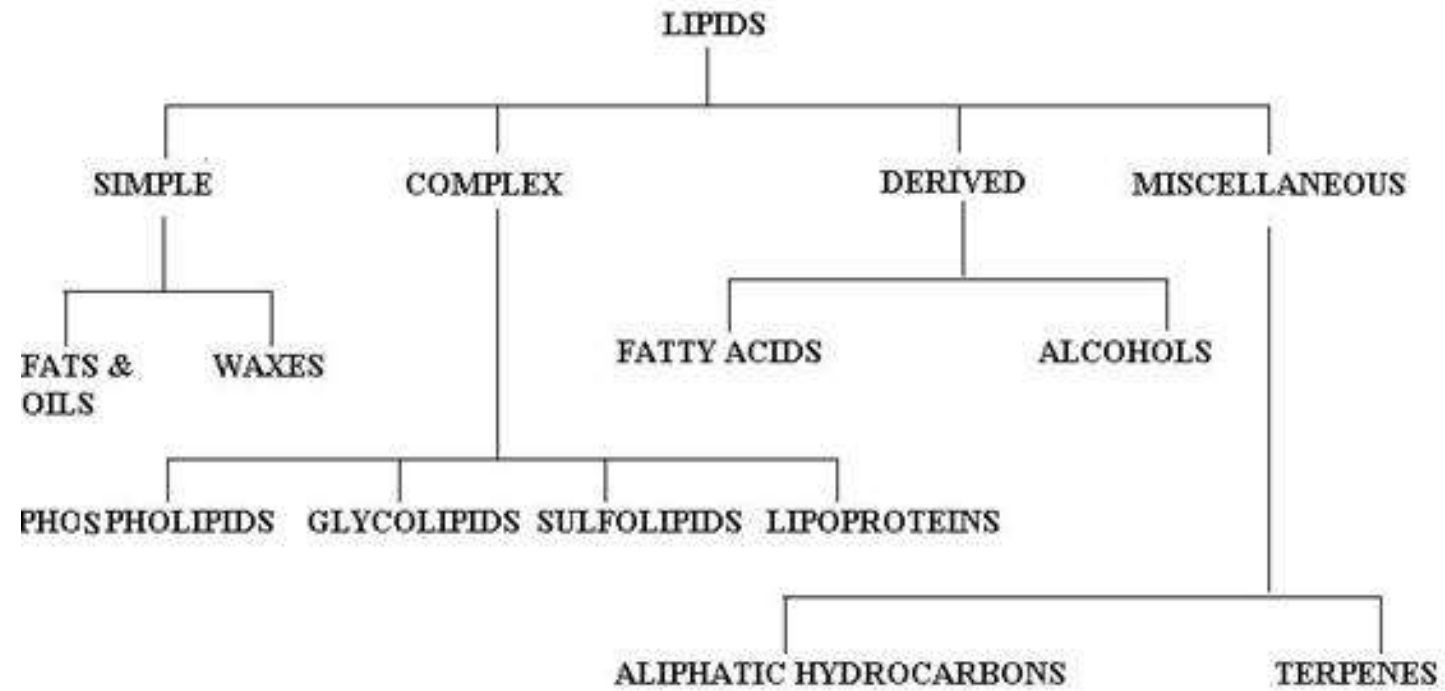


Classification of Lipids

Classification



Simple lipids

- Esters of fatty acids with alcohols
- Fats and oils are ester of fatty acid with triacyl alcohol
- Waxes are esters of fatty acids with mono hydric alcohol

Compound lipids

- Esters of fatty acids and alcohols with additional groups

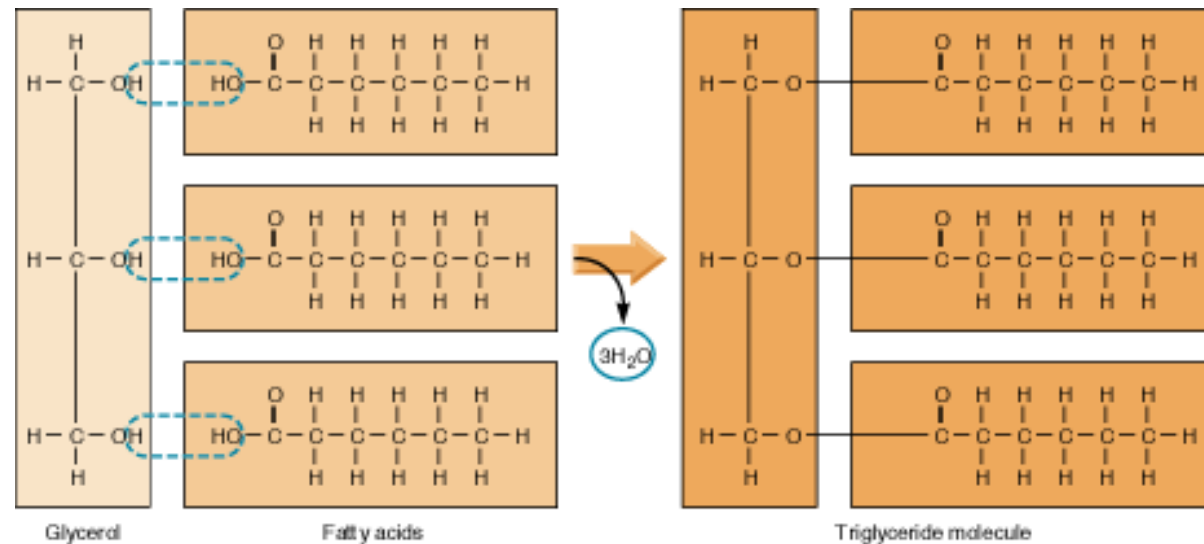
Derived lipids

- Derived from hydrolysis of simple and compound lipids

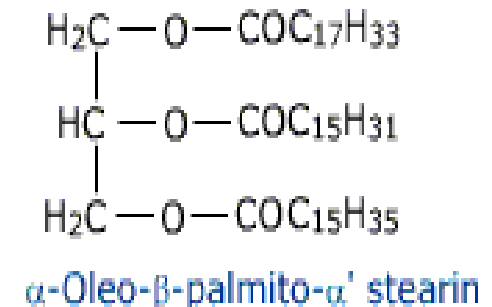
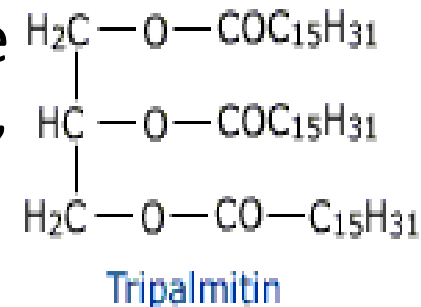
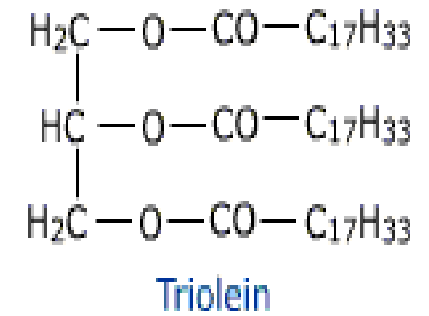
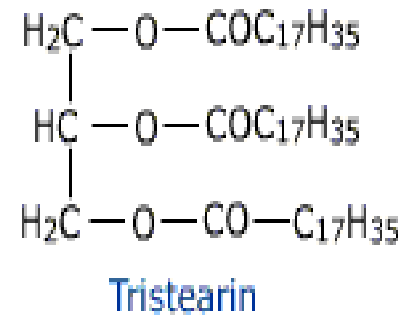
Simple lipids

1. Fats and oils (Triglycerides):

- Most abundant form of all lipids
- Major component of storage

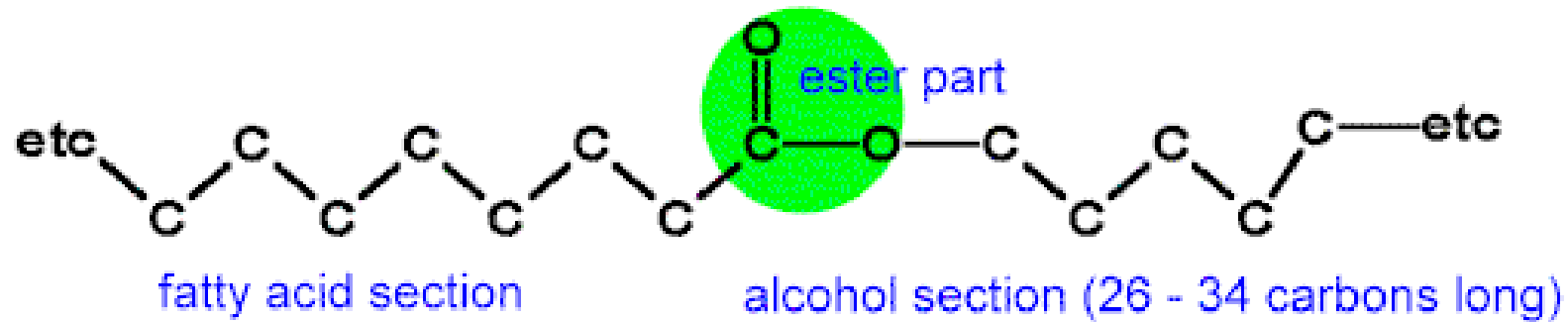


- Esters of glycerol with three fatty acids
- 3 fatty acids may be similar or dissimilar.
- If similar they are simple triglycerides eg: tripalmitin, tristearin and triolein.
- Naturally occurring are dissimilar eg oleodipalmitin, palmitosterin



2. Waxes:

- Esters of fatty acids with monohydroxy alcohols.



Secreted by cutaneous gland

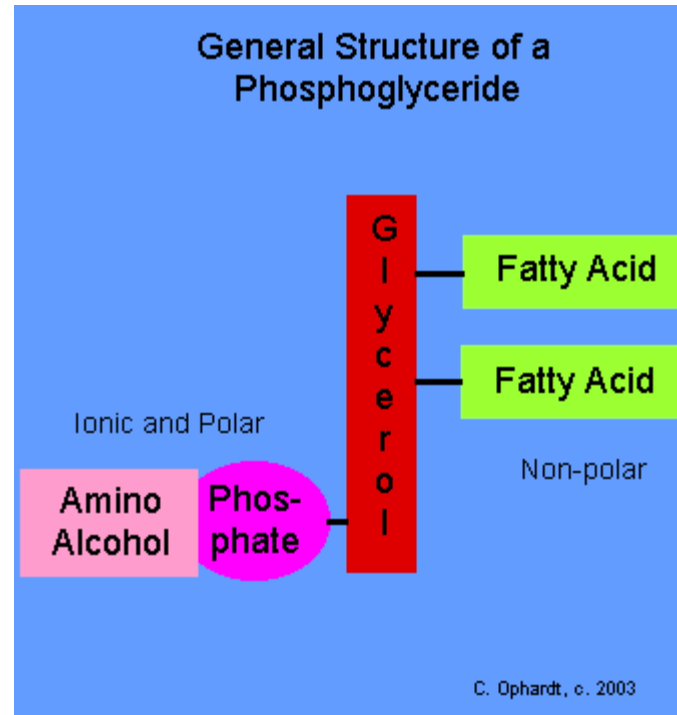
3.Compound lipids

Phospholipids :

- Most abundant membrane lipid.
- Has phosphoric acid in its structure.
- Classified further into
phosphoglycerides,
phosphoinositides and
phosphosipingsides

phosphoglycerides:

- - are major phospholipids present in membrane



Lecithins

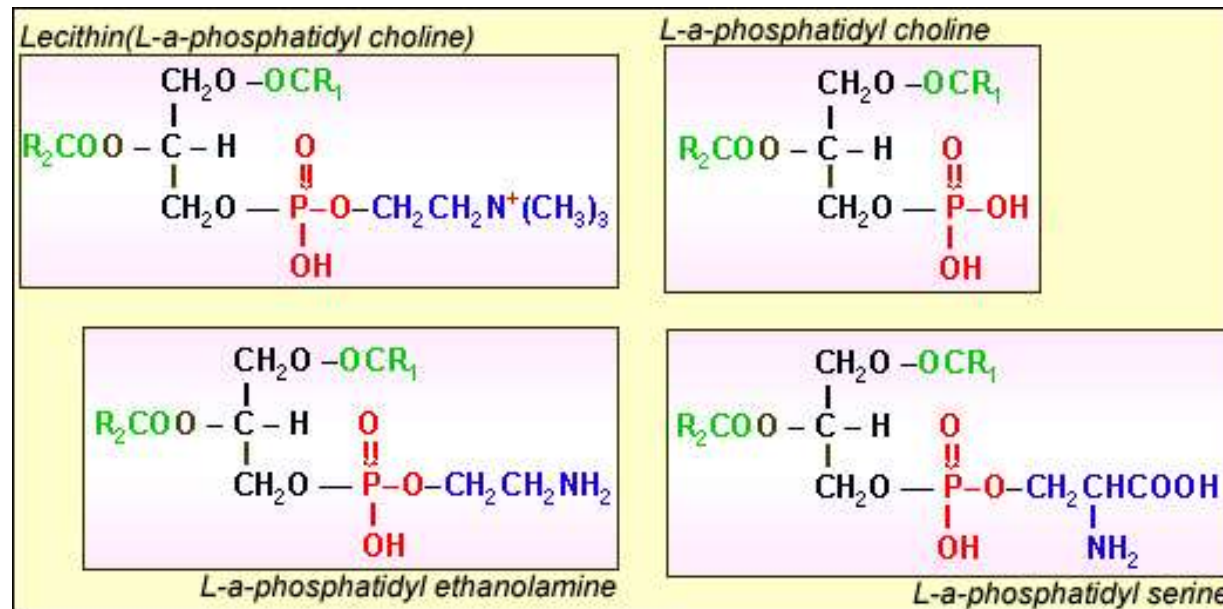
- Also called as phosphatidyl cholines
- Rich in oil seeds, glandular and nervous tissues
- Required for the transport of lipids

Cepahlins

- Present in oil based seeds
- Similar with structure of lecithins
- But choline is replaced by ethanolamine or serine
- Serine is precursor for ethanol amine

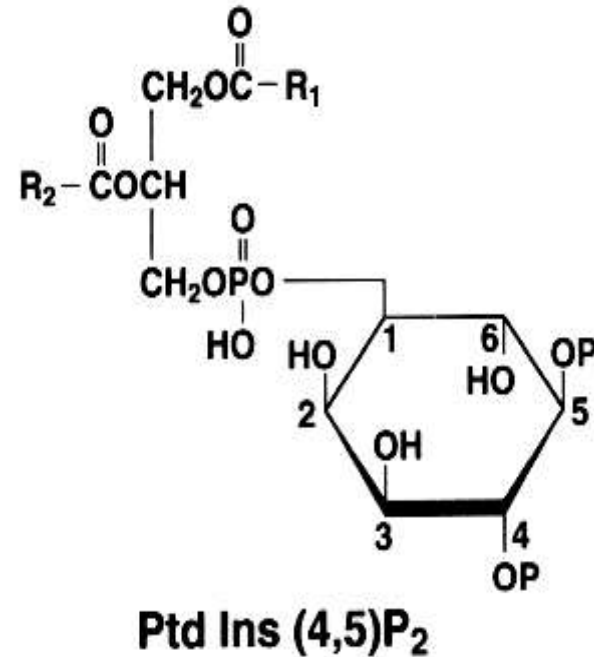
Plasmalogens

- Present in brain and muscle tissue
- Structurally resemble lecithins and cephalins
- But one fatty acid replaced with unsaturated ether



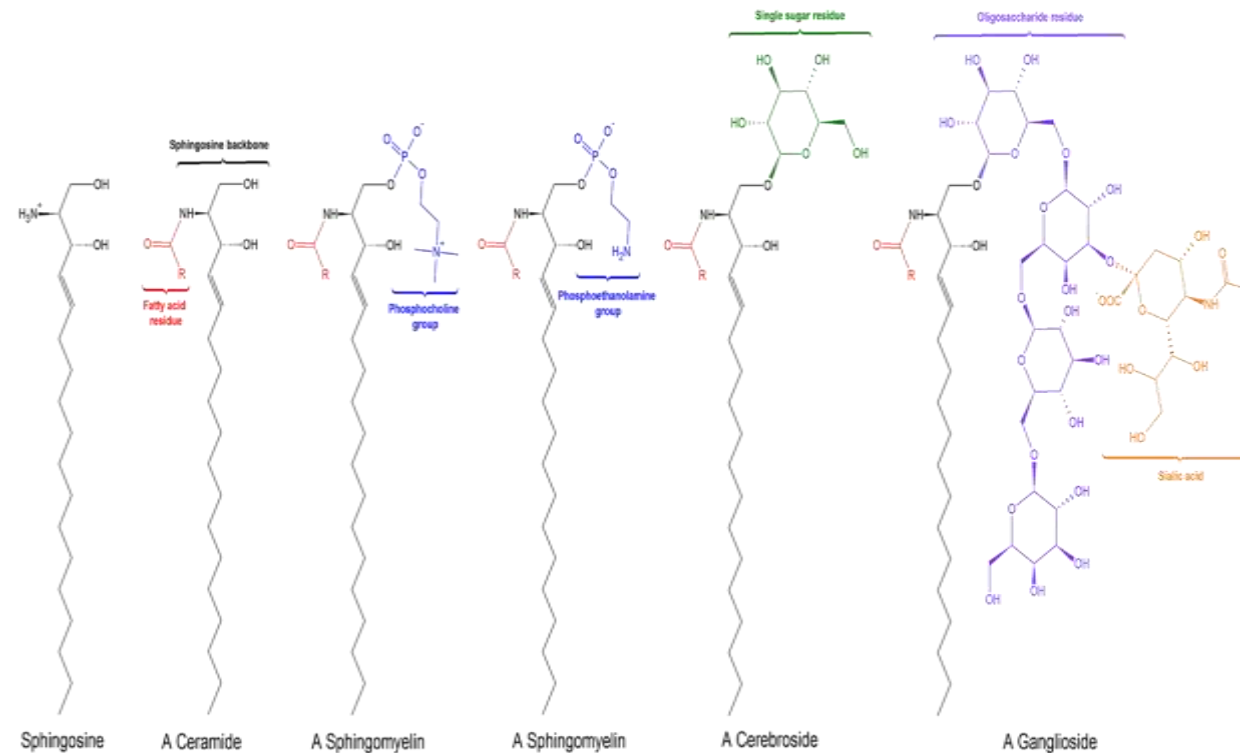
Phosphoinositides

- Also called as phosphatidyl inositols.
- Found in brain tissue and soy beans.
- Important for cell signaling.
- Mono , di, triphosphoinositides are their types



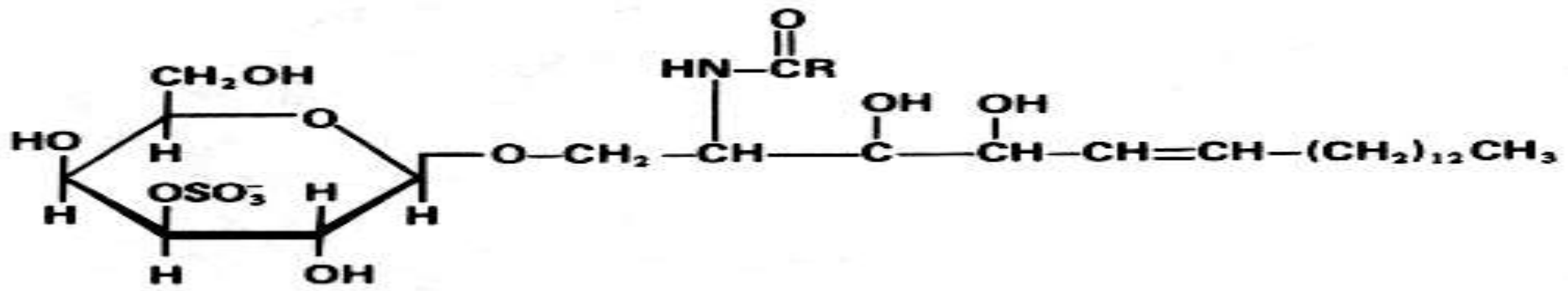
Phosphosphingosides

- Also called as spingomyelins
- Found in myelin sheath of nerve cells
- Lack glycerol but have sphingosine

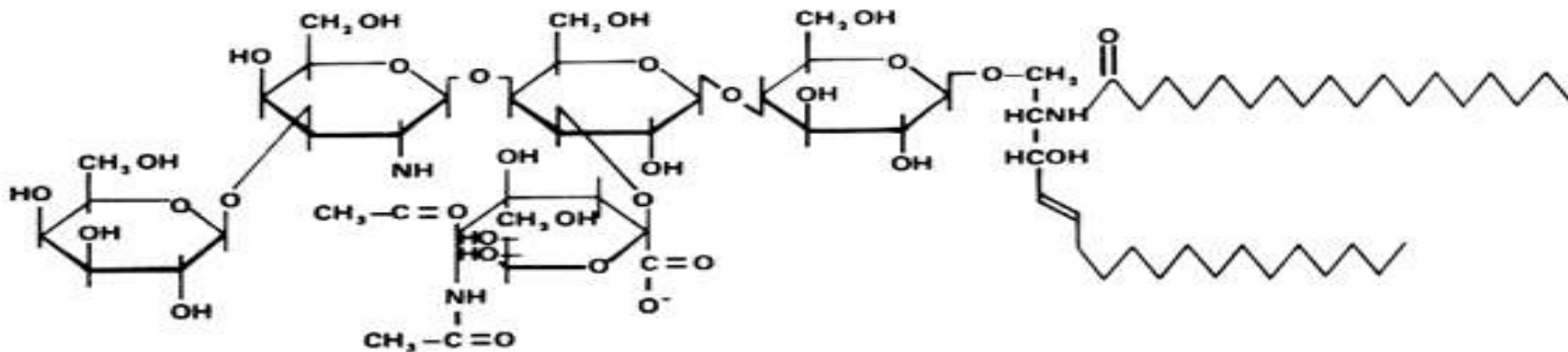


Glycolipids

- Lipids head group consist of one or more glucose units.
- Cerebrosides and gangliosides.
- Abundant in brain tissue.
- Similar to the structure of phosphosphingosides but either galactose or glucose is present of choline without phosphoric acid



- Gangliosides found in ganglion cells.
- Structure has ceramides plus carbohydrate moieties.
- N- acyl spingosine linked with glucose or galactose and carbohydrate moieties like NAG and NANA



Derived Lipids

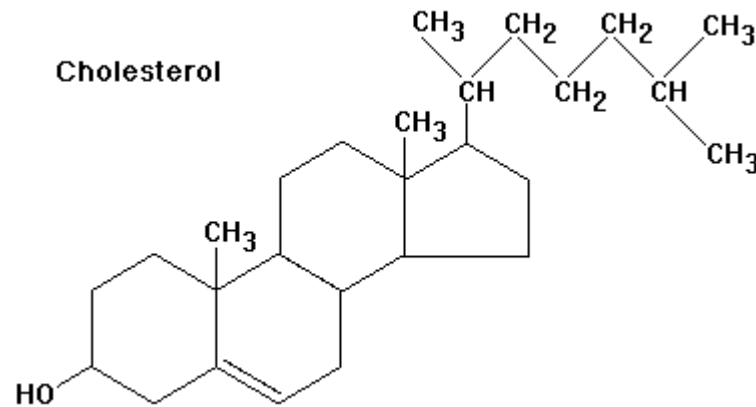
- Hydrolysis product of simple and compound lipids.
- Other compounds like steroids, fatty acids, terpenes, aldehydes, alcohols and ketones.

Steroids

- Most abundant biological compound associated with fat.
- Does not contain fatty acids so cannot be hydrolyzed.
- Structure has saturated cyclohexane and hexagonal rings

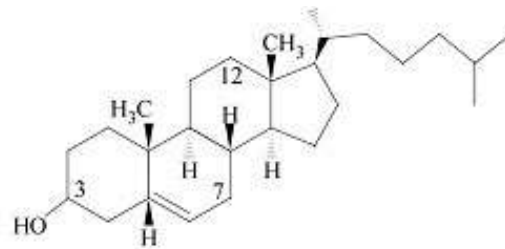
Cholesterol

- Important component of living system.
- 27 carbon molecule.
- Reduced forms are coprostanol, cholestanol, Ergosterol, lanosterol

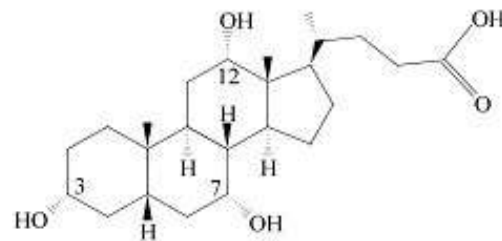


Bile acids

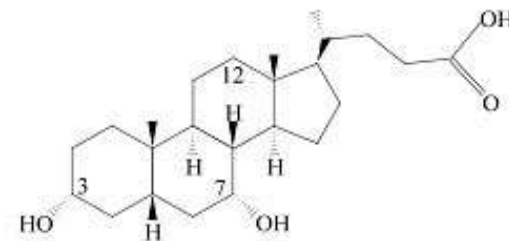
- Important end product of cholesterol
- 24 carbon molecule
- Cholic acid and chenodeoxycholic acid are chief bile acids



Cholesterol



Cholic acid



Chenodeoxycholic Acid

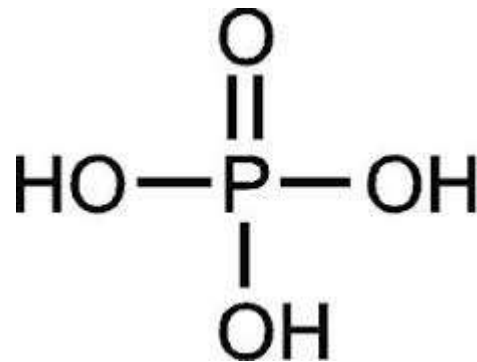
Nucleic acids

- Entirely different from carbohydrate, protein and lipids.
- Location is in the nucleus and having acidic properties so it named as nucleic acids.
- Hereditary determinants of living system.
- Present in free form or bound to proteins.
- Like proteins nucleic acids are polymers with nucleotide units.

- Carbon , hydrogen, oxygen, nitrogen and strangely phosphorus.
- Two kinds of nucleic acids.
- Deoxyribonucleic acid and ribonucleic acid.
- DNA present in cell nucleus RNA in cytoplasm.
- Upon hydrolysis yields phosphoric acid, pentose sugar and nitrogenous base.

Phosphoric acid

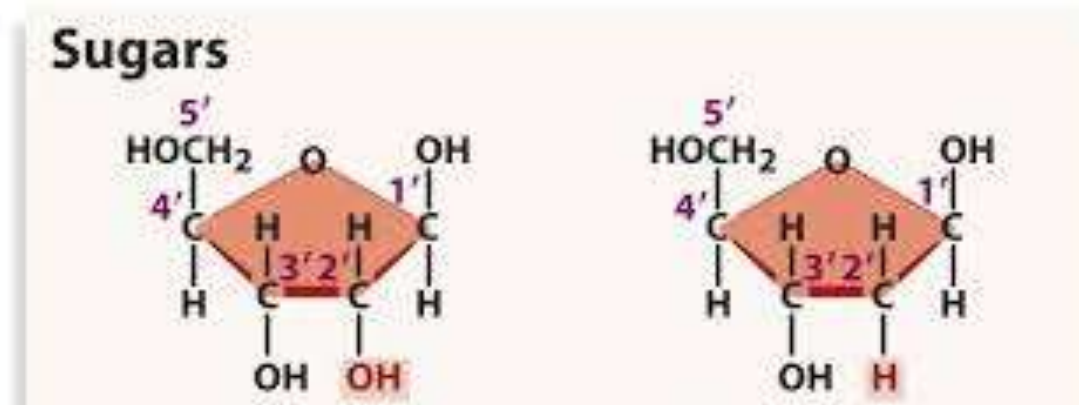
- Mol formula H_3PO_4
- Has 3 monovalent hydroxyl group and 1 monovalent oxygen atom
- Linked to pentavalent phosphorous atom



Phosphoric acid

Pentose sugar

- Two nucleic acids distinguished primarily on presence of pentose or ketose sugar.
- Deoxyribose sugar or ribose sugar



D-ribose

D-2-deoxyribose

Important property of pentose sugar is ability to form esters with phosphoric acid

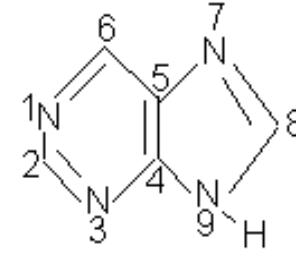
Nitrogenous bases

- Two types of nitrogenous bases are found in all nucleic acids.
- Purine and pyrimidine.

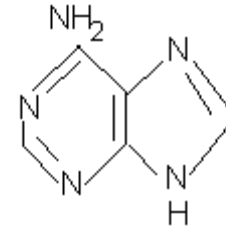
purine

- Contains six member pyrimidine ring fused with imidazole ring.
- Adenine and Guanine are purine derivatives present in nucleic acids

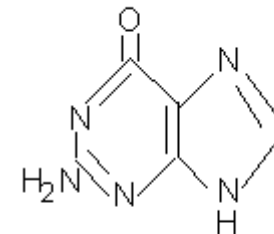
Purines



purine



adenine

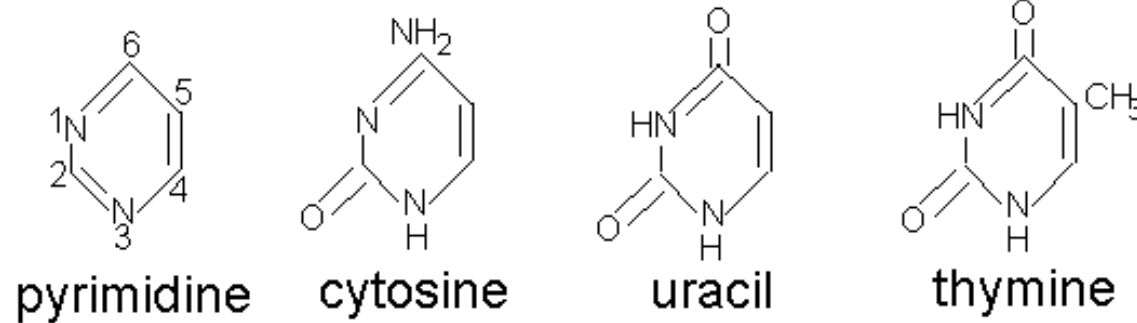


guanine

Pyrimidine

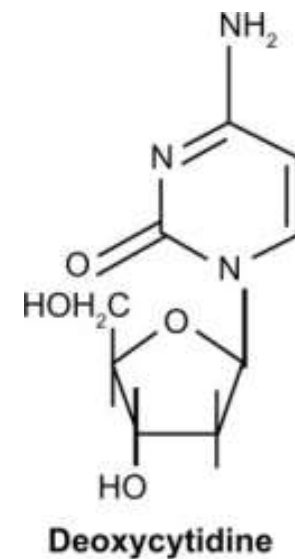
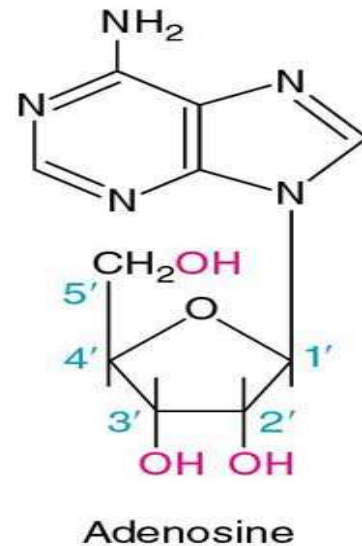
- Derived from heterocyclic pyrimidine rings.
- Pyrimidine derivatives are uracil, thymine and cytosine

Pyrimidines



Nucleosides

- Are the structures by which nitrogenous bases linked to pentose sugar.
- Beta glycosidic linkage.



Nucleotides

- Phosphoric acid esters of nucleosides.

