



***Al-Mustaqbal University College***

***Department of Medical Physics***

***Lecture 10***

***LIPID ,FATTY ACIDS PART 2***

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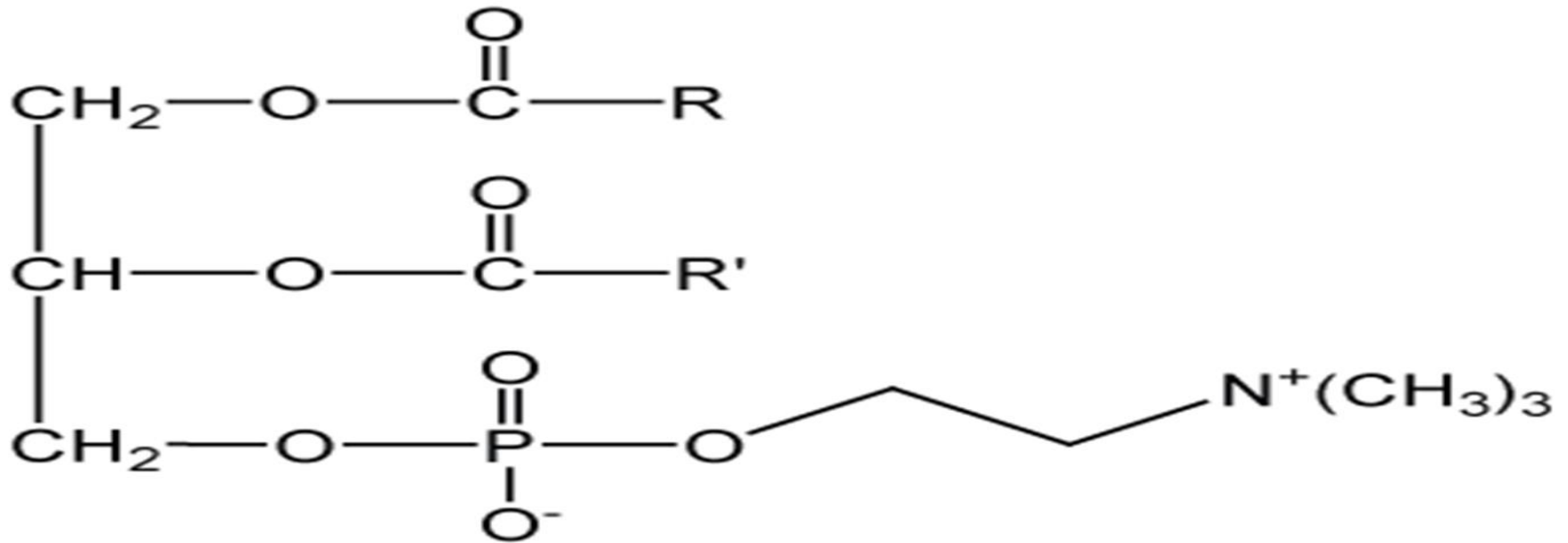
## *Complex lipids*

Esters of fatty acids containing groups in addition to an alcohol and a fatty acid

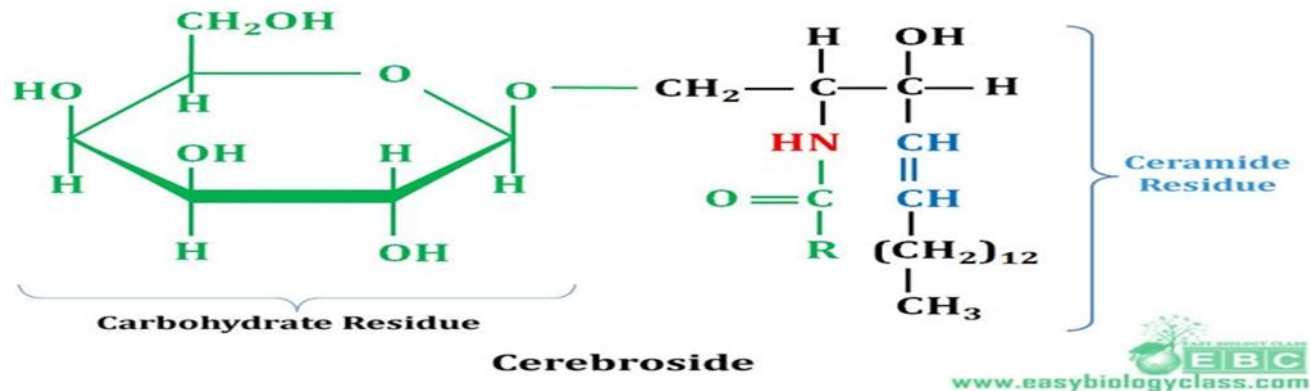
a. Phospholipid :It consists of linking two hydroxyl groups from glycerol with two fatty acids, while the third hydroxyl group is linked to a phosphate group, such as Lecithins (phosphatidyl choline) , plasmalogen, phosphatidicacid, sphingomyelin

# Lecithins

it is found with high percentage in yolk



B-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



c. Other complex lipids: Lipids such as sulfolipids and aminolipids. Lipoproteins may also be placed in this category.

3. Derived lipids: Includes saturated and unsaturated fatty acids, steroids, Terpenes

1-fatty acids:are the major unit of lipids. They are generally found in ester linkage in different classes of lipids

# *FATTY ACIDS*

Fatty acids are represented by the general formula R  
COOH.

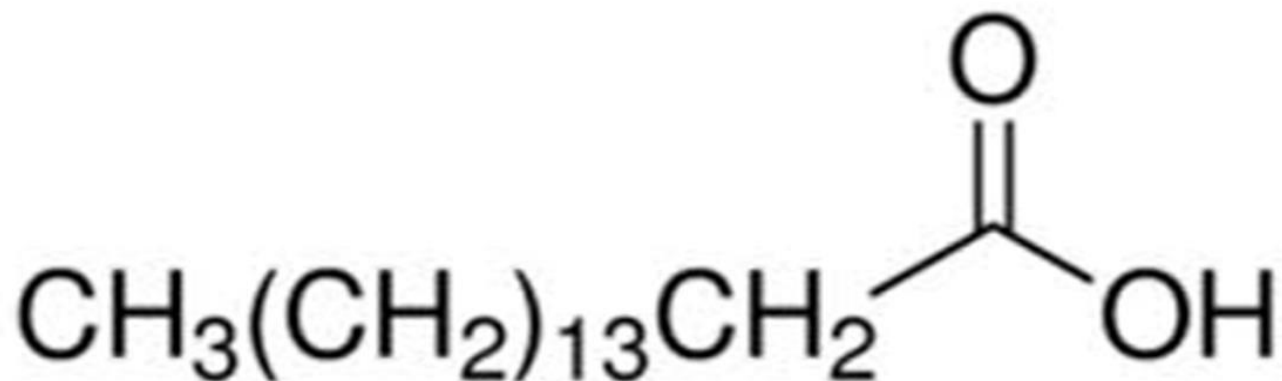
Numbers of carbon atoms of fatty acids are even or odd number, but odd number fatty acids are very rare.

Fatty acids may be saturated or unsaturated

\*saturated fatty acids such as palmitic acid.

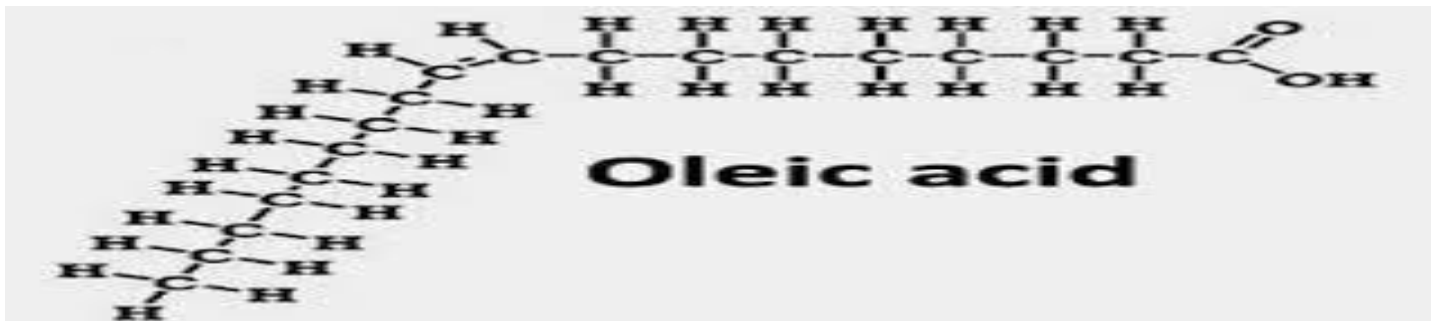
\*unsaturated fatty acids such as oleic acid

***Palmitic acid*** is found naturally in palm oil and palm kernel oil, as well as in butter, cheese, milk and meat.



\*unsaturated acid such as oleic acid:

Oleic acid is an omega-9 monounsaturated fatty acid found in various animal and vegetable sources. It has the formula  $C_{18}H_{34}O_2$  or  $(CH_3 (CH_2)_7CH = CH (CH_2)_7COOH)$ .

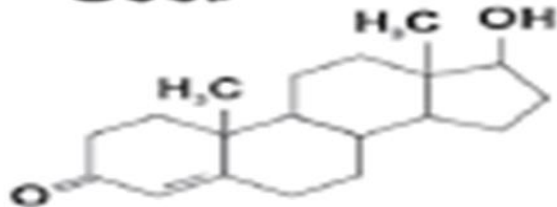




2-steroides:It is a group of hydrocarbon rings that combined with some fatty acids in the form of esters

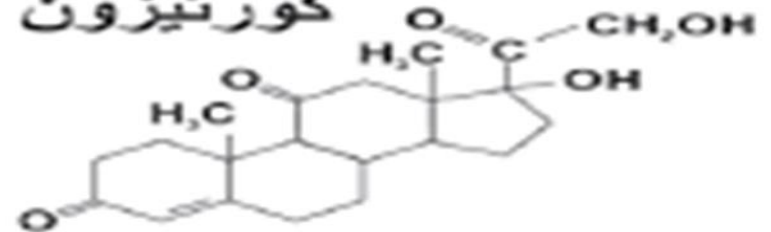
(a) Testosterone

تستستيرون



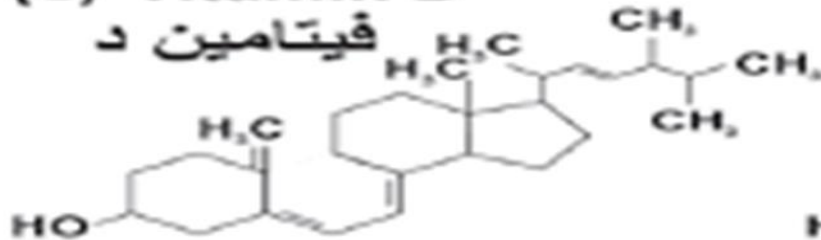
(b) Cortisone

كورتيزون



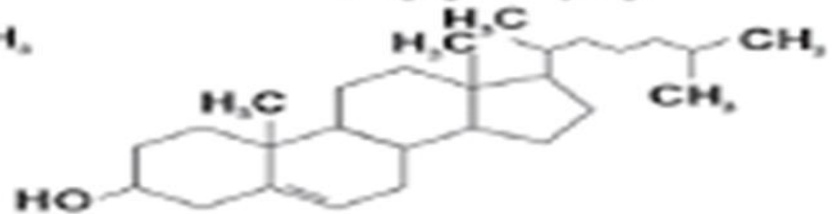
(c) Vitamin D

فيتامين د



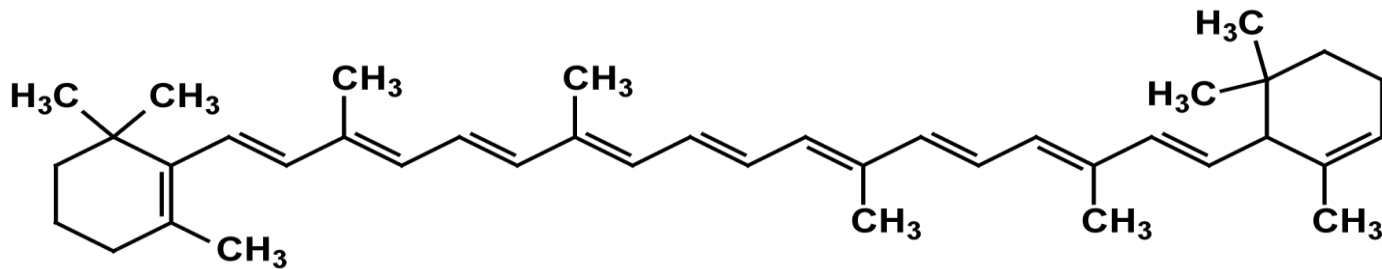
(d) Cholesterol

كوليسترول

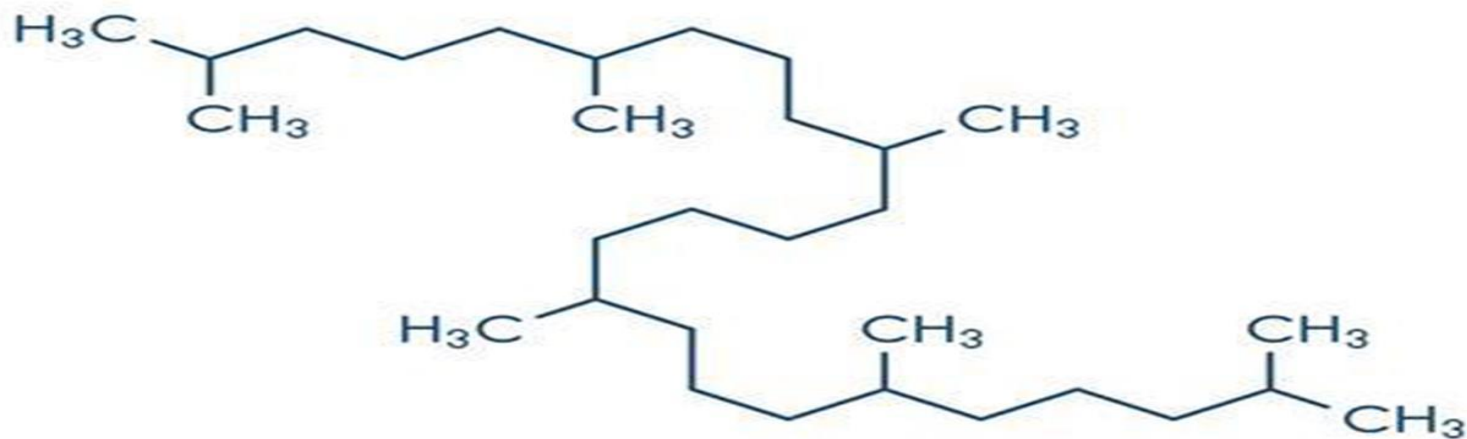


3-Terpenes: Fat-derived compounds consisting of the condensation of two or more isoprene units such as  $\beta$ -carotene , Squalene.

Beta-carotene is the substance that gives some types of vegetables and fruits their orange color and found in high amounts in these foods in particular: Apricot, Broccoli, carrots



Squalene is an oily organic substance ,It is a natural substance produced by living organisms, including humans. It is excreted in human skin



squalane

**GOOD LUCK**

