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
Diversity

Fatty Acids

- Saturated
- Unsaturated
- Polyunsaturated
- Cis and trans
- Linoleate
  - 18:2 \( n-6 \)
  - 18:2 \( \Delta^9,12 \)
Triacylglycerides

\[
\text{CH}_2-\text{CH}-\text{CH}_2
\]
\[
\text{OH} \quad \text{OH} \quad \text{OH}
\]
Glycerol

\[
\begin{align*}
\text{CH}_2 & \quad \text{CH} & \quad \text{CH}_2 \\
\text{O} & \quad \text{O} & \quad \text{O} \\
\text{C}=\text{O} & \quad \text{C}=\text{O} & \quad \text{C}=\text{O} \\
(\text{CH}_2)_n & \quad (\text{CH}_2)_n & \quad (\text{CH}_2)_n \\
\text{CH}_3 & \quad \text{CH}_3 & \quad \text{CH}_3
\end{align*}
\]
Glycerol

3 fatty acyl groups

Phosphoglycerides

- aka glycerophospholipids
- Polar head, hydrophobic tail
Phospholipases

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

Sphingolipids
Other Lipids

• Structural, functional diversity

HDL, LDL

More detail in metabolism chapters
Membranes

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

Lipid Bilayer

- Fatty acids
- Glycerophospholipids
- Triacylglycerols
**Bilayer Melting Point**

- Influenced by packing
- Role of cholesterol
- 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?

**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