Al-Mustaqbal University College
Anesthesia Techniques Department

Lec5 Lipids

Lipids

A lipid is a fatty, oily, or waxy compound that is insoluble in water (hydrophobic). It is a combination of alcohol (glycerol) and fatty acids.

Lipids are an important component Together with carbohydrates and proteins, and they are considered as one of the main constituents of living tissues and food

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The importance of Lipids

1-Fats are stored in the tissues as energy storage, which is used after the stored sugars run out.

2-Fats are basic structural components of cell structure such as cell membrane.

3-Fats and proteins combine to form lipoproteins, this type transport fats through the blood

4- involved in synthesis of steroid hormones as cortisol and testosterone .

5-The presence of fats in the food gives a feeling of satiety, due to the slow digestion and absorption of fats

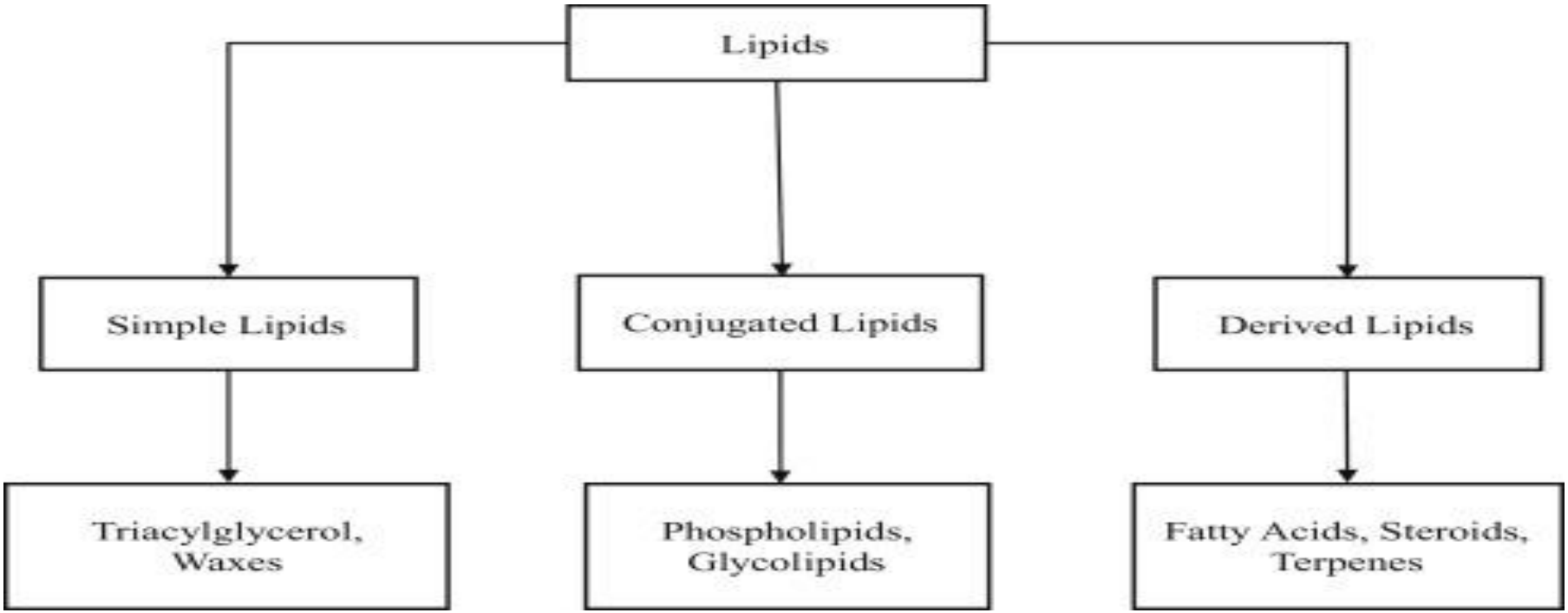
6-There are unsaturated fatty acids of great importance, such as omega fatty acid, which decrease LDL and increase HDL and thus reduces heart disease.

Classification of lipids

1- Simple lipids : contain Neutral lipids , waxes

2- Conjucated lipids : contain phospholipids, Glycolipids, Lipoproteins, Sulpholipids.

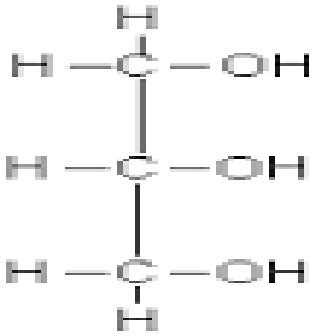
3-Derived lipids: contain Steroids, Sterols, Terpens



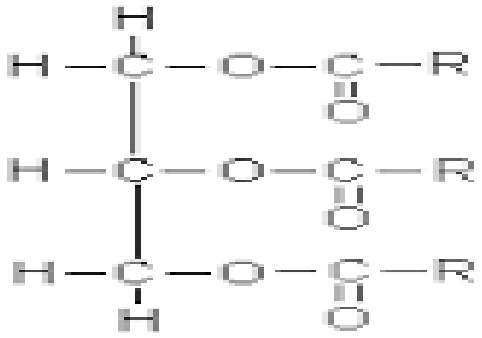
Neutral lipids:

Triglyceride: They are the esters of three a fatty acids with (glycerol)and its main storge form of lipid in our body

Fatty acid



Glycerol



Triacylglycerol

Waxes:They are the esters of fatty acids with alcohols of high molecular. It is the main component of beeswax

Conjucated lipids

Phospholipids: A phospholipid is a type of lipid molecule that is the main component of the cell membrane. phospholipid is made up of two fatty acids and glycerol with addition of a phosphate group.

For examples: Lecithins (phosphatidyl choline) , plasmalogen, phosphatidicacid, sphingomyelin.

Phosphatidyl choline (lecithin)

These are most abundant phospholipids of the cell membrane having both structural and metabolic functions.

lecithin is found in lungs, secreted by pulmonary type II epithelial cell. It acts as a lung surfactant and is necessary for normal lung function. It reduces surface tension in the alveoli, thereby prevents alveolar collapse

In its absence, the lungs tend to collapse and this condition is known as **respiratory distress syndrome.**

Glycolipids: They are compounds that contain sugars and fatty acids and do not contain phosphoric acid such as cerebrosides they are founds in Liver, Nervous tissue, Brain.

Lipoproteins: are formed by combination of lipid with protein, e.g. serum lipoproteins like:

- Chylomicrons
- Very low density lipoprotein (VLDL)
- Low density lipoprotein (LDL)
- High density lipoprotein (HDL).

Derived lipids

Includes saturated and unsaturated fatty acids, steroids,Terpenes

1-fatty acids:

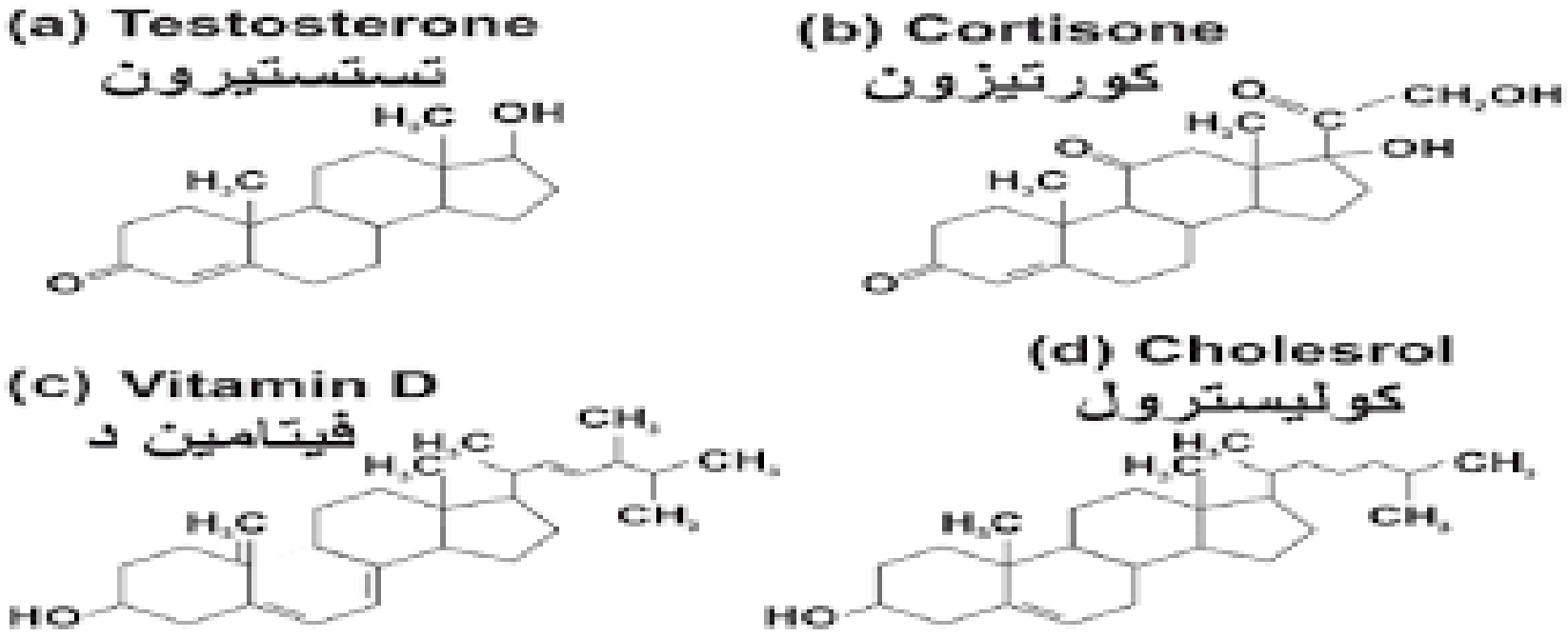
***saturated fatty acids**: there is **no double bond** in these fatty acids such as Palmitic acid is found naturally in palm and butter, cheese, milk and meat.

such as palmitic acid.

***unsaturated fatty acids:** which **have double bonds**

such as oleic acid that is an omega-9 monounsaturated fatty acid found in various animal and vegetable sources.

2-steroides:It is a group of hydrocarbon rings that combined with some fatty acids and for example of steroids: cholesterol, vitamin D and hormones as : testosterone, estrogen and cortisol



GOOD LUCK