NOC:Human Molecular Genetics - Video course

NPTEL

http://nptel.ac.in

Biotechnology

Coordinators:

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COURSE OUTLINE

This is an introductory course designed primarily for students in the undergraduate or master's programs interested in biomedical research, genetic counseling, medicine, and clinical genetics. This course is expected introduce the rapid advancements in our understanding the role of human genome in health and disease. We would introduce key concepts of inheritance of human traits, pedigree analysis, and chromosome organization. Molecular biology tools used for understanding the genome, gene structure and gene mutations, gene mapping and gene cloning strategies will also be covered. Objectives and outcome of human genome project and the HapMap project will also be discussed at the end.

COURSE DETAIL

Week. No.	Topics
1	Fundamentals of central dogma (DNA, RNA and proteins; mutations) Chromosome structure and function (organization; structure-function relationship; chromosome abnormalities)
2	Genes in pedigree (Mendelian pedigree patterns, complications to pedigree patterns) DNA cloning and hybridization techniques (vector based cloning; nuclei acid hybridizations; PCR-based DNA analyses)
3	Mutation and instability of human DNA (mutation and polymorphism; pathogenic mutations, repeat expansions) Molecular pathology (types of mutations; animal models for human disease)
4	Identifying human disease genes (functional cloning versus positional cloning; mutation screening) Complex diseases; The Human Genome and HapMap projects

References:

1. "Human Molecular Genetics 4 Tom Strachan, Andrew P. Read Garland Science/Taylor & Francis Group, 2011