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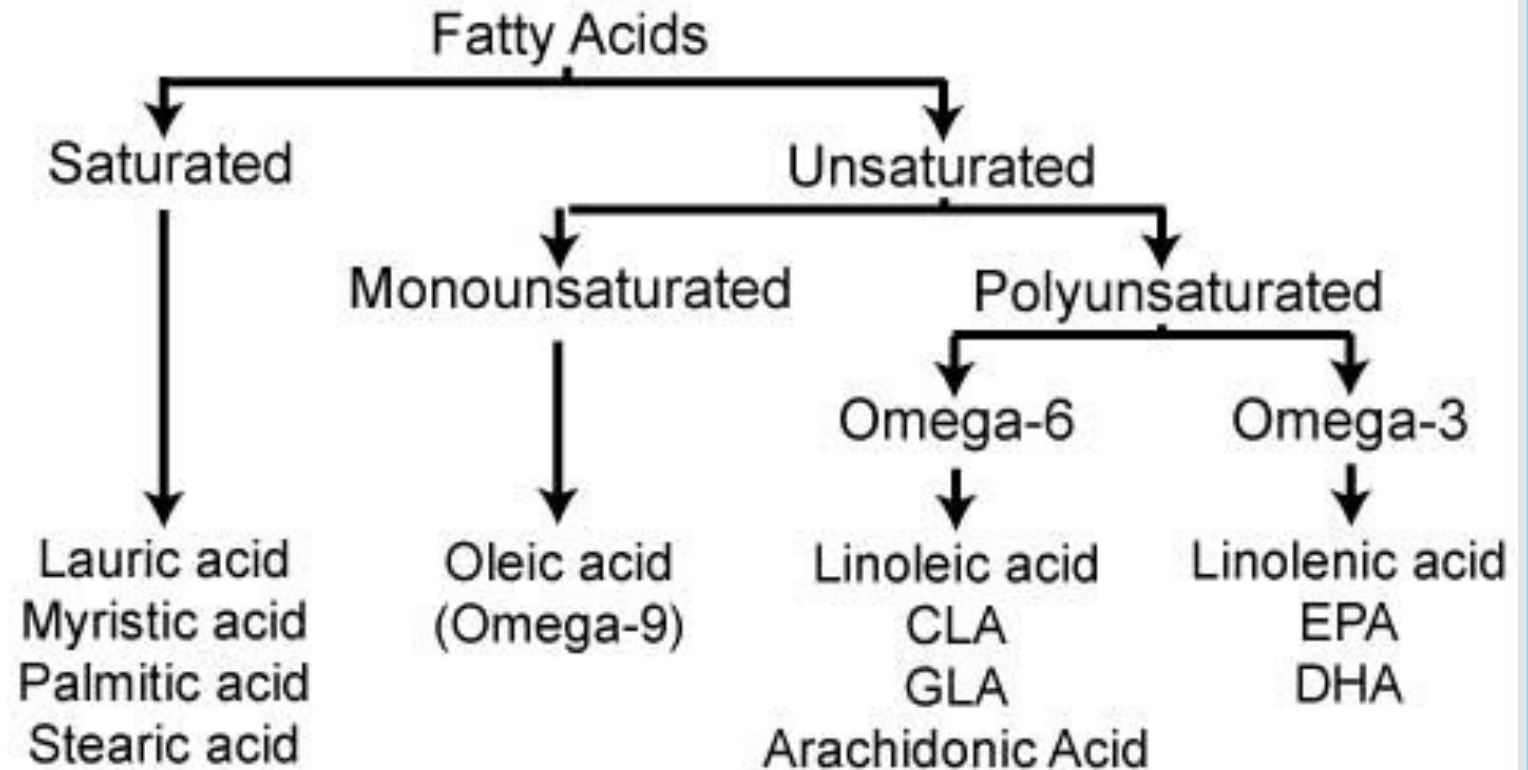
# TOPIC-4: LIPIDS



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# LIPID CLASSIFICATION

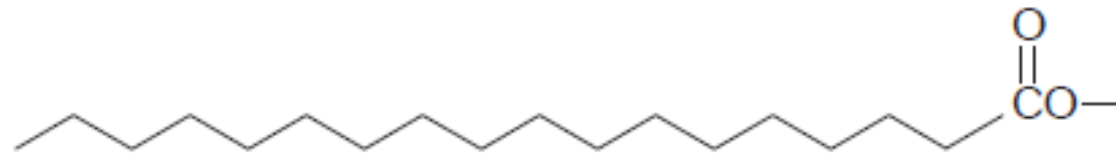




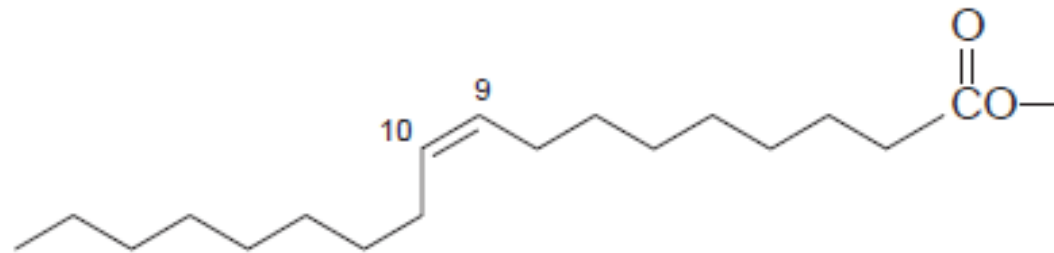
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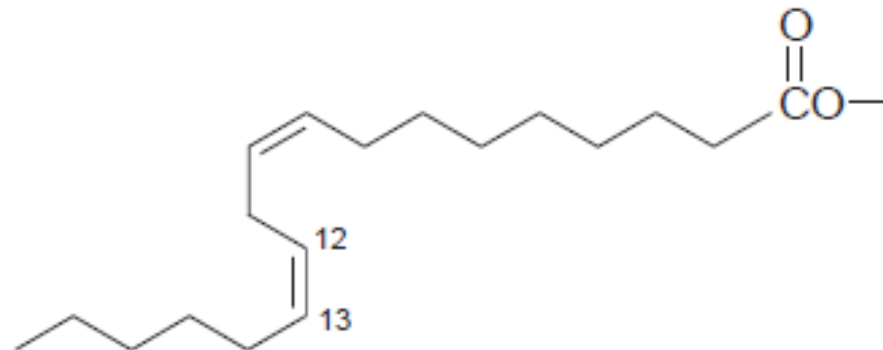
# SYMBOLIC REPRESENTATION OF FATTY ACIDS



Stearic acid  
(18 : 0)



Oleic acid  
(18 : 1,  $\Delta^{9c}$ )



Linoleic acid  
(18 : 2,  $\Delta^{9,12c}$ )

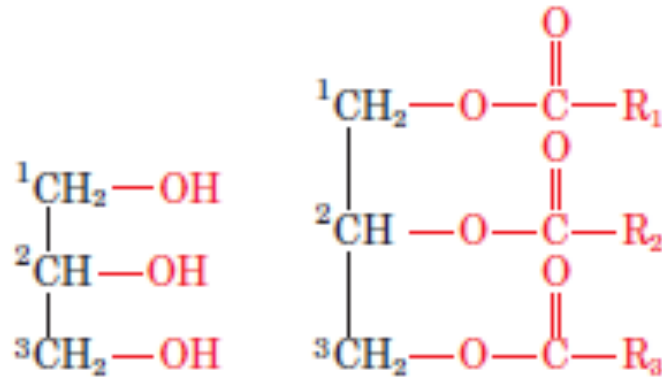


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# Triacylglycerols

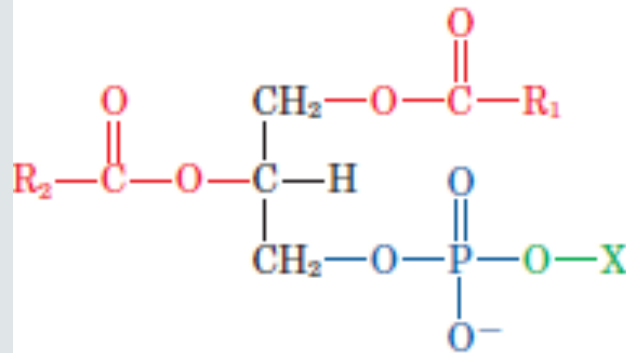
The fats and oils that occur in plants and animals consist largely of mixtures of **triacylglycerols** (also referred to as **triglycerides** or **neutral fats**). *These nonpolar, water-insoluble substances are fatty acid triesters of glycerol:*



**Glycerol**

**Triacylglycerol**

*Triacylglycerols function as energy reservoirs in animals and are therefore their most abundant class of lipids even though they are not components of biological membranes.*



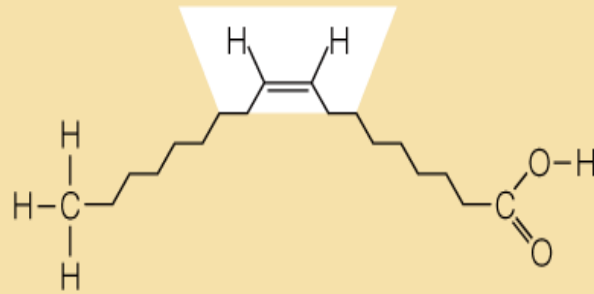
**Glycerophospholipid**



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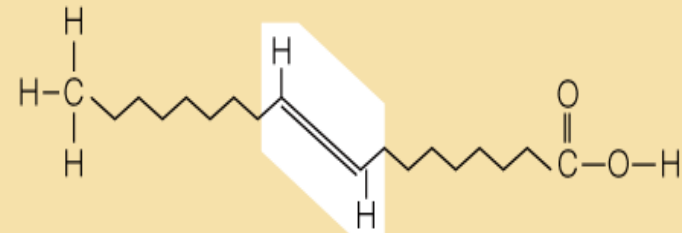
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# Cis- and Trans-Fatty Acids



*cis*-fatty acid

A *cis*-fatty acid has its hydrogens on the same side of the double bond; *cis* molecules fold back into a U-like formation. Most naturally occurring unsaturated fatty acids in foods are *cis*.



*trans*-fatty acid

A *trans*-fatty acid has its hydrogens on the opposite sides of the double bond; *trans* molecules are more linear. The *trans* form typically occurs in partially hydrogenated foods when hydrogen atoms shift around some double bonds and change the configuration from *cis* to *trans*.

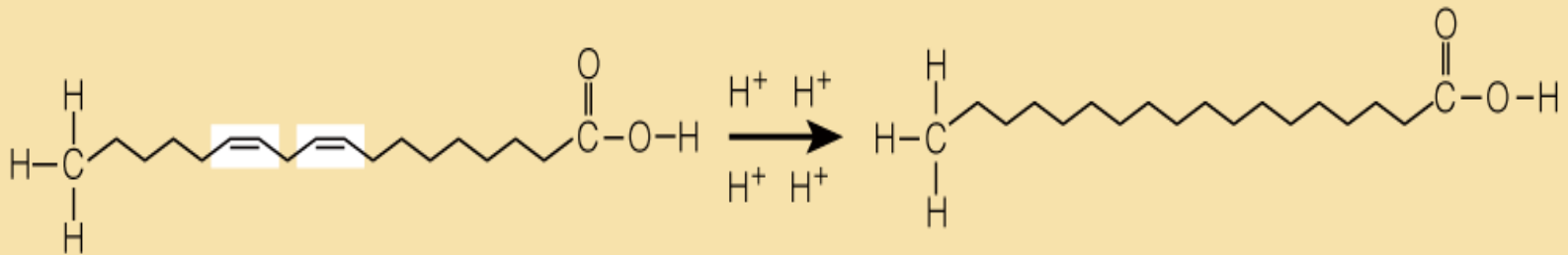


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# Hydrogenation

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Polyunsaturated fatty acid

Hydrogenated (saturated) fatty acid

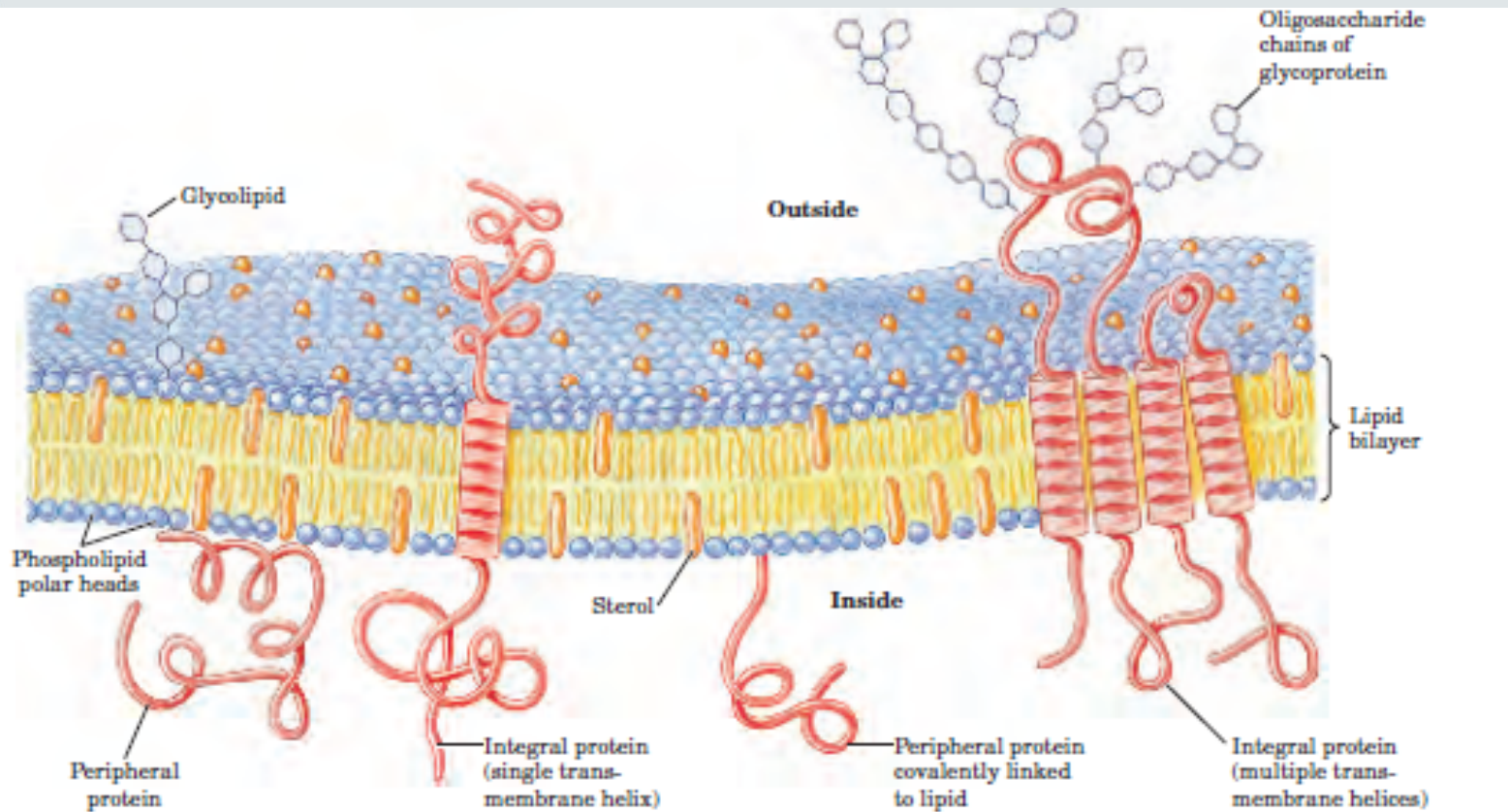
Double bonds carry a slightly negative charge and readily accept positively charged hydrogen atoms, creating a saturated fatty acid. Most often, fat is partially hydrogenated, creating a *trans*-fatty acid (shown in Figure 5-8).



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# FLUID MOSAIC MODEL OF PLASMA MEMBRANE



**FIGURE 11-3** Fluid mosaic model for membrane structure. The fatty acyl chains in the interior of the membrane form a fluid, hydrophobic region. Integral proteins float in this sea of lipid, held by hydrophobic interactions with their nonpolar amino acid side chains. Both proteins and lipids are free to move laterally in the plane of the

bilayer, but movement of either from one face of the bilayer to the other is restricted. The carbohydrate moieties attached to some proteins and lipids of the plasma membrane are exposed on the extracellular surface of the membrane.



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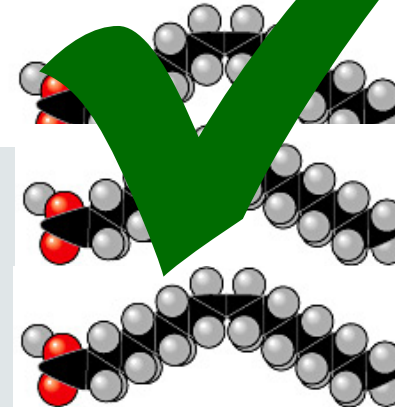
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# Saturated vs. Unsaturated Fatty Acids

saturated



unsaturated







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# Points to Remember

- ❖ Lipids are important constituents of fat soluble vitamins (A, D, E, K) and metabolic regulators.
- ❖ Unsaturated fatty acids are essential to human, deficiency of which cause Phrynoderma.
- ❖ Cyclic fatty acids (Chaulmoogric acid) employed in treatment of leprosy
- ❖ Fats and oils on exposure to air, moisture, bacteria, etc. undergo rancidity. This can be prevented by anti-oxidants (Vitamin E).