MCM Practice Questions Answer Key: Lecture Day 1

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Lecture 1: Protein Structure & Function

Question 1: C In the core of proteins, the amino acid residues are typically hydrophobic in nature. This rules out hydrogen bonding (A) as it is characteristic of hydrophilic and polar substances. While covalent bonds are found within the basic bonding patterns of the atoms that make up proteins, they are not intermolecular forces but intramolecular forces (D). The same applies to ionic bonding (E). London Dispersion Forces (B), while a subcategory of Van der Waals forces, is too narrow of an answer to be correct. This is because Van der Waals forces (C) consist of many weaker types of intermolecular forces which all play a role in the amino acid interactions at the core of the protein.

Question 2: D Catalytic sites (A) are a type of tertiary structure as they are defined as "pockets" formed when the protein folds into its 3-D structure. Zinc fingers (B) are super-secondary structures as they use Zinc, a non Hydrogen-bonding atom, to stabilize the structure. Beta-pleated sheets (C) are a type of secondary structure. Thus the correct answer is (D) because the Heterotrimer of the GPCR is a complex of multiple protein subunits that come together.

Question 3: D Answers (A) and (B) are incorrect as they are properties of Heat Shock Protein 70 (HSP 70) not HSP 60. Answer (C) is incorrect as HSP 60 uses ATP to chaperone the protein into taking the correct shape, which is answer (D).

Question 4: A Hepatic Lipase deficiency (B) is not a likely diagnosis as the patient has no reported history of obesity or high HDL levels. Additionally, hepatic lipase deficiency usually will not result in jaundice or respiratory problems the patient is coming in for. Hepcidin deficiency (C) will lead to anemia due to lowered iron absorption. This may accound for the shortness of breath but will not lead to jaundice. G-6-P Dehydrogenase deficiency will not affect the liver in such a way that can account for the history of jaundice. This leaves Alpha-1 Antitrypsin (A) deficiency as the most likely answer.

Question 5: C Rheumatoid Arthritis (A) is characterized by AA amyloidosis. Multiple Myeloma (B) is characterized by AL amyloidosis. Parkinsons

Disease (D) is caused by cell death in the basal ganglia of the brain. Alzheimer's Disease (C) characterized by AB amyloidosis.

Question 6: C Hemolytic Anemia (A), while is a downstream symptom of the correct answer G-6-P Dehydrogenase deficiency (C), is incorrect as there are many other causes of hemolytic anemia that are not characterized by proteins precipitating within the RBC. Sickle Cell disease (B) is characterized by the abnormal shape of the RBC's taking on the namesake sickle shape. Creutzfelt-Jakob disease (D) is caused by protein misfolding in the brain leading to neurodegeneration.