Protein Modeling - Division C Onsite Exam

University of Texas-Austin Invitational

October 26, 2019

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Team Number: _____

Team Name: _____

Total Points: _____/22 **Rank:** _____

Instructions and Clarifications:

- You have **50** minutes to finish this exam and the computer exploration of protein structure. This onsite exam is for **Part II** of the answer sheet. The onsite exam is worth **30%** of the event.
- Each **participant** may bring **one** 8.5" x 11" sheet of paper that may be in a sheet protector or laminated that contain information without any annotations or labels affixed along with writing utensils for each participant.
- You **may** not write on this exam. Only the **answer sheet** will be graded.
- Write your team number on every page of the answer sheet.
- There are **no** tiebreakers in this section.
- If you have any questions or comments about this exam, feel free to email me at velasco.scienceolympiad@gmail.com. **Happy testing!**

Directions: The following questions refer to the crystal structure of **cytidine deaminase complexed with uridine.** Use the computer to explore the structure and answer the following questions below. Each question is worth **one** point unless otherwise stated. **(22)**

1. How many hydrogen bonds are present in the nucleic portion of this protein?

2. The following questions refer to **residue 22.** (4)
    a. What amino acid is residue 22?
    b. Is this amino acid polar or nonpolar?
    c. Would this amino acid be located in the interior or exterior of the protein? Explain. (2)

3. The following questions refer to **residue 80.** (3)
    a. What amino acid is residue 80?
    b. True or False: This amino acid is aliphatic.
    c. True or False: This amino acid is hydrophobic.

4. The following questions refer to **residue 166.** (3)
    a. What amino acid is residue 166?
    b. True or False: This protein is proteinogenic.
    c. True or False: This protein is encoded by all the codons starting with AG.

5. The following questions refer to **residue 126.** (4)
    a. What amino acid is reside 126?
    b. True or False: This amino acid has a nonpolar side group.
    c. What is the name of this amino acid when it is in its phosphorylated form? (2)

6. How many struts are present between amino acids 124-201? (2)

7. How many struts are present in the nucleic structure of this complex? (2)

8. How many glycine amino acids are found in amino acids 150-192?

9. How many atoms are present in the helix of this structure?

10. How many atoms are in the sheet of this structure?