

Proteomics and Genomics - Web course

COURSE OUTLINE

Introduction and scope of proteomics; Protein separation techniques: ion-exchange, size-exclusion and affinity chromatography techniques; Polyacrylamide gel electrophoresis; *Isoelectric focusing (IEF)*; Two dimensional PAGE for proteome analysis; Image analysis of 2D gels; Introduction to mass spectrometry; Strategies for protein identification;

Protein sequencing; Protein modifications and proteomics; Applications of proteome analysis to drug; Protein-protein interaction (Two hybrid interaction screening); Protein engineering; Protein chips and functional proteomics; Clinical and biomedical application of proteomics; Proteome database; Proteomics industry.

Methods of preparing genomic DNA; DNA sequence analysis methods: Sanger Dideoxy method and Fluorescence method; Gene variation and Single Nucleotide Polymorphisms (SNPs); Expressed sequenced tags (ESTs); Gene-disease association;

Recombinant DNA technology: DNA cloning basics, Polymerase chain reaction, DNA fingerprinting, Human genome project and the genetic map.

COURSE DETAIL

Module*	Topics and Contents	No. of Lectures**
1.	Introduction and scope of proteomics; Protein separation techniques: ion-exchange, size-exclusion and affinity chromatography techniques,	8
2.	Polyacrylamide gel electrophoresis; <i>Isoelectric focusing (IEF)</i> ; Two dimensional PAGE for proteome analysis; Image analysis of 2D gels	6
3.	Introduction to mass spectrometry; Strategies for protein identification; Protein sequencing; Protein modifications and proteomics; Applications of proteome analysis to drug; Protein-protein interaction (Two hybrid interaction screening)	6
4.	Protein engineering; Protein chips and functional proteomics; Clinical and biomedical application of proteomics; Proteome database; Proteomics industry.	4
5.	Methods of preparing genomic DNA; DNA sequence analysis methods: Sanger Dideoxy method and Fluorescence method	6
6.	Gene variation and Single Nucleotide Polymorphisms (SNPs); Expressed sequenced	4



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Biotechnology

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	tags (ESTs); Gene-disease association;	
7.	Recombinant DNA technology: DNA cloning basics, Polymerase chain reaction, DNA fingerprinting, Human genome project and the genetic map.	6
Total		40

* Assignment after each module; mid exam after module 3 and final exam after module 6.

** Numbers of lectures are tentatively fixed.

References:

1. Cantor and Smith, Genomics. John Wiley & Sons, 1999.
2. Introduction to Genomics - Arthur M Lesk, Oxford University Press, 2007.
3. R.M.Twyman, Principles of Proteomics, BIOS Scientific Publishers, 2004.
4. P.Michael Conn, Handbook of Proteomic Method. Humana Press, Totowa, New Jersey, USA, 2003.
5. L.Stryer, Biochemistry, W. H. Freeman and Co., New York, 2007.