

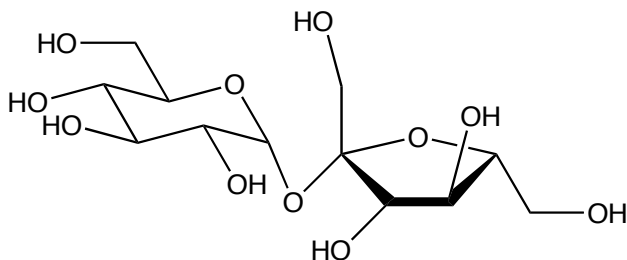
Chem 101 Conference: Structures of Organic Molecules

OCTOBER 31/NOVEMBER 1, 2007

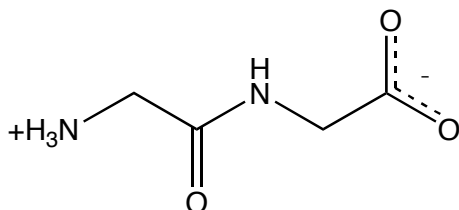
Part 1. Nutrient Structures and Molecular Polarity

1. There are *Spartan* models for examples of each of the following classes of nutrients. For each model (i) give the molecular formula (ii) draw in the orientation of the overall molecular dipole and note the magnitude of the dipole as calculated by *Spartan*, (iii) identify the most positive atom and (iv) identify the most negative atom in the molecule.

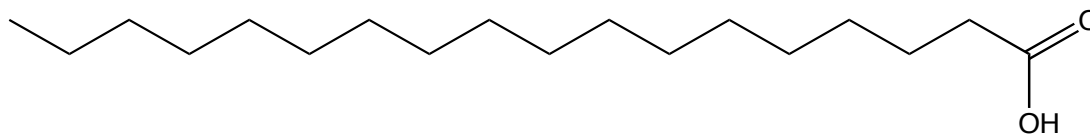
- a. Sucrose (a carbohydrate)



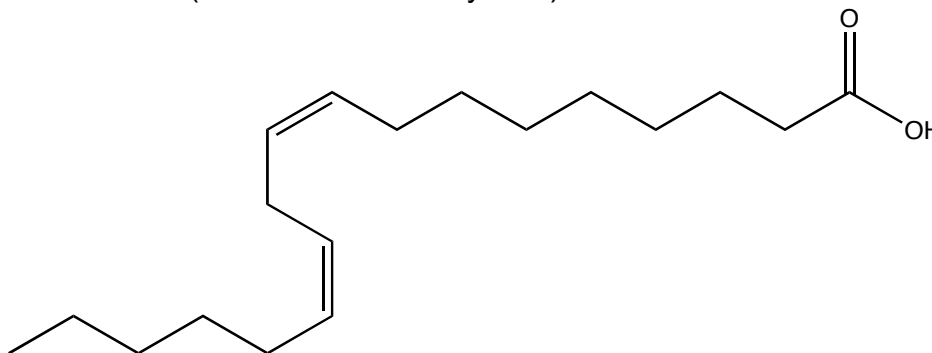
- b. Glycylglycine (the simplest "protein") in its zwitterionic form.



- c. Stearic acid (a fatty acid)



- d. Linoleic acid (an unsaturated fatty acid)



- e. Rank them in order of probable solubility in water.

Part 2. Isomers and Functional Groups

2. Draw four isomers, with no formal charges, with the molecular formula: $C_3H_7NO_2$. Each isomer below should have at least the functional group(s) described below. *Hint:* start by drawing the complete Lewis structure and then draw the corresponding shorthand line structure.

i. Ketone

ii. Amide

iii. Ester

iv. Amine and carboxylic acid

- b. Draw the zwitterionic form of you molecule in part (iv) and one resonance form.

Challenge problem:

How many isomers can you draw with the molecular formula $C_3H_6O_2$?