Center for BioMolecular Modeling

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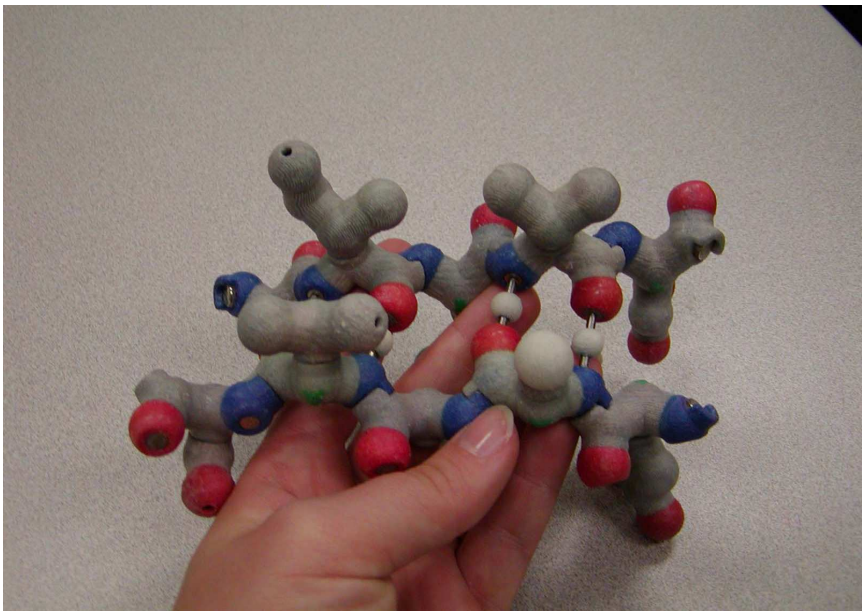
SMART Teams
Exploring the Molecular World

Modeling a β-Sheet of Green Fluorescent Protein



Activity

1. Using the sidechains provided, construct a β-sheet with the following sequence:

NH_2-Ile-Leu-Val-Glu-Leu-COOH
COOH-Ser-Val-Ser-Gly-Glu-NH_2

What differences do you see on one side of the β-sheet versus the other? What implications does this have on the spatial arrangement of this sheet with the environment? *One of the sides of the β-sheet is predominantly not charged (gray amino acid sidechains) and the other side is mostly charged (red and blue in the amino acid sidechains). This would suggest that the hydrophobic (non-charged) side of the β-sheet might be facing inside the GFP protein barrel and the charged side of the β-sheet is on the outside of the GFP.*

****Possible misconceptions to be aware of when using these models:**

Amino acids are not assembled by backbone pieces first followed by the addition of the sidechains. Physiologically, amino acids are constructed as individual units, which are then linked together during translation to form peptide bonds. The sidechains are separate in this kit to allow for exploration of the different structures of sidechains and to allow for constructing just peptide backbones.