

Toober Protein Lab 1 - Student Questions

Primary and Tertiary Structure

Describe Your Observations

- Do you see similarities or patterns in the sidechains? _____ Explain what you observed:

- Hydrophobic sidechains are composed primarily of _____ atoms.

- Acidic sidechains contain two _____ atoms. This is called a carboxylic acid functional group.

- Basic sidechains contain _____ atoms. This is called an amino functional group.

- Hydrophilic sidechains have various combinations of

- An exception to the above observation is:

Predict what causes proteins to fold into their 3D shapes.

- From your experience with *oil* and *water*, which sidechains might position themselves on the interior of a protein, where they are shielded from water? _____

- From your experience with magnets or electricity, which sidechains might be attracted to each other?

- Would the final shape of a protein be a *high energy state* or a *low energy state* for all of the atoms in the structure?

Why? _____

Find the part of the drawing that represents the backbone section of the amino Acid. What do you think the clips represent?

- Why should Methionine be next to the Blue End Cap?

- What happened as you continued to fold your protein and applied each new chemical property to your protein?

- Were you able to fold your protein, so that all of the chemical properties were in effect at the same time? _____

- If not, do you have any ideas why you weren't able to fold your protein in a way that allowed all of the chemical properties to be in effect simultaneously? _____

- Did your protein look like the proteins other students folded? _____
Explain. _____

- How many different proteins, 15 amino acid long, could you make given an unlimited number of each of the 20 amino acids? _____

- Most real proteins are actually in the range of 300 amino acids long. How many different possible proteins, 300 amino acids in length, could exist?

- How many different proteins are found in the human body? (Another way to ask this question is —How many different genes are there in the human genome?)

- Assuming that all human proteins are 300 amino acids long, what fraction of the total number of possible different proteins is found in the human body?

- Why do you think there are fewer actual proteins than possible ones?
