

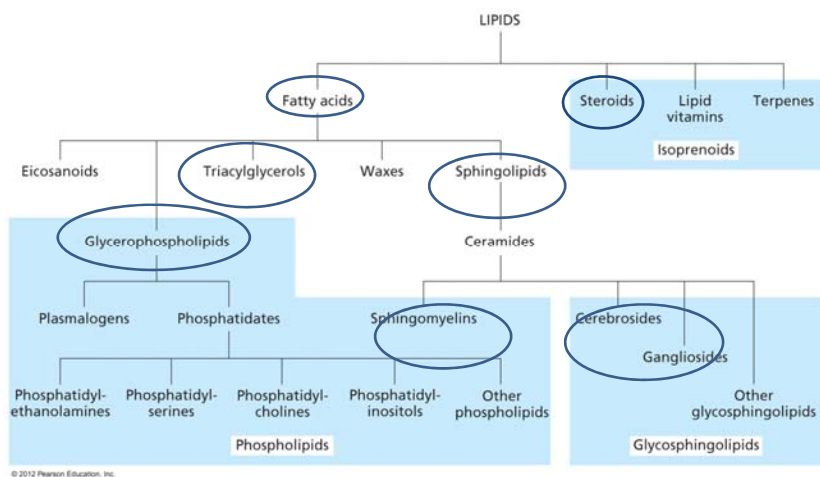
Lipids and Membranes

Pratt & Cornely, Ch 8

Lipids and Membranes

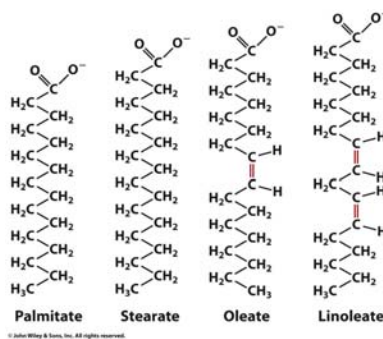
- There is a lot of important biochemistry of lipids.
- We won't cover it all!
- The key points for this class have to do with their role in membranes and fat metabolism
 - Fatty acids and triacylglycerides
 - Phospholipids, glycolipids, steroids

Diversity: Backbone and Modifications

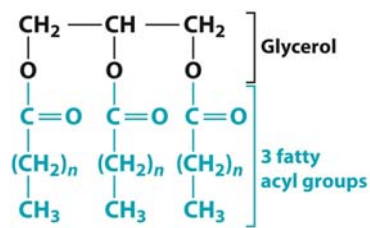
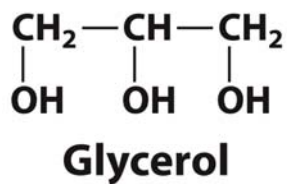


Fatty Acids

- Saturated
- Unsaturated
- Polyunsaturated
- Cis and trans
- Linoleate
 - 18:2 *n*-6
 - 18:2 $\Delta^{9,12}$

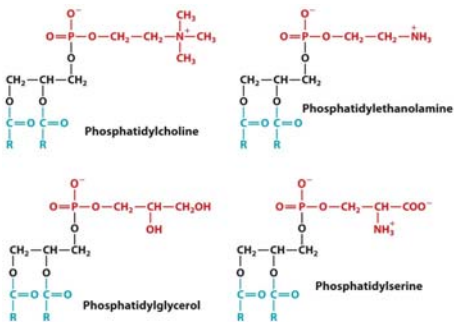


Triacylglycerides



Phosphoglycerides

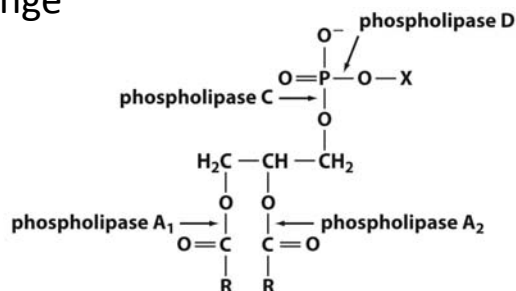
- aka glycerophospholipids
- Polar head, hydrophobic tail
- Phosphatidate derivatives



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Phospholipases

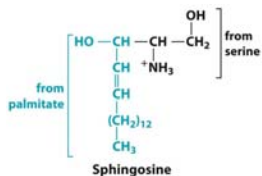
- Wide variety of phosphoglycerides
- Processed by range of lipases
- Snake venom



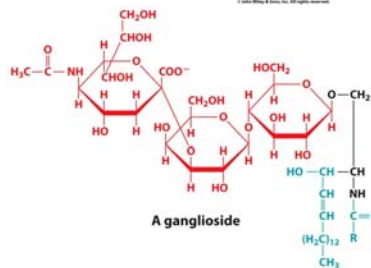
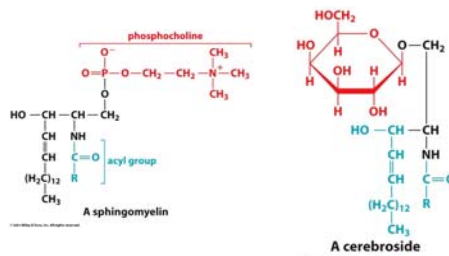
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Sphingolipids

- Sphingosine backbone



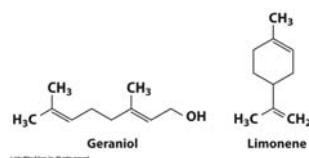
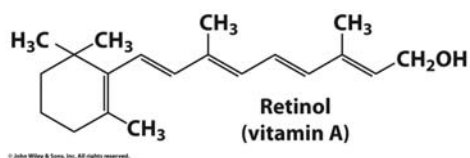
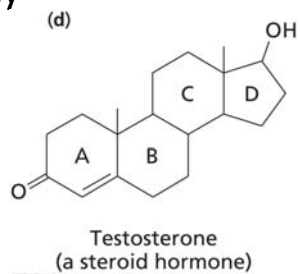
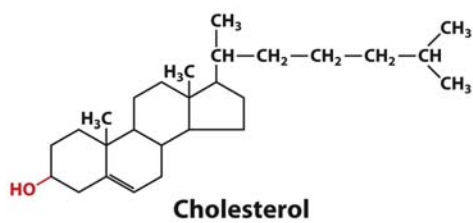
- Phospho derivatives
 - Spingomyelin
- Glyco derivatives
 - Ceribrosides and gangliosides



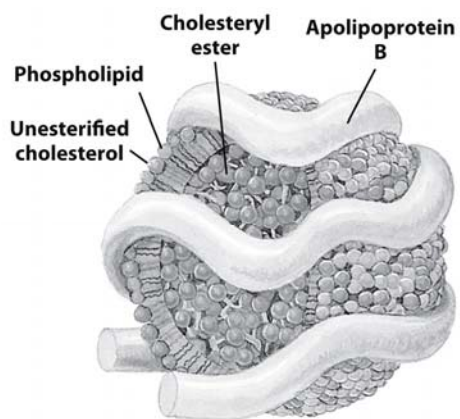
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Other Lipids

- Structural, functional diversity



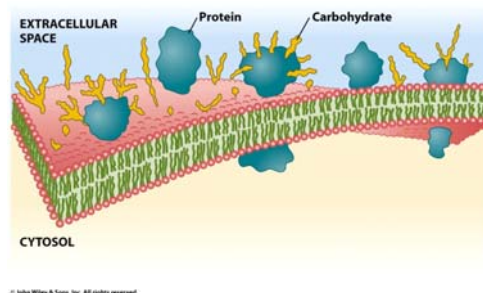
HDL, LDL



More detail in metabolism chapters

Membranes

- Complex
- Fluid
- Dynamic
- Compartmentalization
- Communication
- Gradients



Lipid Bilayer

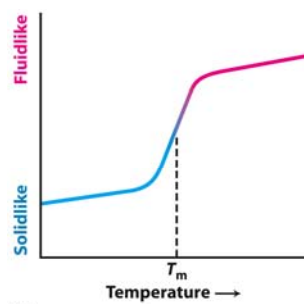
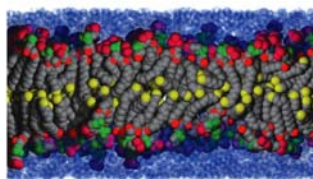
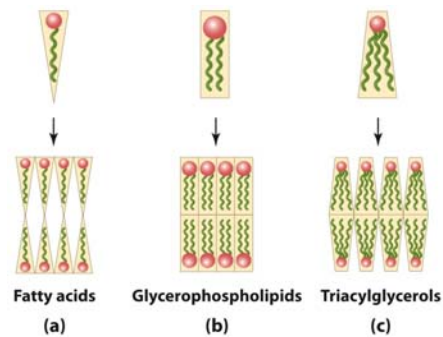
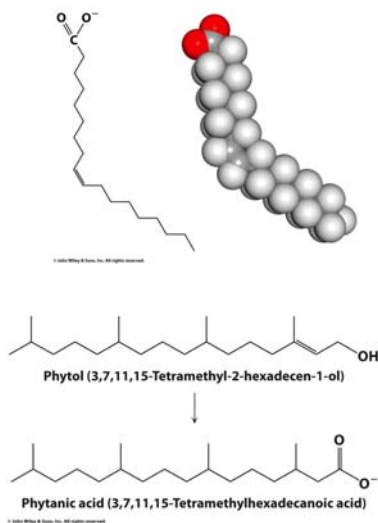


Figure 3.3
Biochemistry of the Cell, Third Edition
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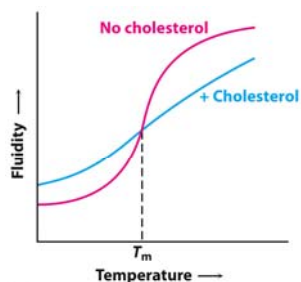
Bilayer Melting Point

- Influenced by packing
- Problem 36: Phytol is generally transformed to a fuel source. Metabolic errors can lead to accumulation of the product in membrane. What effect would it have on membrane fluidity?

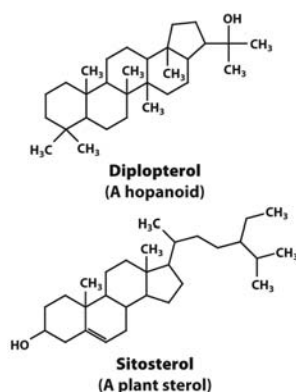


Cholesterol

- Effect of cholesterol on membrane fluidity
- Lipid rafts



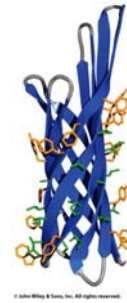
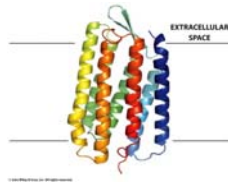
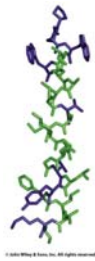
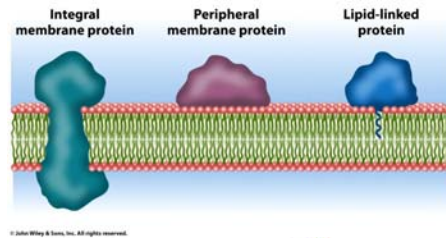
Problem 12.28
Biochemistry of Plants, Second Edition
© 2011 Humana Education



Unnumbered 11 p197b
Biochemistry: A Short Course, Third Edition
© 2015 Macmillan Education

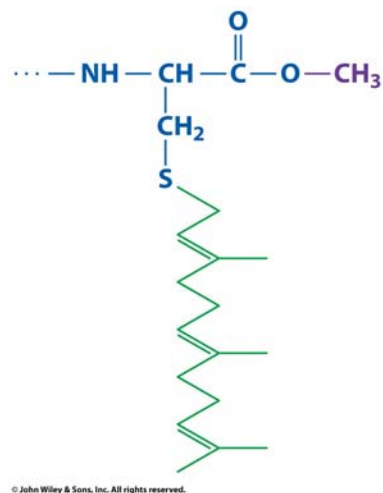
Membrane Proteins

- Integral vs peripheral
- α -helix (20aa)
- β -barrel



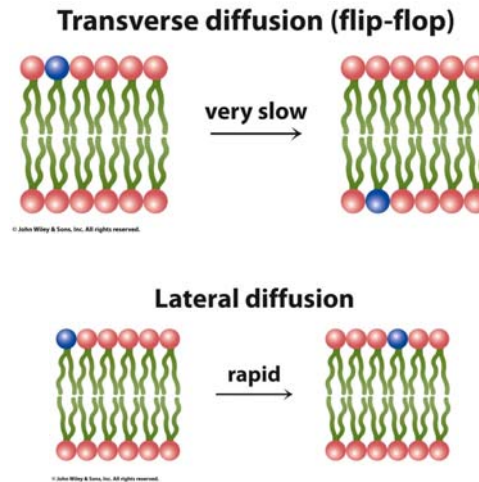
Reversible anchoring

- Signalling
- prenylation
- cancer



Asymmetry

- Flippase
- Most Lipid-anchored face toward interior
- Most glycoproteins face exterior



Fluid Mosaic Model

- Now believed to have some limits to movement due to cytoskeleton

