Name_____Date_____Class _____

Molecules of Life: Protein

Carbohydrates, fats, proteins and nucleic acid's are the four major groups of organic molecules found in living organisms.

This Lab-Aids kit deals with the important class of organic molecules known as proteins. They are the main structural and growth components of cells in tissues such as skin, hair, muscle and blood. Other proteins serve in a regulatory capacity as enzymes or hormones. Proteins always contain nitrogen in addition to carbon, hydrogen and oxygen. Phosphorus and sulfur are also found in many proteins.

The amino acid is the basic structural unit of all proteins. There are only about 20 different amino acids known to exist in proteins; all of them have a similar basic structure. The general structural formula of an amino acid is shown in Fig. 1.

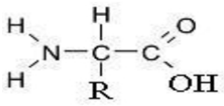


FIG. 1 The generalized structure of an amino acid molecule.

Procedure:

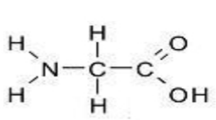
Students should work independently or in teams of 2 as directed by their instructor. It will be necessary for each student to complete his own worksheet while *possibly* sharing a packet of molecular parts with another student. The packet of molecular parts consists of:

14	Carbon (C) - tetrahedral electrons - black
4	Nitrogen (N) - tetrahedral electrons - red
9	Oxygen (O) - double electrons - blue
32	Hydrogen (H) - single electron - white
58	electron bond - plastic tube - white

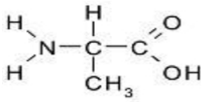
1. Examine the structural formula for an amino acid in Fig. 1. Construct a model using the molecular parts provided leaving the R portion open.

2. Note that the amino acid has an amino (NH_2) group at one end and an acid (carboxyl) - (COOH) group at the other end. R stands for radical (an atom or a group of atoms). The uniqueness of each amino acid is determined by the atoms in the R position.

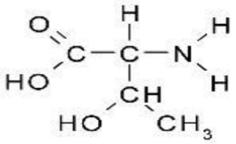
3. The structural formulas of four (4) representative amino acids are shown in Fig. 2. Glycine is the simplest amino acid, with only a single hydrogen atom in the R position. Complete the model for glycine you will use this in number 4.



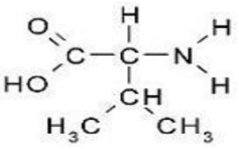
GLYCINE



ALANINE



THREONINE



VALINE

FIG. 2. Structural formulas of representative amino acids