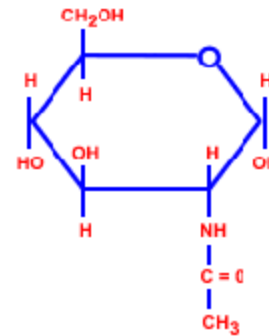
GLUCOSE



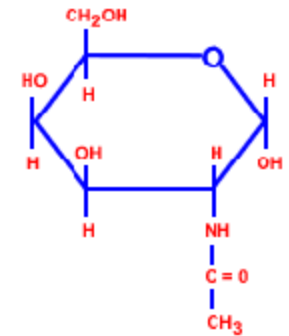
GALACTOSE



MANNOSE



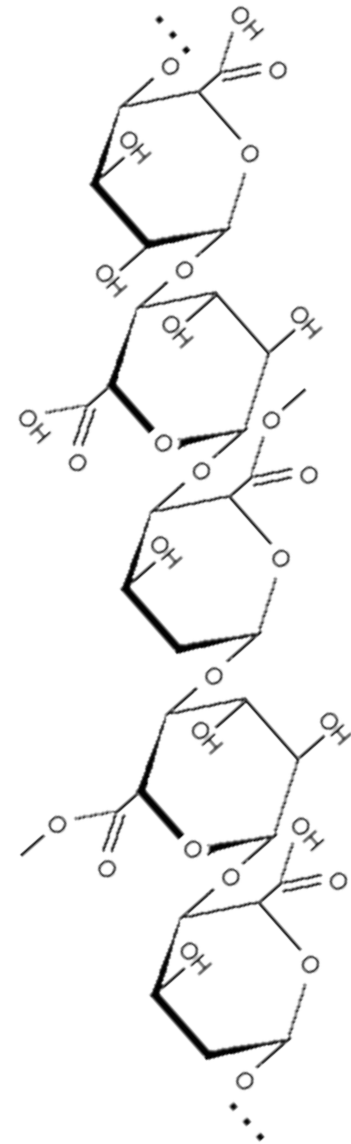
N - ACETYLGUCOSAMINE



N - ACETYLGALACTOSAMINE

# Carbohydrates

- Energy source for living things
- Referred to as “Fast Fuel” because we can access it immediately





# Carbohydrates

Benedict's Test – for  
simple sugars

Lugol's Test – for starch  
and other complex  
carbs



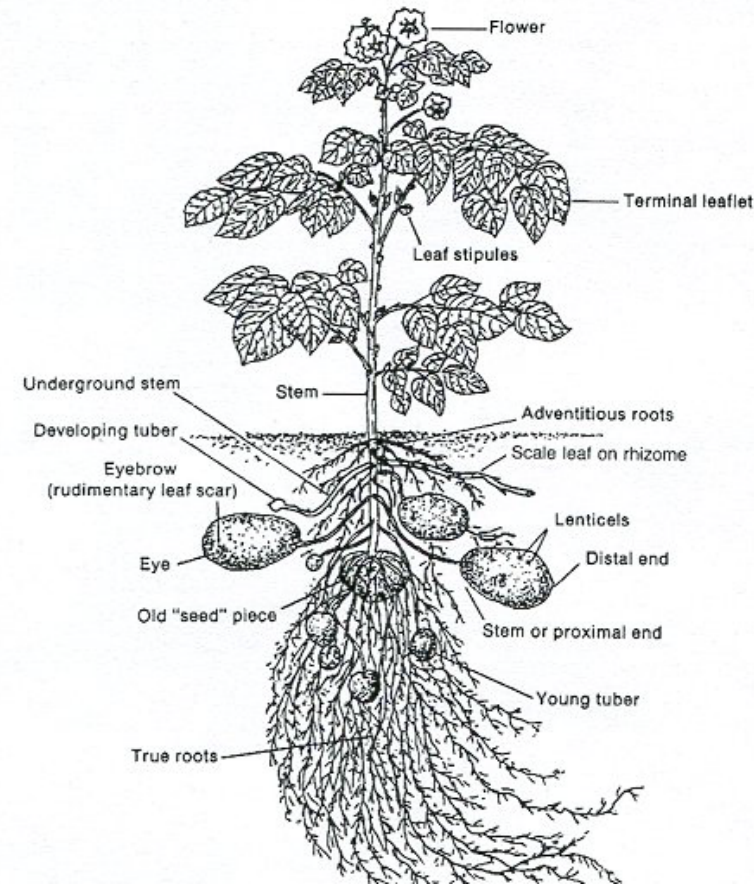


# Carbohydrates

- Chemicals ending in —ose
  - Glucose
  - Fructose
  - Galactose
  - Lactose
- Plant parts
- Starch



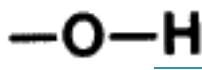
phillipmartin.info



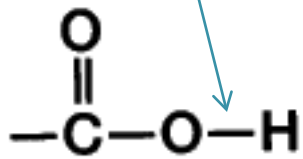
# Lipids

## Structural components

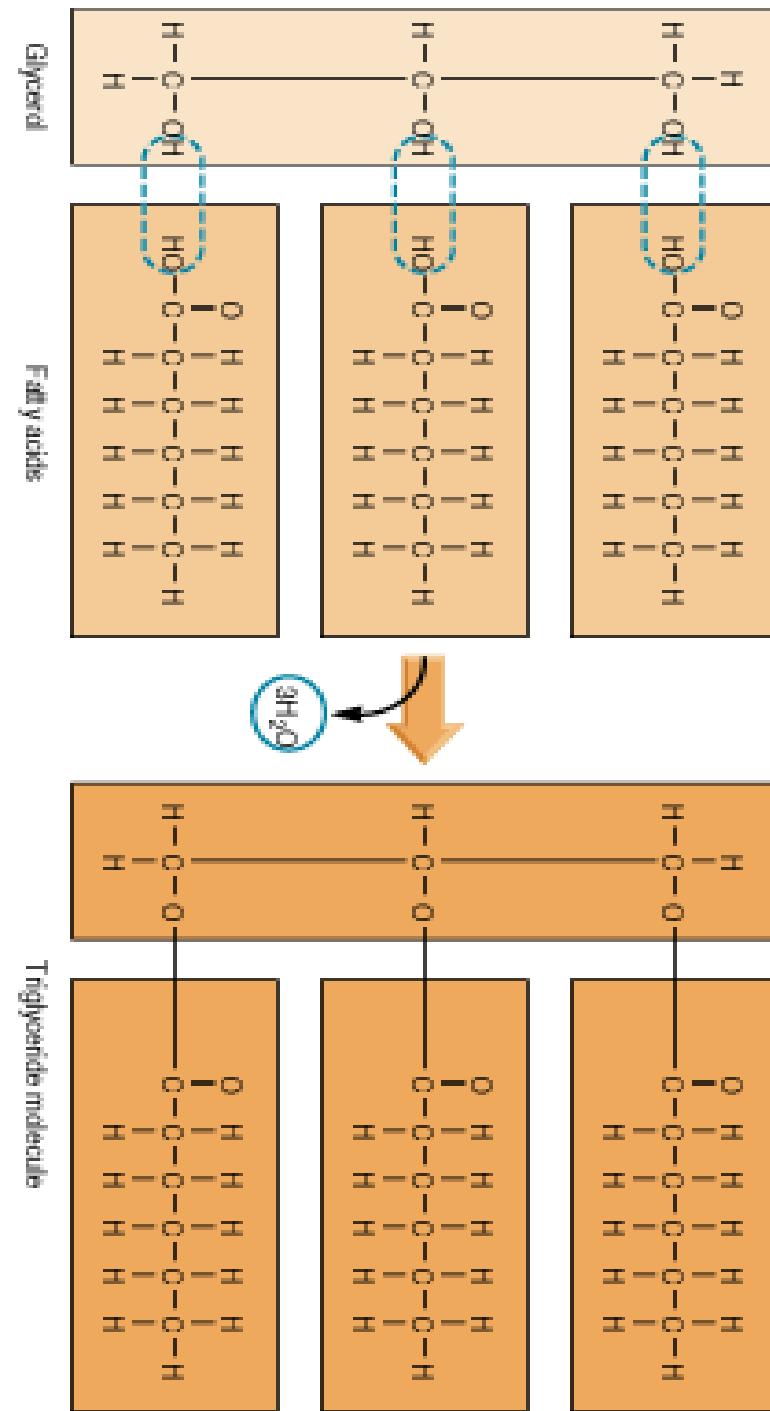
- Hydrocarbon chain w/ Carboxyl group
- Glycerol molecule w/ hydroxyl group
- 4-24 carbons in chain
- Double C bonds form liquid lipids



**Hydroxyl group**



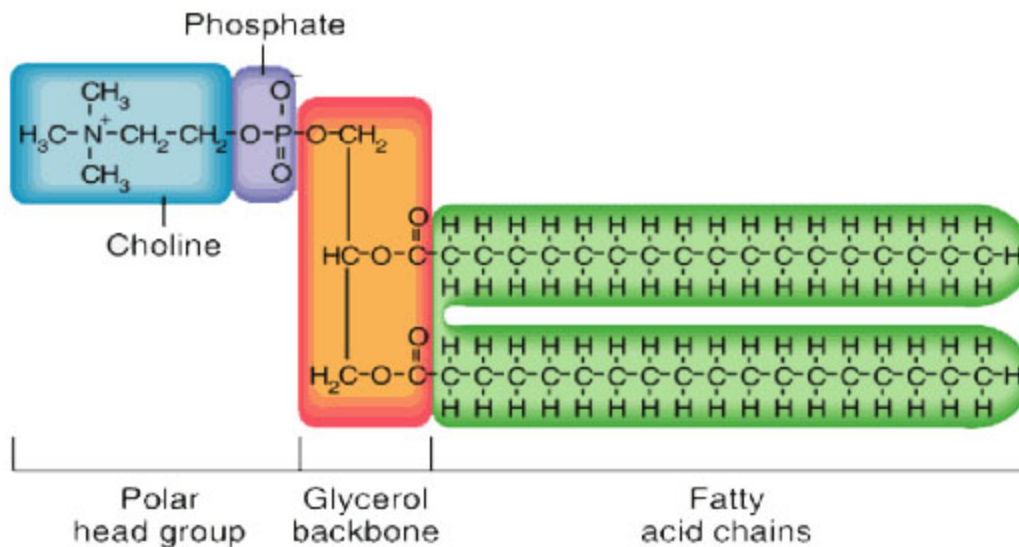
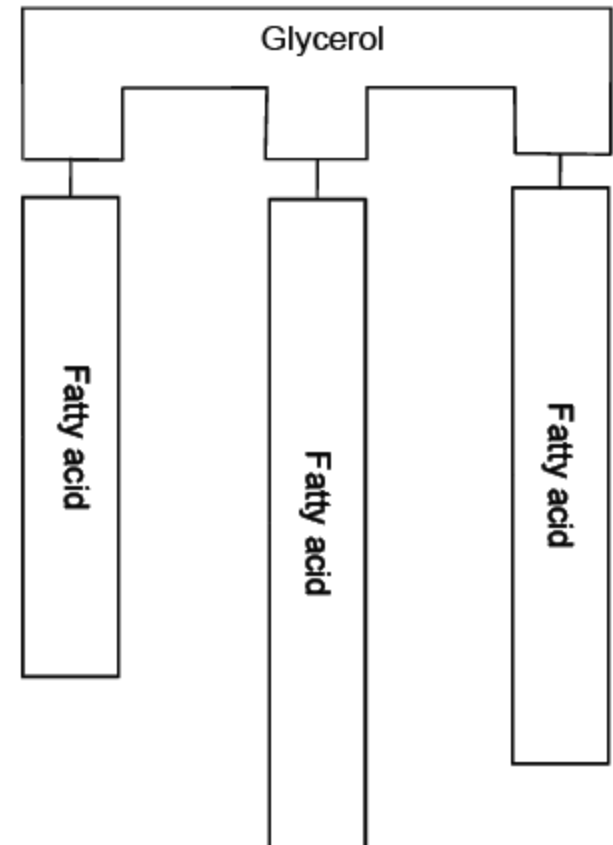
**Carboxyl group**



# Lipids

# Building Blocks

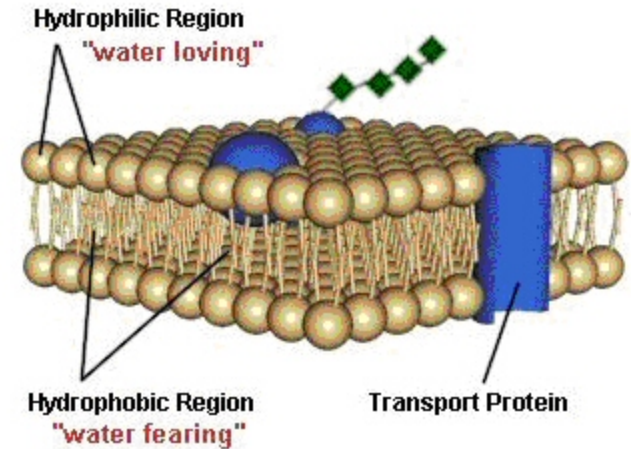
= fatty acids & glycerol



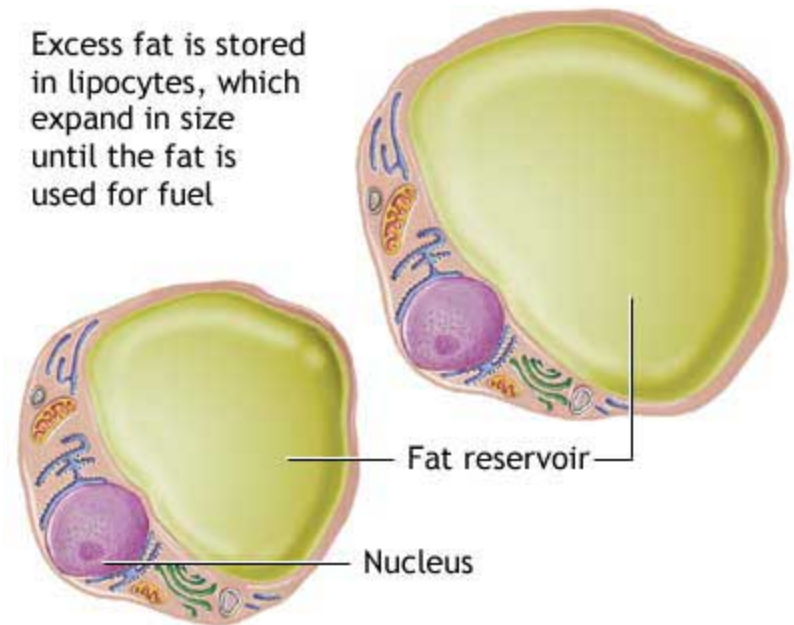
# Lipids

- Store energy
- Form membranes in cells
- Form hormones (signaling molecules)
- Vitamins
- Cushioning
- Warmth

**Cell Membrane**



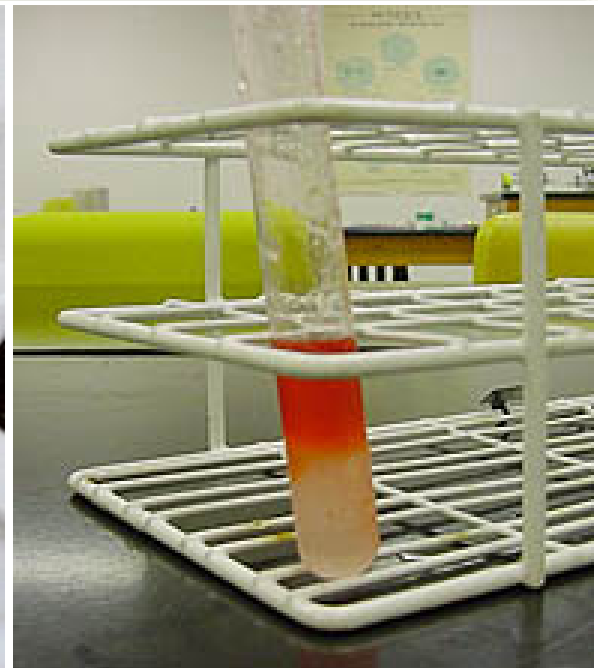
Excess fat is stored in lipocytes, which expand in size until the fat is used for fuel





# Lipids

- Transparency Test
- Sudan IV
  - Turns solution reddish-orange



# Lipids

- Fats
- Oils
- Cholesterol
- Wax
- Vitamins A, D, E, & K
- Monoglycerides
- Phospholipids

