

Epigenetics and Gene Regulation

Semester No 7-8	Code BI- 426	Credit Hours 3+1
------------------------	---------------------	-------------------------

Course description:

Epigenetic processes, including DNA methylation, histone modification and various RNA-mediated processes, are thought to influence gene expression chiefly at the level of transcription; however, other steps in the process (for example, translation) may also be regulated epigenetically. The following course will outline the role epigenetics in influencing gene expressions.

Recommended Books:

1. *Turner BM. Chromatin and gene regulation: molecular mechanisms in epigenetics. John Wiley and Sons; 2008 Apr 15.*
2. *Mandal SS, editor. Gene Regulation, Epigenetics and Hormone Signaling. John Wiley & Sons; 2017 Oct 23.*

Prerequisite:

1. Essential of Genetics

Course Learning Outcomes:

After completing this course, students will understand epigenetics and its importance in gene regulation and disease. The students will acquire global theoretical and practical concepts around analysis of DNA methylation and histone modifications.

Assessment system:

Quizzes	10-15%
Assignments	5-10%
MSE	30-40%
ESE	40-50%

Week wise Lecture Plan:

Wee k	Lecture Topic	Quizzes	Assign ments
1	Epigenetics and gene expression		
2	DNA methylation and epigenetic regulation of gene expression		1
3	DNA methyltransferases (DNMTs)	1	
4	DNA methylation and methyl-binding proteins		2
5	Histones and epigenetic regulation of gene expression	2	
6	Epigenetics and gene expression		3
7	Histone modifications and gene expression		
8	RNA-based mechanisms and epigenetic regulation of gene expression		
9	MIDTERMS		
10	Small non-coding RNAs		
11	Long non-coding RNAs	3	
12	Long-Term Silencing of Gene Expression		
13	Heterochromatin		4
14	Chromatin Remodelling Machines	4	
15			
16	Interaction of lncRNAs with chromatin-modifying complexes		
17			
18	END SEMESTER EXAMINATION		