

# GENE EXPRESSION AND DISEASE

TAPAS K KUNDU

**Genome Organization:** Organization of DNA elements, Evolution of genome Organization, Nucleography, Genome architecture, rearrangements, genomic disorders. Eukaryotic genome organization into chromatin.

**Chromatin dynamics:** Chromatin modifications and remodelling, Interaction of non-histone proteins with chromatin as a factor for dynamic chromatin structure, Chromatin structure and aging (E.g. Histone variants and aging process).

**Transcriptional regulation:** In Bacteria, Viruses, and Eukaryotes, Role of chromatin structure, Transcription, and disease. Translational control: in viruses, prokaryotes, and Eukaryotes, with particular emphasis on disease and therapeutics, Host-pathogen interaction to alter the gene expression (e.g. Epigenetic modulation)

**Functional genomics and Epigenomics:** In the context of gene function and disease.

**Molecular cancer biology:** Hallmarks of Cancer, Tumour cells, genetic basis of cancer, oncogene, a tumor suppressor and cancer manifestation, Epigenetic regulation of Cancer (histone modifications, DNA methylation, and non-coding RNA) and Cancer stem cells, DNA repair and cancer, chromatin and cancer, Epigenetic cancer therapeutics.

**Epigenetic Regulations of neurological disorders:** Neurodevelopmental disorders (Autism) and neurogenerative Disorders (Alzheimer's, Huntington's, and Parkinson's disease) with special emphasis on underline epigenetic mechanisms.