

SEMESTER I
LSM4245 ADVANCED EPIGENETICS AND CHROMATIN BIOLOGY

Prerequisite: LSM1102 Molecular Genetics and LSM2102 Molecular Biology

Workload: 26 lecture hours + 16 tutorial hours

The aim of this module is to introduce concepts and molecular mechanism of epigenetics. Students will learn the historic discoveries of epigenetic research, DNA methylation, post-translational histone modifications, non-coding RNAs, chromatin remodeling and epigenetic reprogramming. The module will focus on the role of epigenetic modifications in biological functions. The clinical applications of epigenetics will also be discussed.

S/N	Topics	Lecture hours
1	Introduction of epigenetics History, concepts and methods	2 Sudhakar Jha
2	DNA methylation DNA methylation pattern, DNA methyltransferases, DNA methylation in Cancer and development	4 Sudhakar Jha
3	Histone modifications Histone methylation, histone acetylation, histone phosphorylation and other histone modifications	4 Chen Ee Sin
4	Chromatin remodeling Mechanism of ATP-dependent chromatin remodeling, remodeling complexes, functions of chromatin remodeling	4 Sudhakar Jha
5	Non-coding RNAs RNAi, Micro RNA and long non-coding RNA (LncRNA)	4 Yvonne Tay
6	Cancer epigenetics Epigenetic mechanisms in cancer	4 Sudhakar Jha
7	Epigenetic reprogramming Topics including nuclear transplantation, cloning, and induced pluripotent stem (iPS) cells will be covered.	2 Wee Wei Tee
8	Epigenetic technologies in prognosis and diagnosis	2 Karthik Mallilankaraman
Total Lectures: 26 h		
Tutorials: 16 h		
Total hours: 42 h		

TEXT BOOK (Recommended text):

1. Epigenetics. Edited by CD Allis, T Jenuwein and D Reinberg (2007). Cold Spring Harbour Laboratory Press.
2. Epigenetics. Edited by Jorg Tost (2008). Caister Academic Press.

MODE OF ASSESSMENT:

1. CA Tests – 20%
2. Essay (Term Paper) – 20%
3. Final Examination – 60%

MODULE CO-ORDINATOR:

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LECTURERS:

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