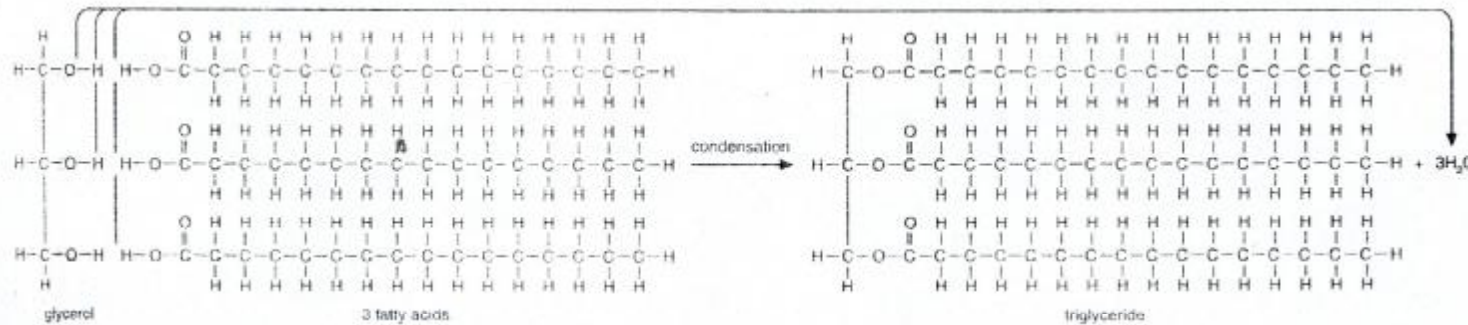


- **Lipids**, like carbohydrates, are built out of the elements carbon, hydrogen, and oxygen. Despite this, they have very different properties.
- The most common types of lipid are fats and oils, or **triglycerides** as they are officially known. A triglyceride is constructed from a **glycerol** head which is joined by condensation reactions to three **fatty-acid** tails, as shown below.



- Because of a lack of OH and NH groups, triglycerides are insoluble (see unit 1). This means that, like starch and glycogen, they make ideal **energy-storage** molecules. Fats tend to be used as a long-term energy store, which is only accessed after all of an organism's carbohydrate reserves have been used up. Triglycerides, in the form of body fat, are also used to provide insulation and protection for delicate organs.
- Fatty acids, which are used in the construction of a triglyceride, come in two varieties, **saturated** and **unsaturated**. You have probably heard about these in relation to diet. The fatty acids shown in the triglyceride diagram above are saturated, as found in most animal fat. Unsaturated fatty acids have **double bonds** between carbons at key points, which causes the fatty-acid tail to kink or bend. They are most commonly found in fish and plant oils, and are less likely to contribute to heart disease.
- **Phospholipids** are similar in structure to triglycerides, except for the fact that they have only two fatty-acid tails and a charged phosphate group attached to their glycerol head. The charged head and uncharged tails of a phospholipid molecule lead to some unusual properties. It is these properties that allow phospholipids to function as a component of the cell membrane (see unit 6).
- Other types of lipid include **waxes**, such as those that coat the surface of a leaf, and **steroids**, like the sex hormone **testosterone**.