

Department of Biochemistry and Molecular Medicine

Mission Statement

Departmental faculty use cutting-edge technologies and novel experimental systems to define the mechanistic aspects of cancer initiation or progression and/or to develop target-specific inhibitors that can reverse the pathogenic symptoms of cancer or other human diseases.

AN, Woojin

Research Focus

- Regulation of chromatin structure and function
- Histone modifications and histone tail proteolysis
- Development of inhibitors targeting epigenetic factors

Technologies/Model Systems

- In vitro transcription, modification, and binding assays
- Cancer cell and xenograft models

BELL, Oliver

Research Focus

- Epigenetic regulation of cell fate decisions
- Mechanisms of epigenetic gene silencing
- Development of small molecule antagonists targeting epigenetic modifiers

Technologies/Model Systems

- Epigenomics and Proteomics
- In vivo assays recapitulating epigenetic silencing in mouse embryonic stem cells
- Mouse and human embryonic stem cell and neuronal differentiation
- Cancer cells

FARNHAM, Peggy

Research Focus

- Oncogenic transcription factors
- Transcriptional genomics

Technologies/Model Systems

- Epigenomics and Proteomics (ChIP-seq, RNA-seq, WBGS, TurboID, CRISPR)
- Cancer cells

HACIA, Joe

Research Focus

- Genetics of rare diseases
- Targeted therapies for peroxisome biogenesis disorders

Technologies/Model Systems

- Drug screening and gene therapy
- Induced pluripotent stem cells

LEE, Amy

Research Focus

- Mammalian stress response
- Cancer

Technologies/Model Systems

- Cancer models (mouse models, patient-derived xenografts, organoids)
- Therapeutic targeting of GRP78

LIU, Yifan**Research Focus**

- Epigenetic regulation of transcription and replication
- DNA methylation

Technologies/Model Systems

- Leukemia
- 3rd generation sequencing

PATEL, Pragna**Research Focus**

- Genetic basis of & therapeutic strategies for neurological, craniofacial and developmental disorders
- Population genetics of Asian Indian populations
- Educational research on effective graduate education strategies

Technologies/Model Systems

- Small molecule screening to identify therapeutic compounds
- Proximity-labeling with biotinylation, followed by mass spec (BioID2)

REDDY, Sita**Research Focus**

- RNA biology and biochemistry of RNA binding proteins
- Myotonic dystrophy and Werner syndrome

Technologies/Model Systems

- Small molecule screening and efficacy assessment
- Transgenic mice

RHIE, Suhm**Research Focus**

- Non-coding genetic variants and regulatory elements
- 3D chromatin interactions and transcriptional regulation networks

Technologies/Model Systems

- Next generation sequencing technologies to study genomics, epigenomics, and transcriptomics (e.g. DNA-seq, ChIP-seq, RNA-seq, NOMe-seq, Whole Genome Bisulfite Sequencing, Micro-C, CRISPR)
- Human tissues and cancer cells

RICE, Judd**Research Focus**

- Chromatin modifications that regulate DNA repair and transcription pathways
- Histone tail proteolysis in human development and disease

Technologies/Model Systems

- Screening and application of small molecule inhibitors of chromatin modifiers
- Investigation of genomic sites targeted for histone tail proteolysis using ChIPac

WEISENBERGER, Dan**Research Focus**

- DNA methylation alterations in human cancers
- Clinically-relevant cancer patient subgroups based on DNA methylation profiles

Technologies/Model Systems

- DNA methylation microarrays and bisulfite sequencing
- Fresh frozen, FFPE and cell free DNAs from primary biological fluids