

BSHND 402: PROTEOMICS AND NUTRI-GENOMICS

Learning Objectives:

At the end of this course and following completion of an appropriate amount of independent study, a student will be able to have understanding of;

- Proteomics and Nutrigenomics,
- their importance and role in management of chronic diseases.

Course Content

- Introduction to Nutritional genomics
- DNA composition, structure and functions
- Genes, genetic code and its importance
- Central dogma, Transcription
- Central dogma, Post-transcriptional modifications
- Central dogma, t RNA, structure and functions
- Central dogma, Translation mechanism
- Central dogma, Post-translational modifications
- Protein structure and functions
- Protein-protein interaction
- Protein production process through microorganisms
- Protein purification strategies
- Nutritional genomics
- Metabolomics
- Transcriptomic
- Application of proteomics
- Application of proteomics
- Transcription factors
- Nuclear receptors
- Classifications of nuclear receptors
- Mode of actions of nuclear receptors
- Carbohydrates and gene regulation
- Carbohydrates and gene regulation
- Lipids and gene regulations
- PUFA and gene regulations
- Vitamins and gene regulations
- Antioxidants and gene regulations
- Functional peptides and gene expression

- Specific nutraceuticals and gene expression
- Functional peptides and gene expression
- Role of nutrients in prevention/management of chronic diseases
- Role of nutrients in prevention/management of chronic diseases

Practical

- Genomic DNA extraction
- Genomic DNA extraction
- DNA Quantification through gel electrophoresis or nano drop
- PCR Primer designing and practice
- PCR Primer designing and practice
- PCR introduction, applications and mechanism
- PCR hands on performance
- PCR product and gel electrophoresis
- Recombinant proteins
- Introduction to NCBI & BLAST
- Hands on practice on BLAST in NCBI
- Demonstration of genetic analyzer
- Protein purification – any one technique
- Protein purification – any one technique
- Enzyme activity β -galactosidase activity
- Effect of cations on enzyme activity

Teaching-Learning Strategies:

Teaching will be a combination of class lectures, class discussions, and group work. Short videos/films will be shown on occasion.

Assignments:

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination:

Sessional Work: 25 marks

Midterm Exam: 35 marks

Final Exam: 40 marks

Recommended readings:

1. MineY, Kazuo M & Fereidoon S.(2009). Nutrigenomics and Proteomics in Health and Disease: Food factors and gene interactions. John Willey & Sons. New Jersey, USA
2. Regina B-F & Joost H-G. (2006). Nutritional Genomics: Impact on health and disease. WileyVCH, Germany

Nawin C.M. (2010). Introduction to Proteomics: Principles and Applications. John Willey & Sons. New Jersey, USA.