

Chapter 3 – Biochemistry, Nutrition, and Water

Section 3: The Molecules of Life – Nutritional Information

1. Lipids

Definition: large, non-polar, hydrophobic (water-fearing) fatty compounds that are not soluble (lipids float) in water.

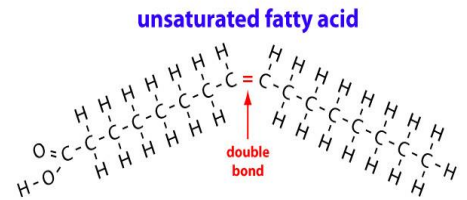
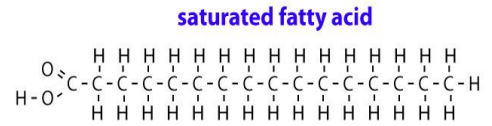
a. Monomer Unit: Fatty Acids and alcohols

i. Saturated

1. Fully Saturated with Hydrogens
2. No double bonds between carbons
3. Solid fats at room temperature
 - a. Animal fats
4. Straight chain
5. Taste better, worse for you!

ii. Unsaturated

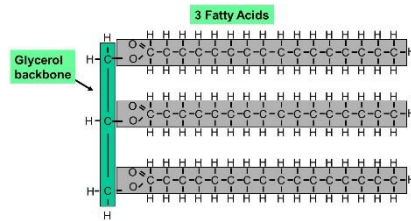
1. Not fully saturated with Hydrogens
2. Double bonds between carbons
3. Liquid fats at room temperature
 - a. Plant oils
4. Kinked structure
5. Better for you b/c they are digested easier



b. Types of Lipids

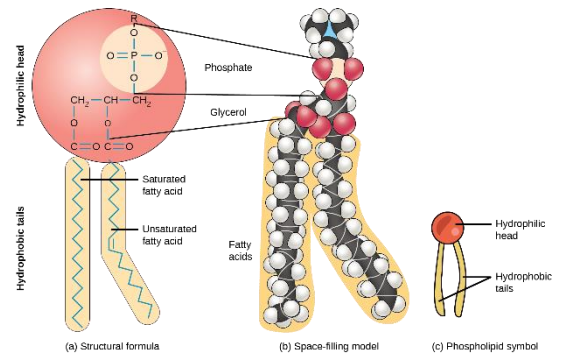
i. Triglycerides

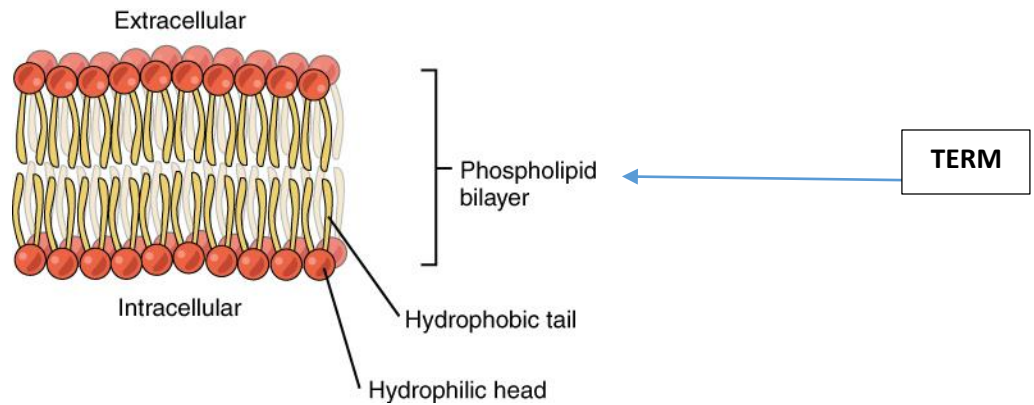
1. Glycerol alcohol and 3 fatty acids
2. Fats and oils
3. Long term energy storage
4. Insulate



ii. Phospholipids

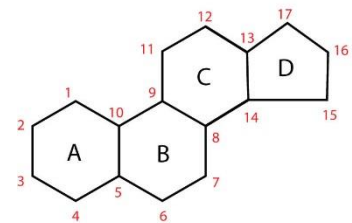
1. Glycerol, 2 fatty acids, and a phosphate group
2. Makes up the cell-membrane
3. **Structure**
 - a. **Head:** polar
 - i. Hydrophilic: loves water
 - b. **Tails:** non-polar
 - i. Hydrophobic: fears water
4. Phospholipids in water create the following structure:





iii. Steroids

1. 4 fused carbon rings (no fatty acids)
 - a. Have the same properties as lipids
2. Bring about cell reactions
3. Keep the membrane flexible
4. **Examples:** Estrogen, Testosterone, Progesterone, prednisone, cholesterol
5. All steroids have the same base structure, but different functional groups can be added in order to create a different steroid.



(a) Steroid skeleton

iv. Waxes

1. Long-chain alcohol joined to a long chain fatty acid
2. Non-polar (they float)
3. Waterproof
4. Provide protection



Link – Biochemistry Foldable – Lipids



What characteristics do lipids possess that enable them to function in living organisms and support life?

Answer: As a group, lipids have many different functions and uses in living cells and organisms, from storing energy to regulating metabolism, signaling hormones, and providing the structure of cell membranes.