

## Protein Structure Worksheet

Name: \_\_\_\_\_

This worksheet is to be used with the online [Protein Structure](#) activity.

### Common Display Formats

1. Record an advantage and a disadvantage of each type of display.

### Protein Primary Structure

2. What color and types of atoms make up each of the four R groups that you explored?

### Protein Secondary Structure

#### Alpha Helices

3. Determine the ratio of hydrogen bonds per amino acid.
4. Where are the amino acid sidechains located in relation to the backbone atoms in the alpha helix?

#### Beta Pleated Sheets

5. Count the number of hydrogen bonds and the number of amino acids in the selected beta sheet.
6. Determine the ratio of hydrogen bonds per amino acid.

7. Where are the amino acid sidechains located in relation to the protein backbone in the beta sheet?

### **Protein Tertiary Structure**

#### Hydrophobic Interactions

8. Are hydrophobic residues located mostly on the surface of the protein or on the inside of the protein? Why do you think that is the case?

#### Hydrogen Bonds

9. Do one or both of the groups have a polar hydrogen?

#### Salt Bridges

10. Do these interactions occur on the inside or outside of the protein? Why?

#### Sulfur-Sulfur (Disulfide) Bonds

11. How does the strength of this interaction compare to the other three interactions?

### **Testing Your Understanding**

12. Are the amino acids that coordinate the zinc atom the same in GATA-1 and FOG-1?

13. What type(s) of interactions occur between the zinc atom and these amino acids?

14. What type of interaction is interaction 1?
  - a. hydrophobic interaction
  - b. hydrogen bond
  - c. sulfur-sulfur (disulfide) bond
  - d. salt bridge
  
15. What type of interaction is interaction 2?
  - a. hydrophobic interaction
  - b. hydrogen bond
  - c. sulfur-sulfur (disulfide) bond
  - d. salt bridge
  
16. What type of interaction is interaction 3?
  - a. hydrophobic interaction
  - b. hydrogen bond
  - c. sulfur-sulfur (disulfide) bond
  - d. salt bridge
  
17. What type of interaction is interaction 4?
  - a. hydrophobic interaction
  - b. hydrogen bond
  - c. sulfur-sulfur (disulfide) bond
  - d. salt bridge
  
18. What interaction does the orange residue have with the DNA in interaction 5?
  
  
19. What interactions are seen between the orange residue and DNA in interaction 6?
  
  
  
20. What interactions occur between the orange residue and DNA in interaction 7?
  
  
  
21. How does the lime green residue interact with the phosphate in DNA in interaction 8?
  
  
  
22. How does the lime green residue interact with the phosphate in DNA in interaction 9?