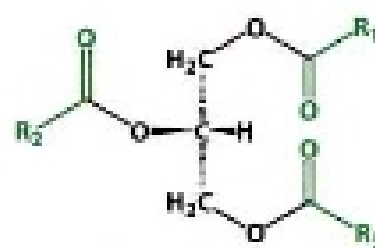


Lecture 35 11/17/06 Triglycerides, Phospholipids, Cholesterol:

Lipids containing Glycerol:

Triglycerides:

- Triglycerides are also called as Triacylglycerols or neutral fats.
- Triglycerides are non-polar, water insoluble fatty acid triesters of glycerol.
- Triglycerides function as energy reservoirs in animals (stored in adipose tissues-“remember love handles”) and thus the most abundant class of lipids.
- Triglycerides differ according to their identity and the position that the three fatty acid residues are esterified to glycerol.
- If the triglycerides have only one type of fatty acid then they are termed as simple triglycerides.
- The more common triglycerides contain more than one type of fatty acid and are termed mixed triglycerides.
- When acid hydrolyzed by acids, triglycerides yield three fatty acids and glycerol.
- When hydrolyzed by base, triglycerides yield salts of the three fatty acids and glycerol. This base hydrolysis is termed as saponification, and results in making soap.



Triacylglycerol

Figure 22-3
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Glycerophospholipids:

- Glycerophospholipids (phosphoglycerides) are major components of biological membranes.
- Phospholipids are made up of one or more fatty acids, glycerol, a phosphate and an alcohol attached to the phosphate.

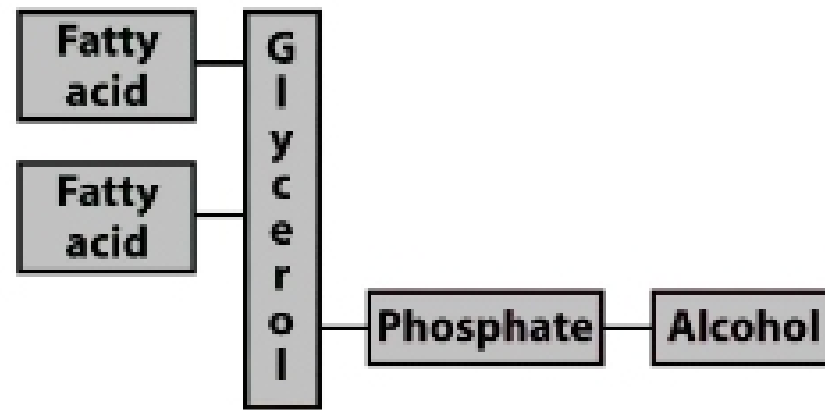
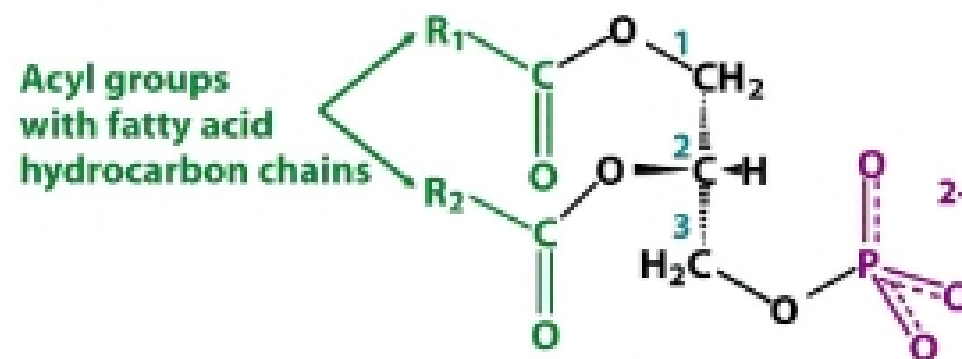


Figure 12-1
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- Instead of glycerol more complex alcohols can form a backbone to which the fatty acid can attach.
- In phosphoglycerides the hydroxyl groups at C1 and C2 of glycerol are esterified to the carboxyl groups of the two fatty acid chains. The C3 hydroxyl group of the glycerol backbone is esterified to the phosphoric acid.
- When no such groups are added then it is called phosphatidic acid or phosphatidate—the simplest phosphoglyceride.



**Phosphatidate
(Diacylglycerol 3-phosphate)**

Figure 12-1
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- The major phosphoglycerides are derived from phosphatidate by the formation of an ester bond between the phosphate group of phosphatidate and the OH-group of one of the several alcohols such as serine, ethanolamine, choline, glycerol and inositol.
- The resulting phospholipids are termed as phosphatidyl serine, phosphatidyl ethanolamine, phosphatidyl choline, phosphatidyl glycerol and phosphatidyl inositol respectively (collectively called as Lecithins).

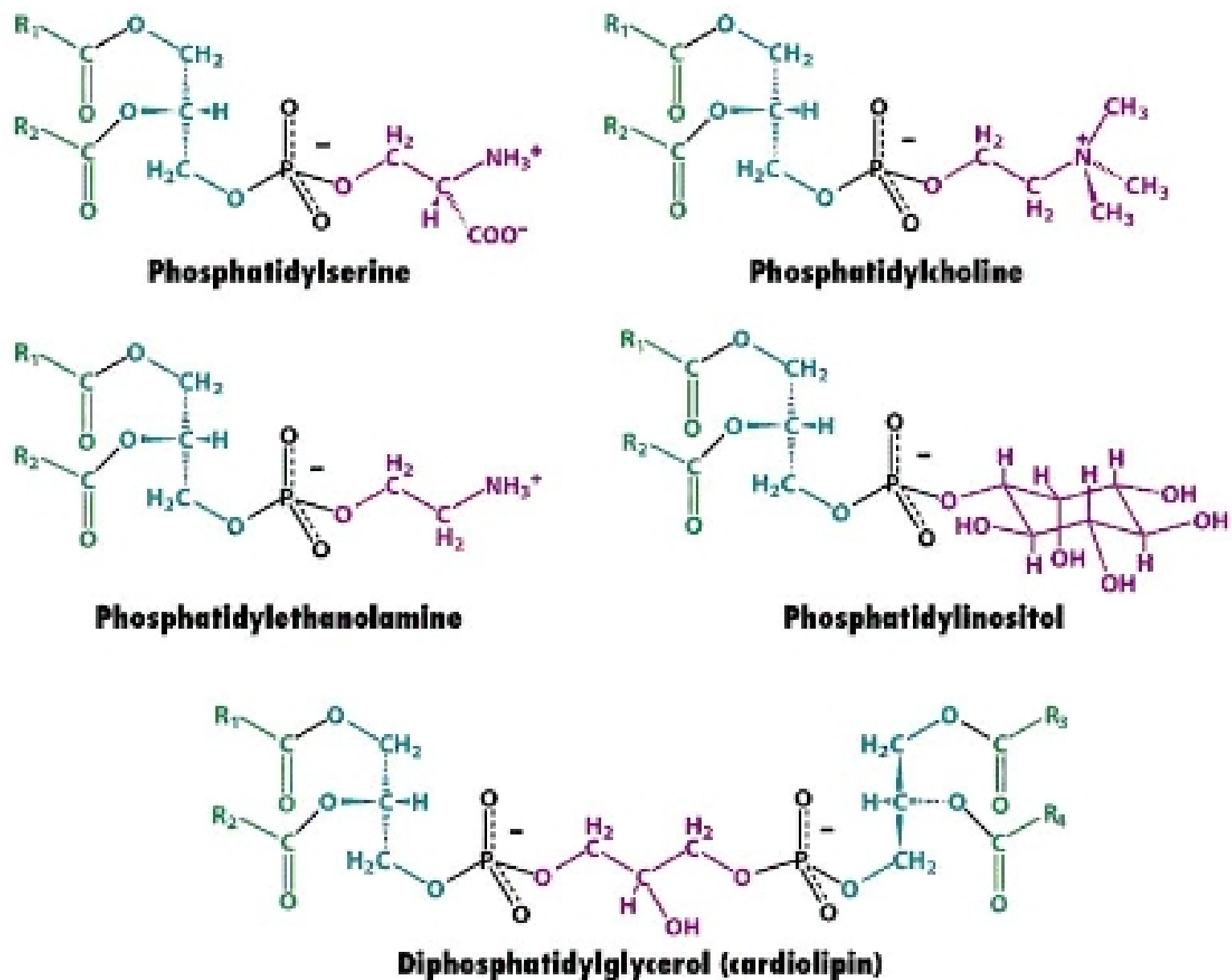


Figure 12-5
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Lipids not containing Glycerol:

Cardiolipin:

- **Cardiolipin** for example is interesting in way such that it has two molecules of phosphatidic acids joined by a glycerol.
- **Cardiolipin** is found in the heart muscles.
- Moreover there are **non-glycerol containing lipids**. They are,
 - Glycolipids- contain sugar molecule instead of a glycerol.
 - Ceramides are another non-glycerol containing lipid.
 - Cholesterol and cholesteryl esters.