Biological Macromolecules and Bioenergetics

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1. Understand the structure and properties of amino acids and their role in protein function.
2. Analyze the different types of proteins and their classification based on structure and function.
3. Evaluate the forces stabilizing protein structure and shape, and the different levels of structural organization of proteins.
4. Recognize the structure of fibrous and globular proteins such as keratin, collagen, and hemoglobin.
5. Explain the structure, function, and properties of carbohydrates including monosaccharides, disaccharides, and polysaccharides.
6. Differentiate between homo and hetero polysaccharides, mucopolysaccharides, bacterial cell wall polysaccharides, and glycoproteins, and their biological functions.
7. Classify lipids and describe their structure and functions, including fatty acids, essential fatty acids, phospholipids, sphingolipids, glycolipids, and cholesterol.
8. Analyze the physical and chemical properties of nucleic acids, and the structure and functions of purines, pyrimidines, nucleosides, and nucleotides.
9. Explain the double helical model of DNA structure, the forces responsible for A, B, and Z DNA structures, and the processes of denaturation and renaturation of DNA.
10. Explore the folding of RNA into higher order structures, the types of RNAs (mRNA, tRNA, rRNA), and the importance of modified nucleotides in tRNA.