RNA BIOLOGY

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PRE-REQUISITES : Minimum qualification is bachelors in Science. Post graduation in Science is desirable

INTENDED AUDIENCE : Graduates, Post graduates and PhD students

INDUSTRY SUPPORT : Biotechnology and pharma industry

COURSE OUTLINE :

The origin of life on earth is believed to be started from RNA. The RNA remains one of the most studied, yet enigmatic molecules of biology. RNA can form complex structures with enzymatic activity that can be even engineered, known as ribozymes. Several medical applications also have emerged based on RNA biology. RNA biology is strongly linked with chromatin dynamics and gene expression in a cell, which is the fundamental basis of life.

ABOUT INSTRUCTOR :

Prof. Rajesh Ramachandran is working as Associate professor at IISER Mohali since 2012. He did his Ph.D from CCMB Hyderabad followed by postdoctoral training on regeneration biology at University of Michigan, USA. His lab is currently working on various aspects of tissue regeneration in Zebrafish and Axolotl models, with special reference to retina, fin and limbs. His lab uses different pharmacological, genetic, epigenetic, cellular and molecular tools to understand various aspects of tissue regeneration. His lab studies the importance of microRNAs, mRNAs and long non-coding RNAs during zebrafish retina regeneration. His lab has published several research articled and reviews that are widely cited in the regeneration biology field.

COURSE PLAN :

Week 1: Introduction to RNA Biology and RNA world (Lectures 1-6)

Week 2: RNA as enzymes: The Ribozymes (Lectures 7-9)

Week 3: RNA Transcription (Lectures 10-14)

Week 4: RNA Processing and Life cycle (Lectures 15-17)

Week 5: Alternative RNA processing and editing (Lectures 18-23)

Week 6: RNA splicing, export and stability (Lectures 24-27)

Week 7: snRNA, rRNA, miRNA, siRNA processing, export and function (Lectures 28-33)

Week 8: Mechanisms of RNA decay and Non coding RNAs (lectures 34-39)

Week 9: Dosage compensation and X-inactivation (Lectures 40-44)

Week 10: Dosage compensation, Xist and ncRNA in imprinting (lectures 45-51)

Week 11: Telomere, telomerase and impact on genomes (lectures 52-57)

Week 12: Epitranscriptome and protein synthesis (Lectures 58-62)