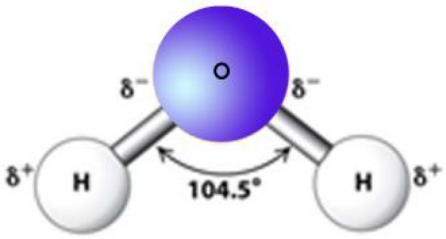

δ+ partial positive

δ-partial negative

Water molecule is a small, polar and angular molecule Polarity is an uneven charge distribution within a molecule. ……...

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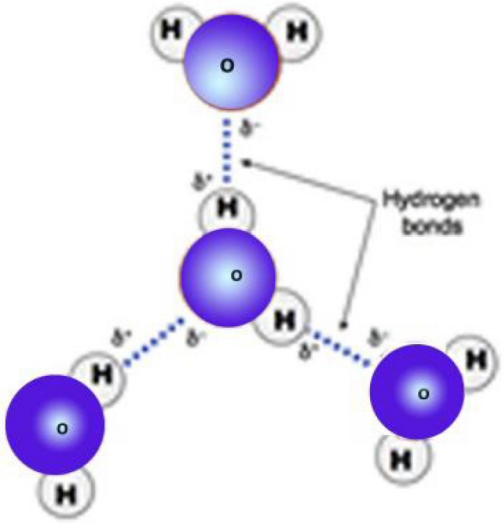

The properties of water arise due to the hydrogen bonds between different water molecules.

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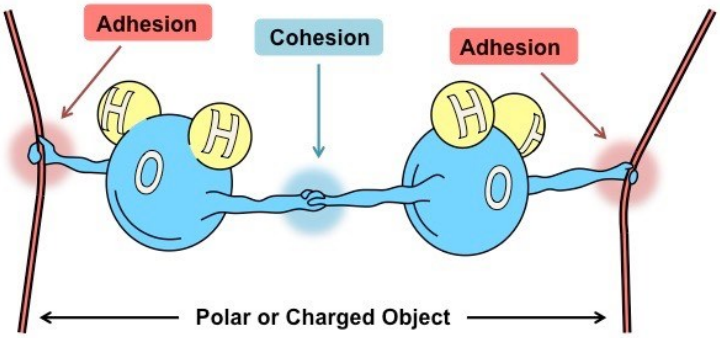
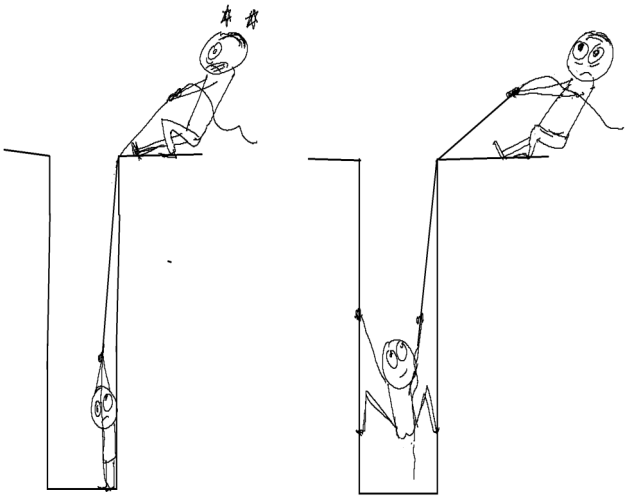
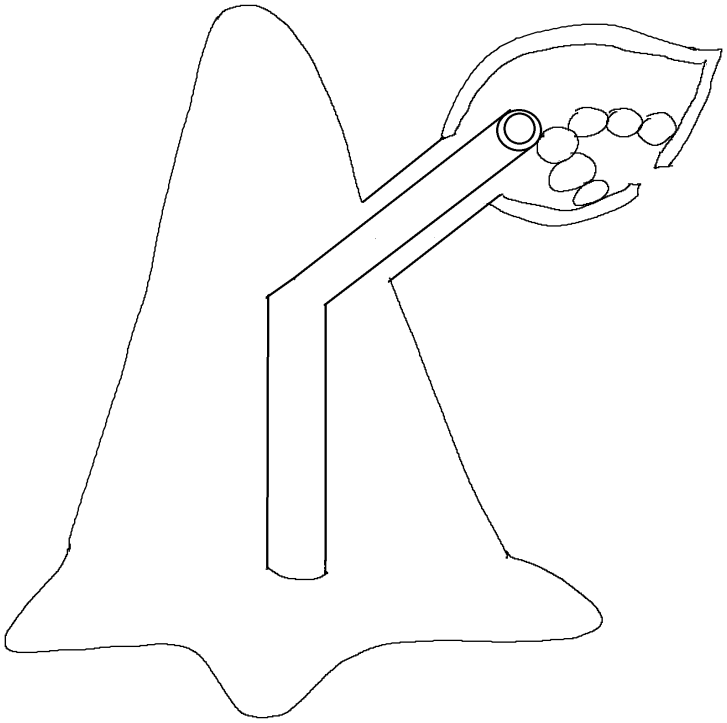
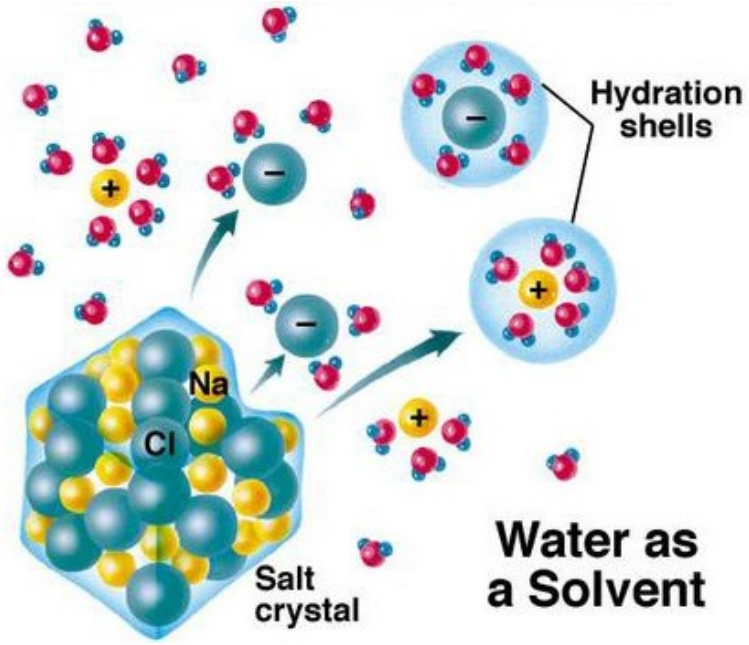
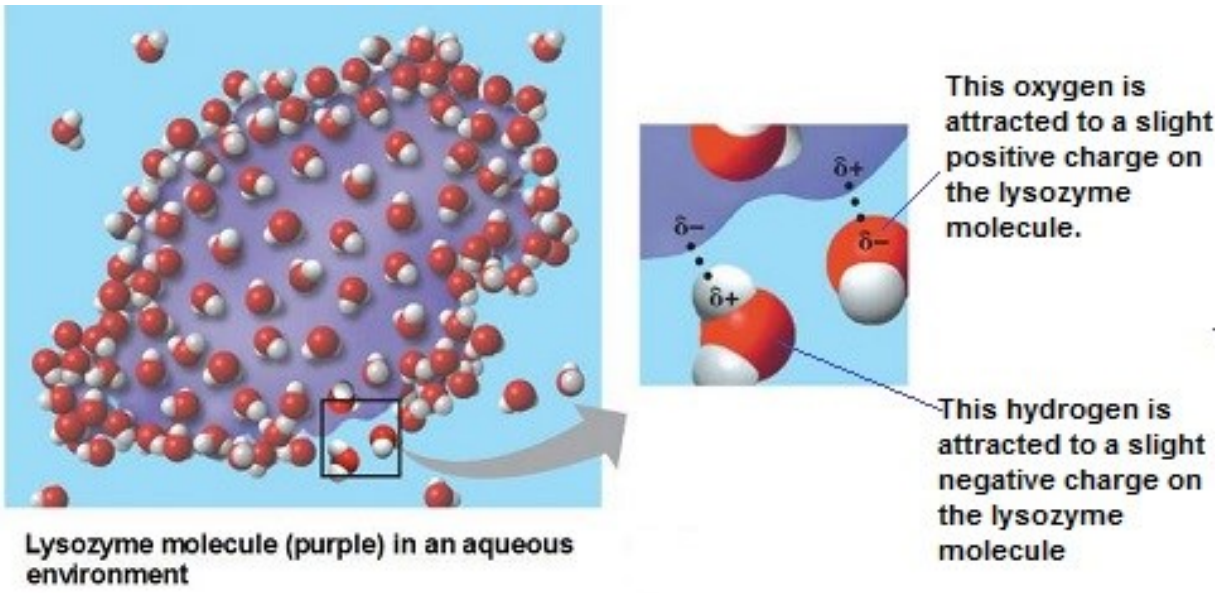

Adhesion
Cohesion
Adhesion
H
H
O
H
H
O
Polar or Charged Object









Lysozyme molecule (purple) in an aqueous environment

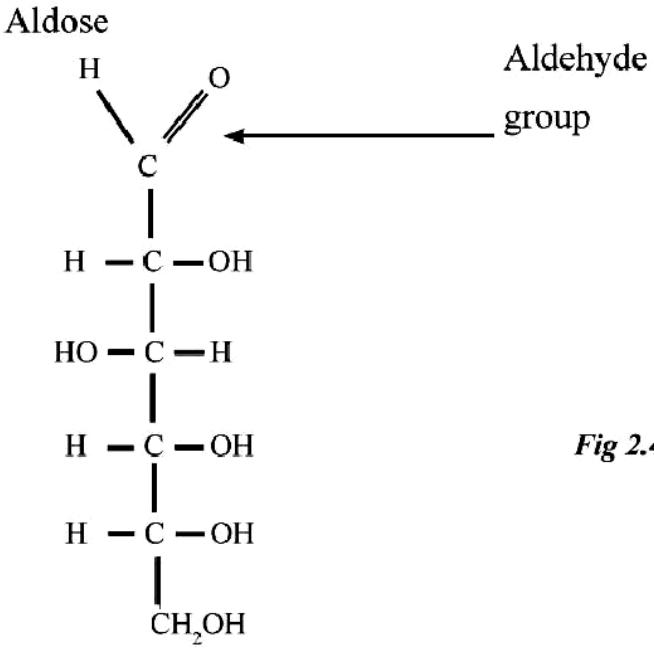


Fig 2.3: Solid form of glucose

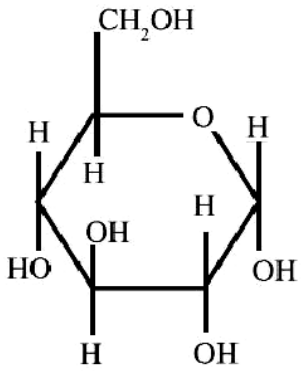


Fig 2.4: Aqueous form of Glucose molecule

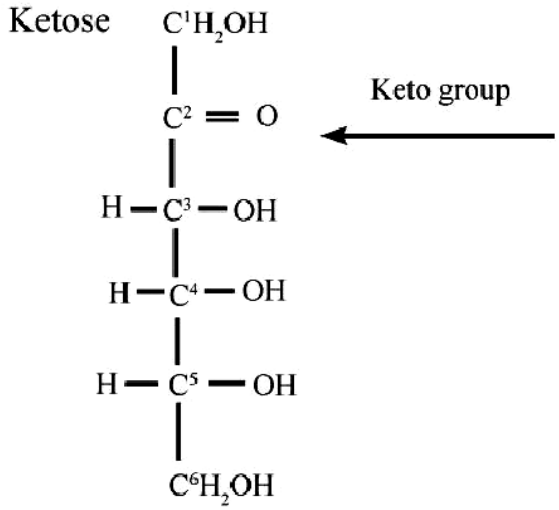


Fig 2.5: Solid form of fructose

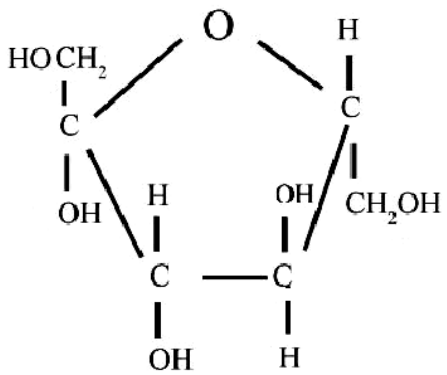
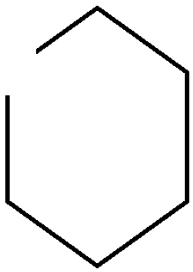
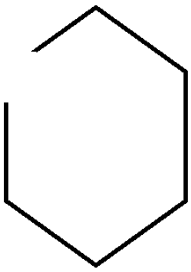
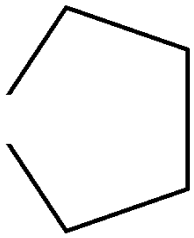
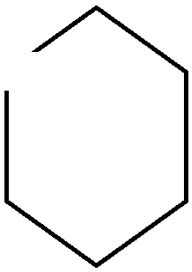
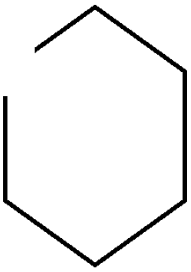
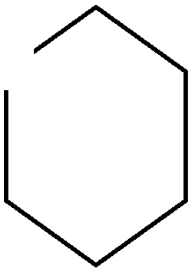
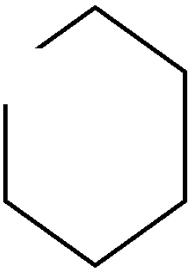
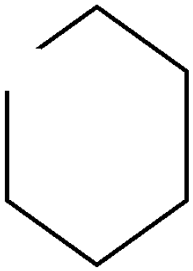
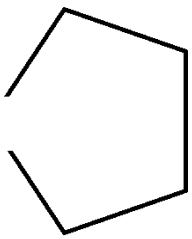
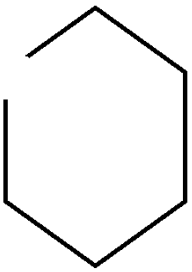
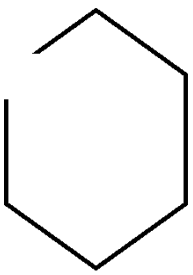
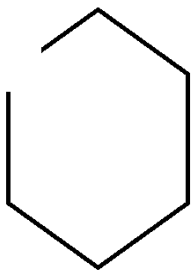
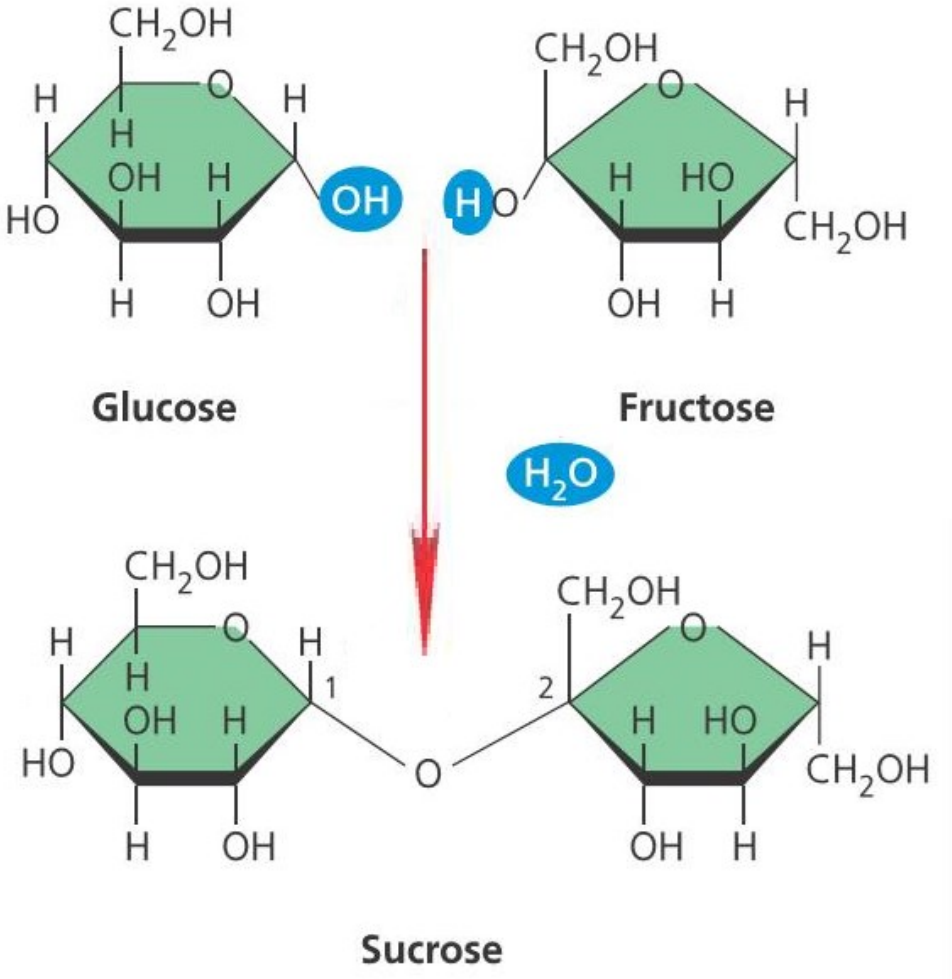


Fig 2.6: Aqueous form of fructose

In aqueous media some monosaccharides are in ring form (No need to memorize the chemical structures)


Glucose
Fructose
H_2O
Sucrose

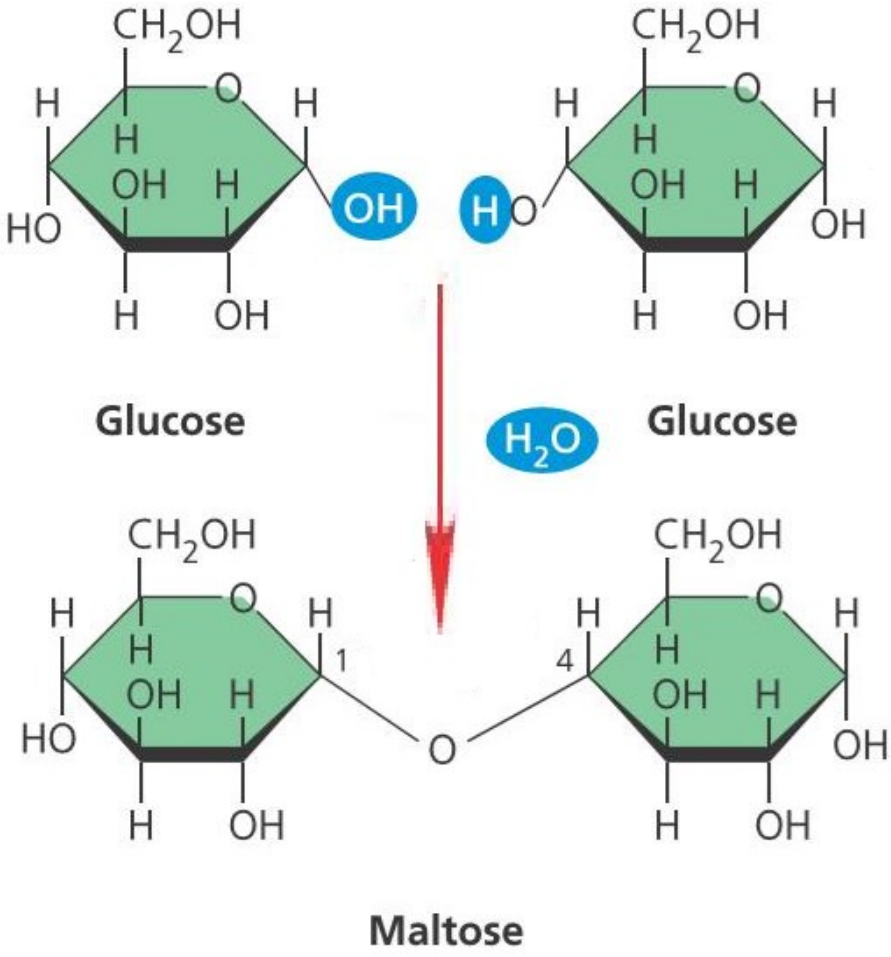

Glucose
Glucose
H_2O
Maltose

Table 2.1: Major polysaccharides, their monomers and functions

Polysaccharide	Monomer	Functions
Starch	Glucose	Stored in plants
Glycogen	Glucose	Stored in animals and fungi
Cellulose	Glucose	Component of Cell wall
Inuline	Fructose	Stored in tubers of Dhalia
Pectin	Galacturonic acid	Component of Middle lamella of plant cell wall
Hemicellulose	Pentose and Hexoses	Component of Plant cell walls
Chitin (nitrogen containing polysaccharide)	Glucosamine	Component of Fungal cell walls and exoskeleton of Arthropods

Functions of carbohydrates

Monosaccharides

- Energy source
- Building blocks of disaccharides and polysaccharides (disaccharides such as maltose, sucrose and polysaccharides such as starch, glycogen)
- Components of nucleotides (DNA, RNA)

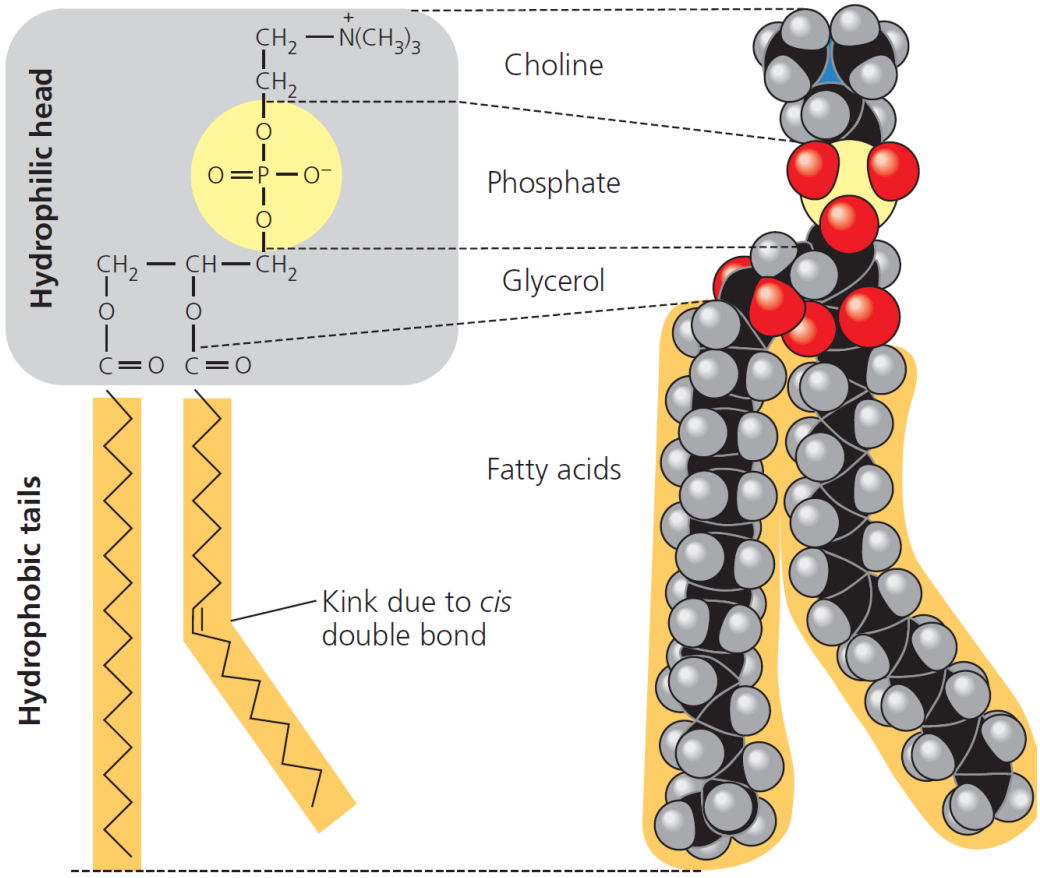
Disaccharides

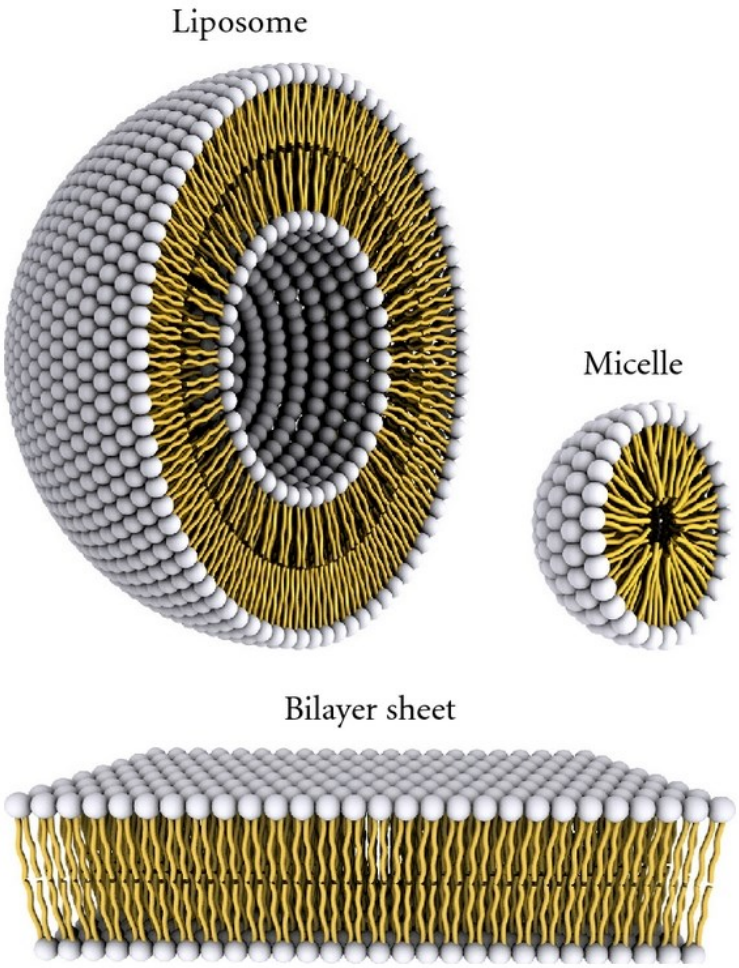
- Storage sugar in milk- Lactose
- Translocation in phloem –Sucrose
- Storage sugar in sugarcane- Sucrose

Polysaccharides

a.) Storage polysaccharides-

- starch stores glucose as energy source in plants and chlorophytes
- glycogen stores glucose as energy source in animals and fungi
- inulin stores fructose as energy source in Dahlia tubers

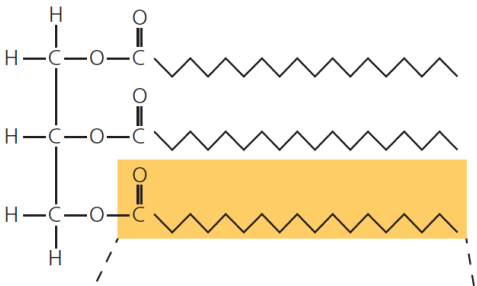

Hydrophilic head
Choline
Phosphate
Glycerol
Fatty acids
Hydrophobic tails
Kink due to *cis* double bond
(a) Structural formula
(b) Space-filling model


Liposome
Micelle
Bilayer sheet

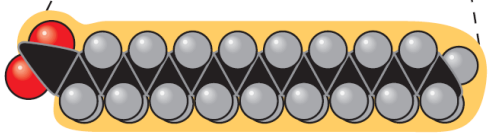
(a) Saturated fat

At room temperature, the molecules of a saturated fat, such as the fat in butter, are packed closely together, forming a solid.

Structural formula of a saturated fat molecule (Each hydrocarbon chain is represented as a zigzag line, where each bend represents a carbon atom and hydrogens are not shown.)



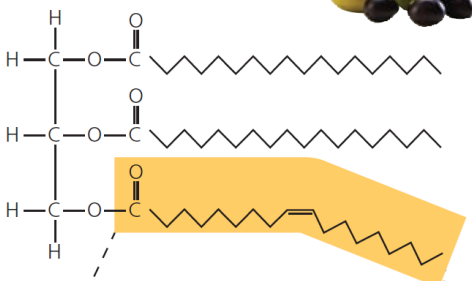
Space-filling model of stearic acid, a saturated fatty acid (red = oxygen, black = carbon, gray = hydrogen)



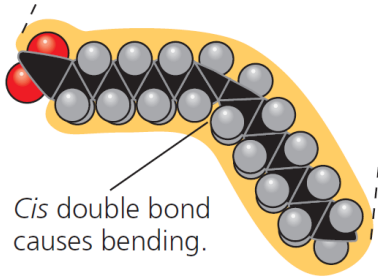
(b) Unsaturated fat

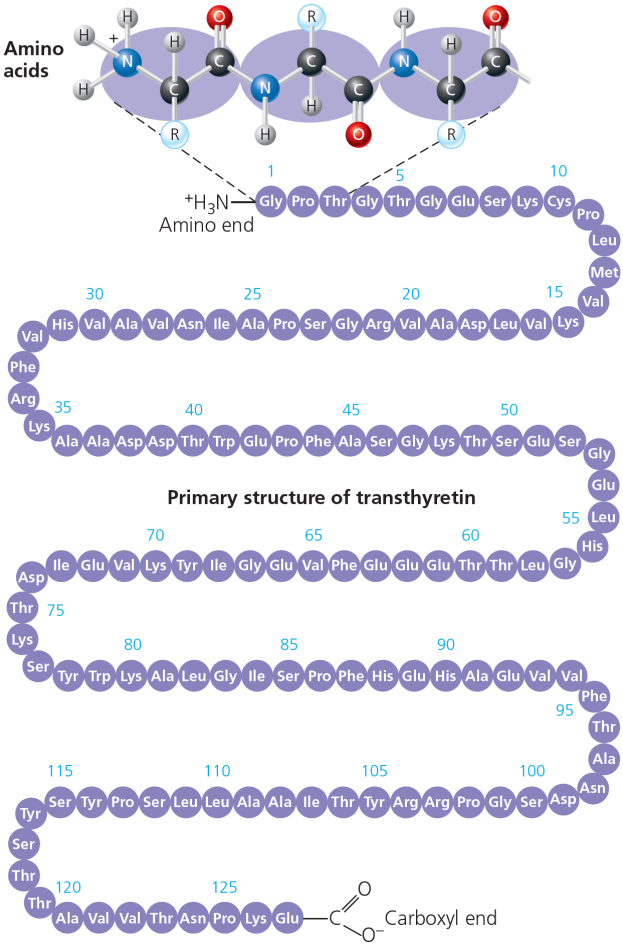
At room temperature, the molecules of an unsaturated fat such as olive oil cannot pack together closely enough to solidify because of the kinks in some of their fatty acid hydrocarbon chains.

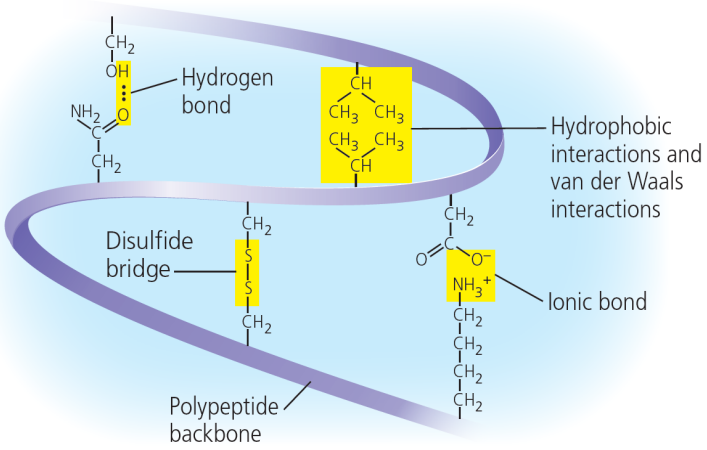
Structural formula of an unsaturated fat molecule

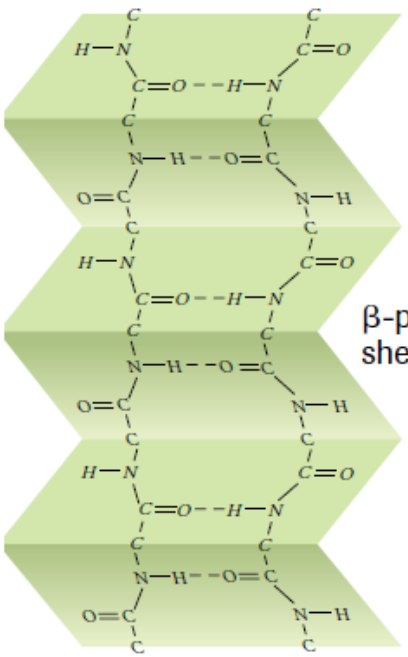


Space-filling model of oleic acid, an unsaturated fatty acid

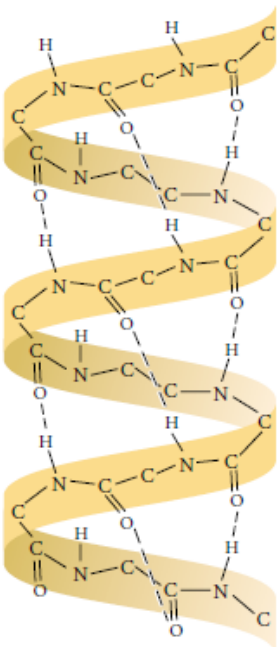




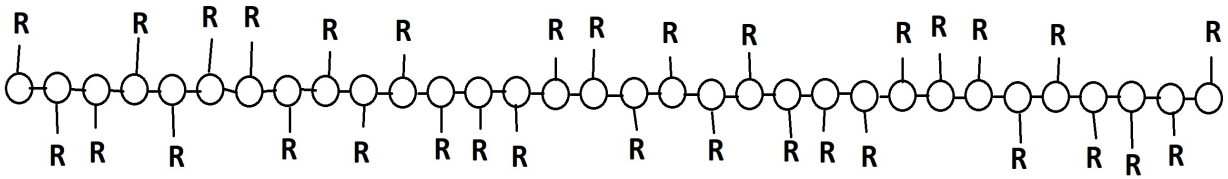


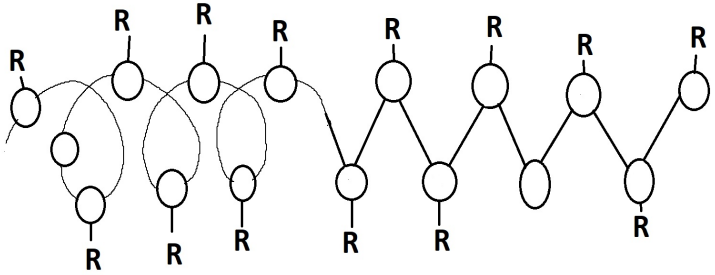


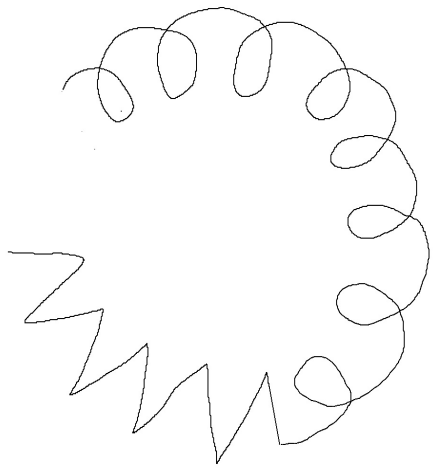
β-pleated sheet

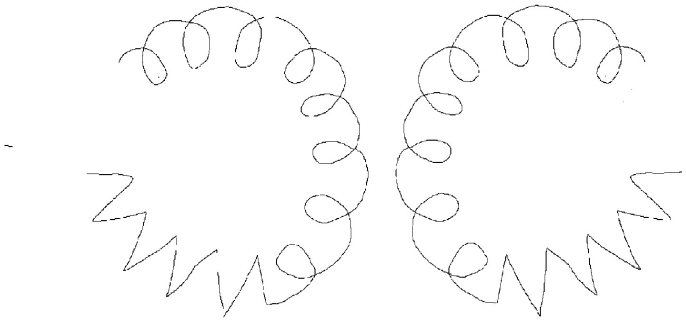


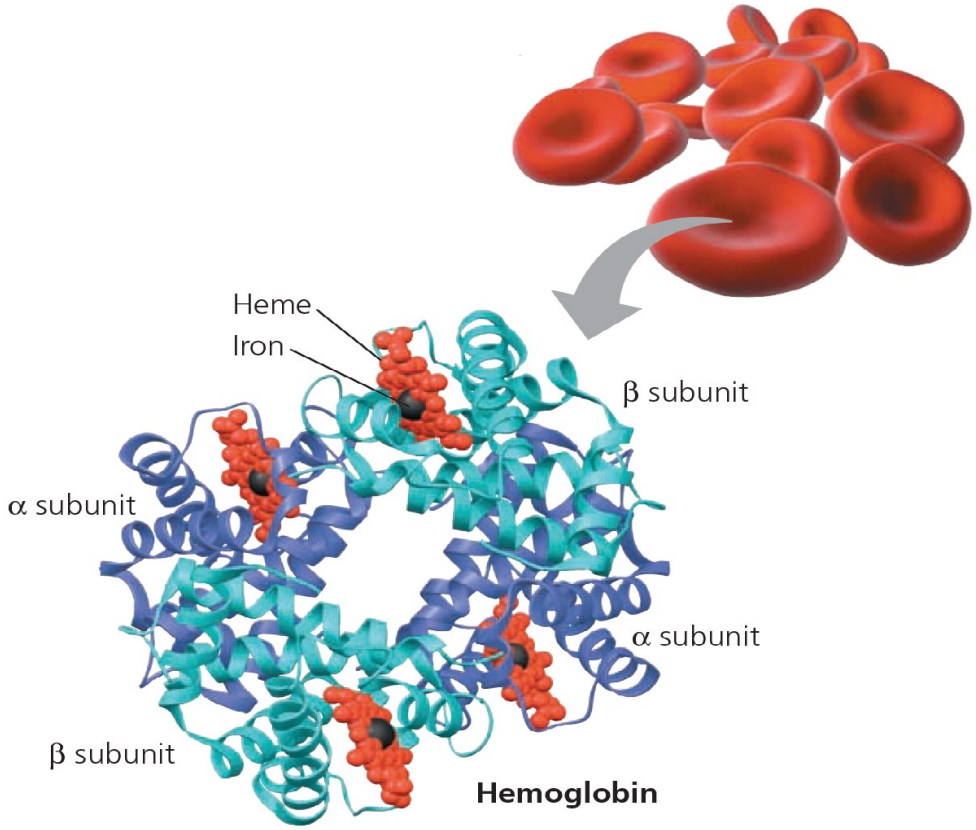
α helix



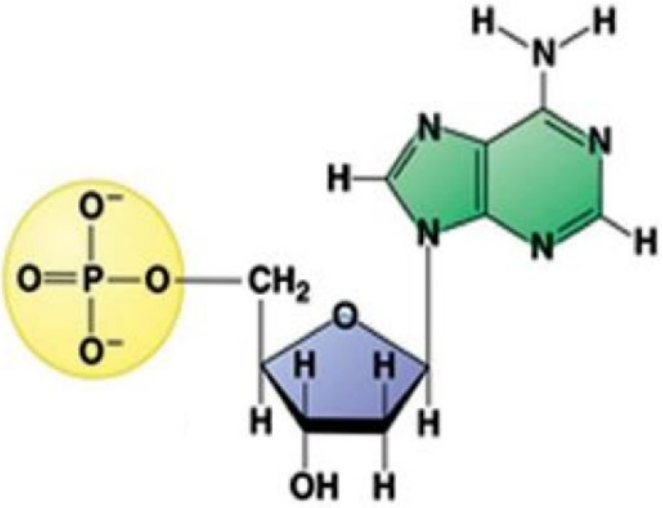








Type of protein	**Example**	**Functions**
Catalytic protein	Pepsin, Amylase	Catalyze biochemical reaction
Structural protein	Keratin	Prevent desiccation
	Collagen	Provide strength and support
Storage	Ovalbumin	Storage protein in egg
	Casein	Storage protein in milk
Transport	Haemoglobin	Transport O_2 and CO_2
	Serum albumin	Transport fatty acids
Hormones	Insulin	Regulate blood glucose level
	Glucagon	
Contractile/ Motor	Actin/Myosin	Contraction of muscle fibres
Defensive	Immunoglobins	Eliminate foreign bodies



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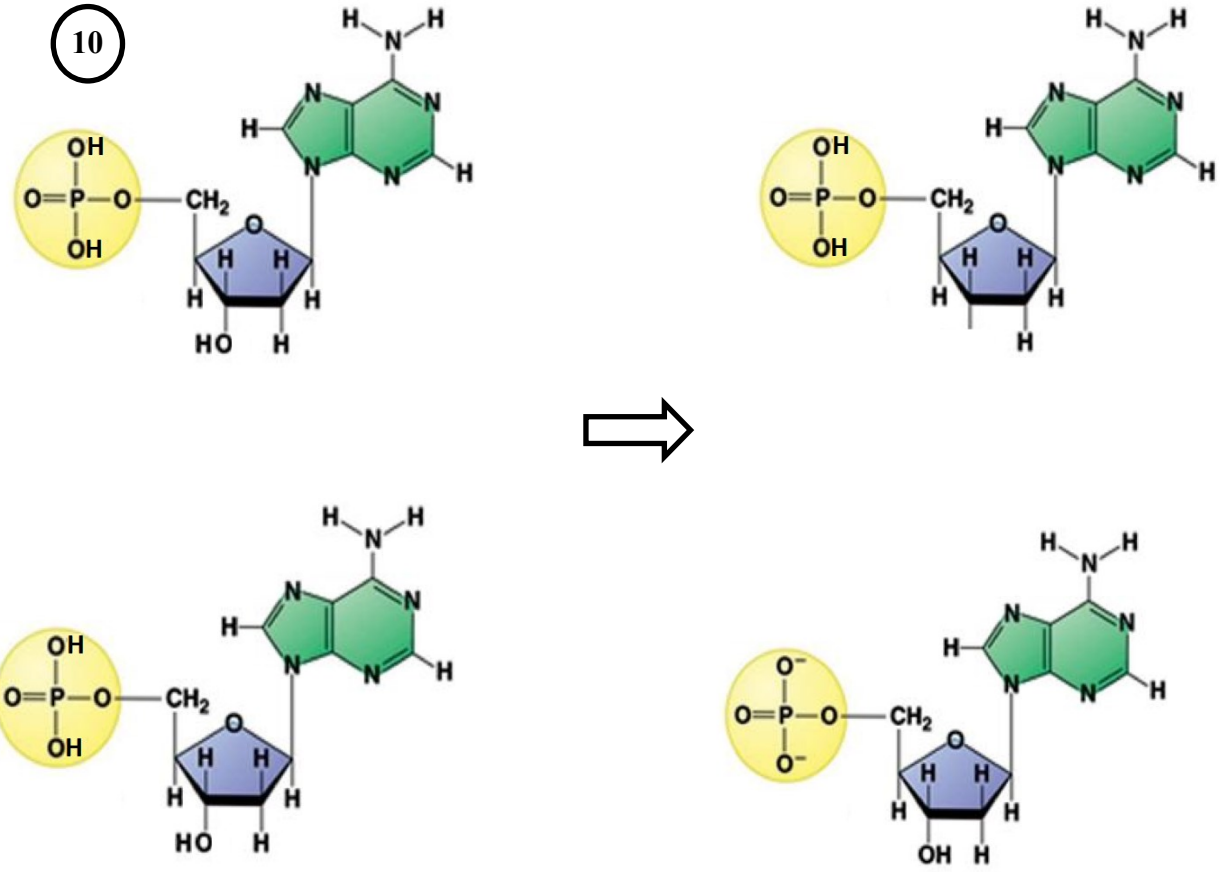
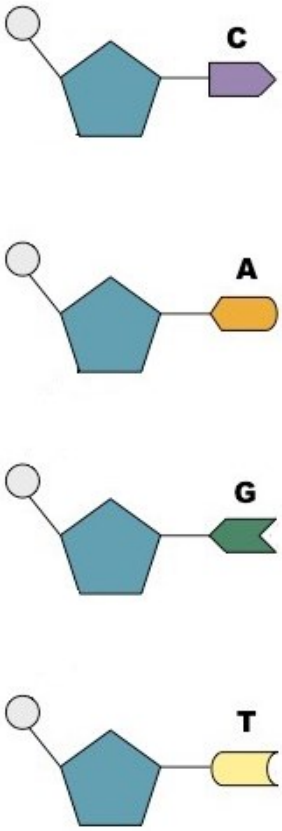
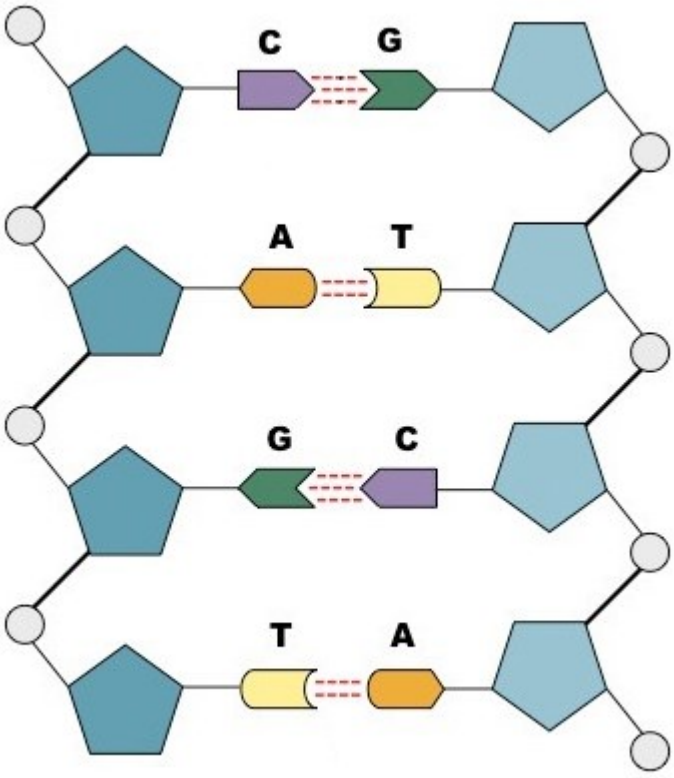



C
A
G
T


C
G
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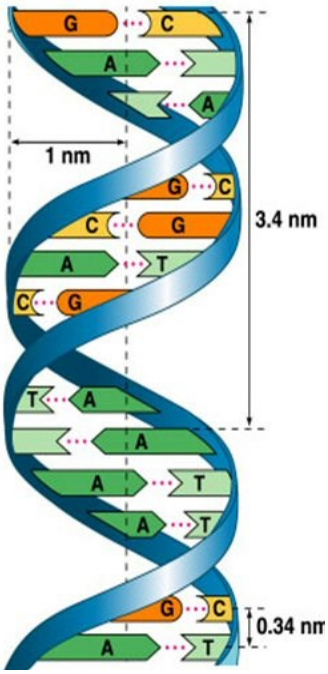
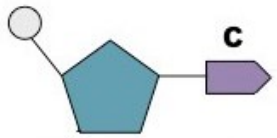
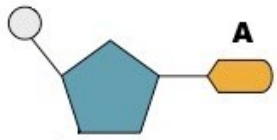
T
G
C
T
A


1 nm
3.4 nm
0.34 nm


C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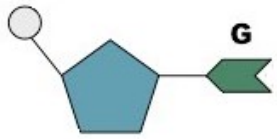
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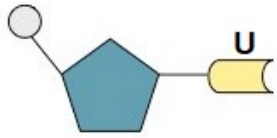
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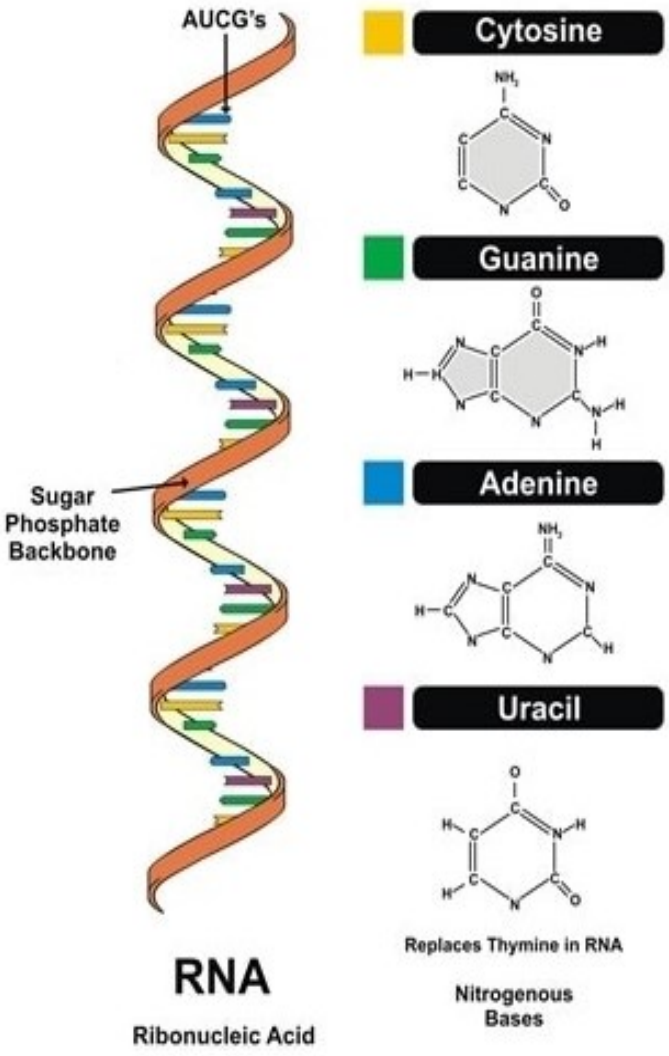
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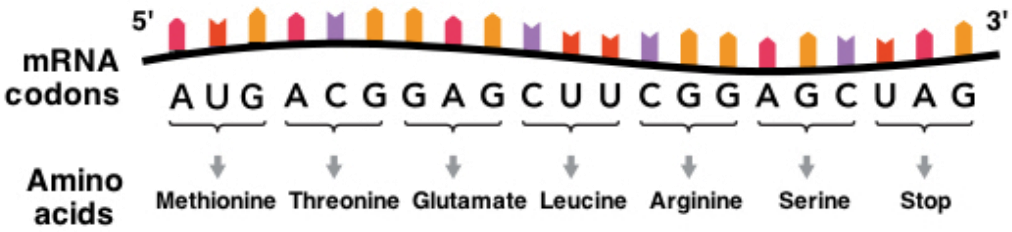
Guanine
Adenine
Uracil
Replaces Thymine in RNA
Nitrogenous Bases
RNA
Ribonucleic Acid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3'
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codons
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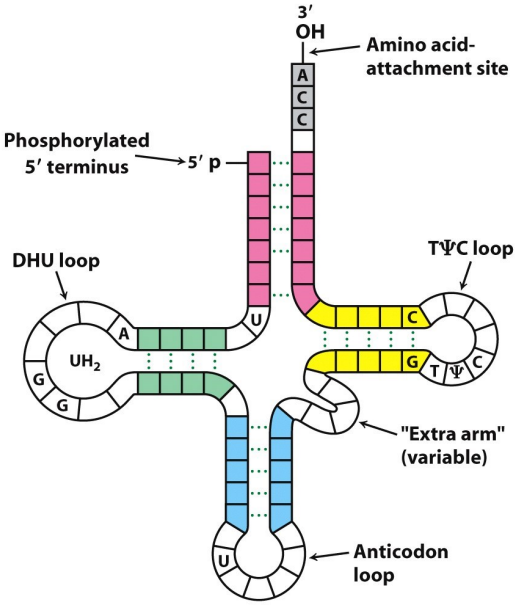
Amino
acids
Methionine Threonine Glutamate Leucine Arginine Serine Stop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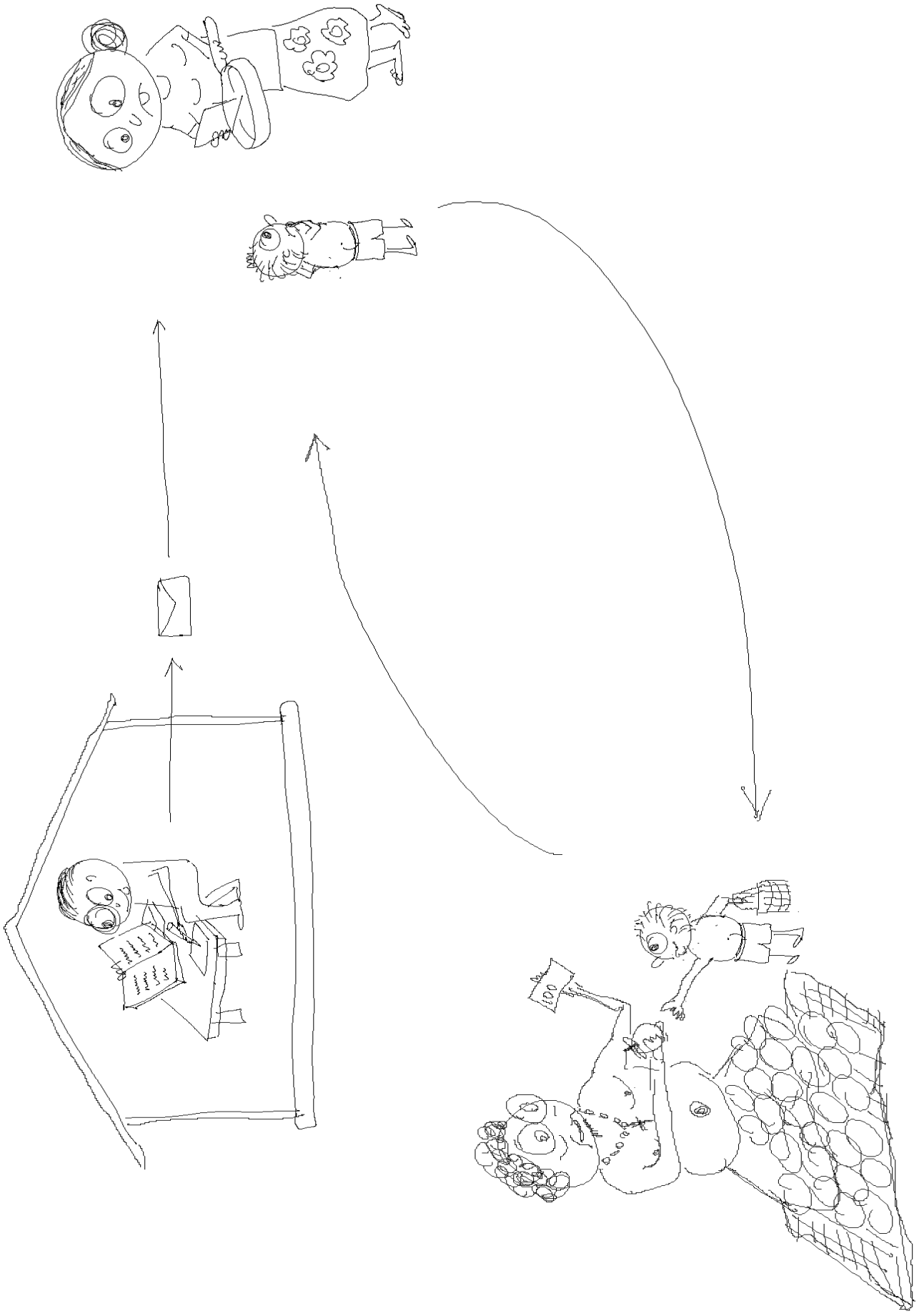
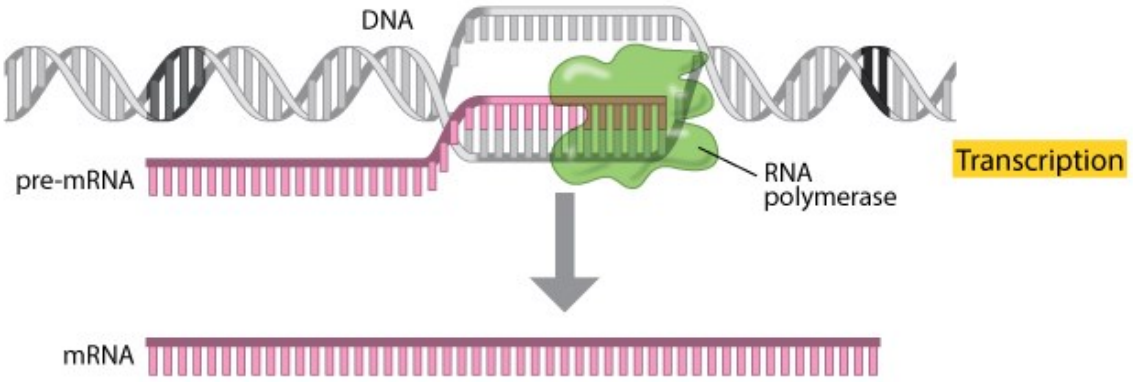
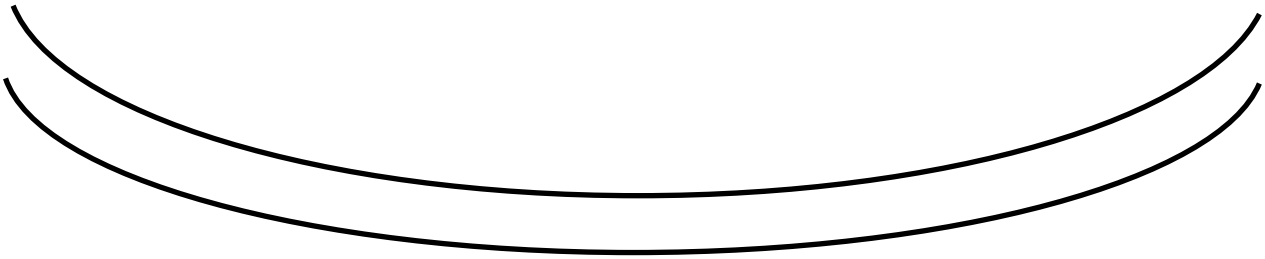
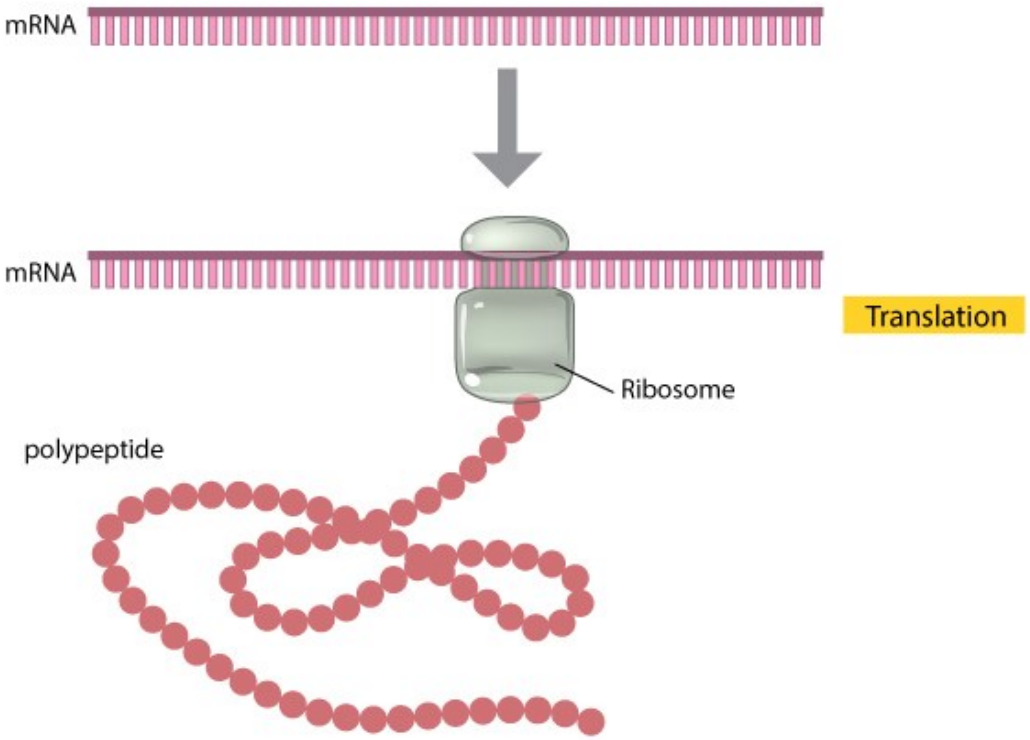
OH
Amino acid-
attachment site
A
C
C
Phosphorylated
5′ terminus
5′ p
DHU loop
TΨC loop
A
U
UH2
G
G
C
G
T
Ψ
C
"Extra arm"
(variable)
U
Anticodon
loop

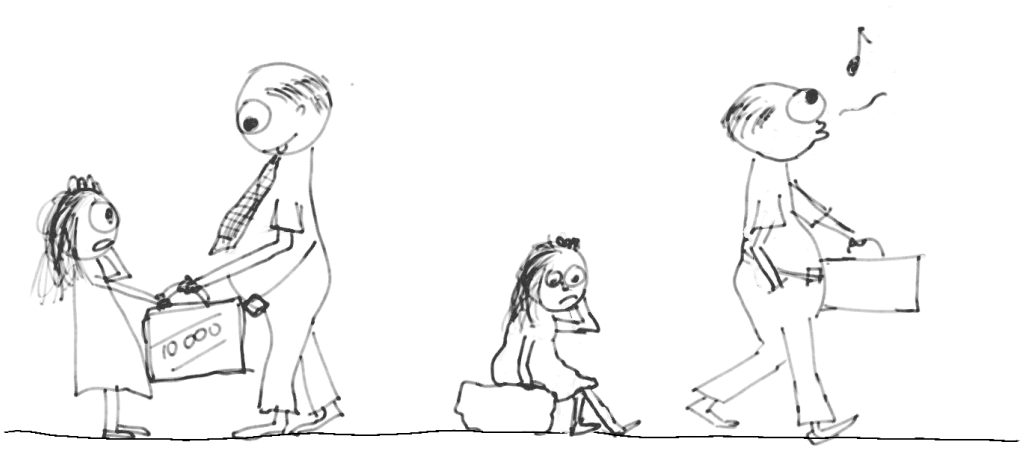

70S



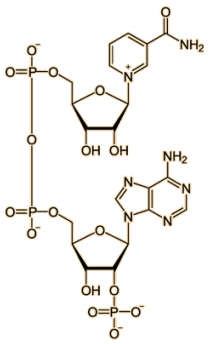
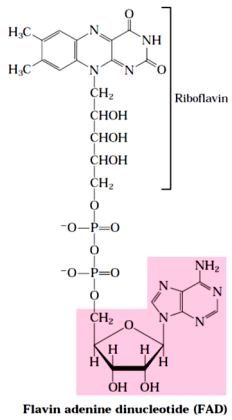

DNA
pre-mRNA
RNA polymerase
Transcription
mRNA

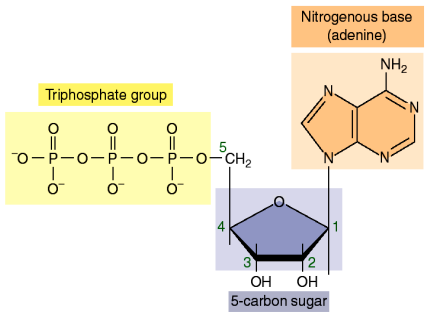
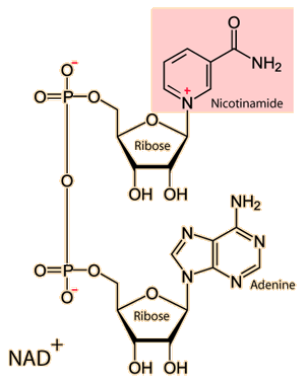



mRNA
mRNA
Translation
Ribosome
polypeptide


10 000


10 000
10 000

NADP$^+$ 	**Functions of NADP** •Act as a coenzyme •Act as a an electron carrier •Act as an oxidizing agent in photosynthesis
FAD  Flavin adenine dinucleotide (FAD)	**Functions of FAD** •Act as a coenzyme. •Act as an electron carrier. •Act as oxidizing agent

 Nitrogenous base (adenine) Triphosphate group 5-carbon sugar	**Functions of ATP** •Universal energy carrier.
NAD$^+$  Nicotinamide Ribose Adenine Ribose NAD$^+$	**Functions of NAD$^+$** •A coenzyme •Function as an electron acceptor •Function as an oxidizing agent during respiration