BB101
Prof. Sanjeeva Srivastava
Feb 09, 2024

Summary of today's session – Lecture 10 - Proteins: Basic concepts & Techniques

Dear Students,

In today's class, we discussed few fundamental concepts related to Proteins and Techniques to study proteins.

Summary:

Amino Acids: Building Blocks of Proteins

- Proteins are complex molecules made up of amino acids.
- Amino acids are linked together in a specific sequence to form polypeptide chains, which fold into functional protein structures.
- The sequence of amino acids determines the protein's structure and function.

Proteins have hierarchical levels of structure:

- Primary Structure: The linear sequence of amino acids in a protein.
- Secondary Structure: Localized folding patterns such as alpha helices and beta sheets.
- Tertiary Structure: Overall 3D folding of the entire protein molecule.
- Quaternary Structure: Arrangement of multiple protein subunits in a complex.

Techniques to Study Proteins

Chromatography:

- Gel Filtration Chromatography: Separates proteins based on size.
- Ion Exchange Chromatography: Separates proteins based on charge.
- Affinity Chromatography: Separates proteins based on specific binding interactions.

Electrophoresis:

- SDS-PAGE Gel Electrophoresis: Separates proteins based on molecular weight.

Two Dimensional Electrophoresis: Separates proteins based on both molecular weight and charge.

Sequence Alignment Techniques

- Sequence alignment is a method used to compare protein sequences.

- It helps identify similarities and differences between proteins to infer evolutionary relationships and functional similarities.
- Techniques such as BLAST (Basic Local Alignment Search Tool) are commonly used for sequence alignment.

Proteomics

- Proteomics is the study of the entire complement of proteins in an organism.
- It involves identifying and characterizing proteins, studying their abundance, modifications, interactions, and functions.
- Proteomics techniques include mass spectrometry, protein microarrays, and bioinformatics tools for data analysis.

Resource Update:

The course handout and reference materials have been updated and are accessible through the provided Google Drive link:
https://drive.google.com/drive/folders/1FgzzCom1n6WKlgheQrFLA1U8rkJuISGT

Our next lecture will discuss metabolism.

Best wishes,
Sanjeeva