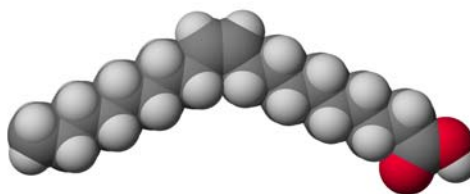
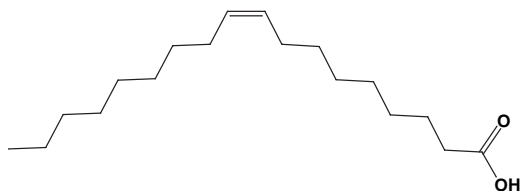


Molecule of the week: Oleic Acid**Concepts: Hydrophobic Interactions**

Oleic Acid is a fatty acid found in vegetable oils, particularly from olives and cocoa butter. With its cis double bond, oleic acid is a mono-unsaturated fatty acid. Oleic acid occurs naturally in greater quantities than any other fatty acid. It is present as glycerides in most fats and oils. Oleic acid is used in the food industry to make synthetic butters and cheeses. It is also used to flavor baked goods, candy, ice cream, and sodas. Oleic acid is believed to be good for one's health. It is the major fatty acid in olive oil, comprising 55 to 85 percent of the substance. Olive oil, a mainstay of Mediterranean cuisine, has been hailed for its therapeutic benefits for centuries. Recent studies support the idea that olive oil is beneficial to health, as studies show that oleic acid helps lower levels of harmful low-density lipoproteins in the blood.

Questions:

Unsaturation in fatty acids can be detected quantitatively by addition of bromine. Illustrate the products expected from addition of one equivalent of Br₂ to oleic acid, indicating the stereochemistry expected (in terms of R and S).

How would you distinguish the cis olefin from the trans olefin using NMR spectroscopy?

Stearic acid, the saturated fatty acid analog, is a solid at room temperature while oleic acid is a liquid. Explain why.

Add a drop of olive oil to a glass of water. What do you observe? How do you explain your observations in light of hydrophobic interactions?

