FIRST SEMESTER 2016-2017

Course Handout

Date: 02/08/2016

Course Number: PHA G645
Course title: Molecular Pharmacology
Instructor In-charge: Dr. Gaikwad Anil Bhanudas

1. Course description: Molecular pharmacology deals with understanding the molecular basis for the actions of drugs and the characteristics of interactions between drug molecules and those of the substrates of drug action in the cell. Course will include chemical, molecular biological and all biochemical and cell biological techniques to understand how cells respond to pharmacologic agents.

2. Scope and objectives of the course:

a) To impart advance knowledge about the epigenetic changes involved in the disease development..
b) To give advanced knowledge regarding the molecular mechanisms involved in the drug action.

3. Text Book

1. Hardman J. G., Limbird L. E. 2011. "Goodman and Gilman's The Pharmacological Basis of Therapeutics" 12th Ed.McGraw-Hill Professional.
2. Textbook of Receptor Pharmacology Foreman John C, Johansen Torben, Boca Raton, CRC Press.
3. Epigenetics. Allis, Jenuwein, Reinberg and Caparros. Cold Spring Harbour Laboratory Press. ISBN-13: 978-0879697242 Edition: 1

4. Reference Book

1. H. P. Rang and M. M. Dale, "Pharmacology" 5th Ed. Churchill Livingstone.
2. B. G. Katzung, "Basic and Clinical Pharmacology" 9th Ed. McGraw-Hill Medical.
3. Harvey R. A, Champe P. C., "Pharmacology-Lippincott's illustrated Reviews" 4th Ed. Lippincott
4. Lodish H, Baltimore D, Berk A, Zipursky SL, Matsundaira P and Darnell J. Molecular Cell Biology. WH Freeman & Company, New York. Latest Edition.
5. Brown TA. Gene Cloning and DNA Analysis. Blackwell Science, USA. Latest Edition.
6. Alberts B, Bray D, Lewis J, Raff M, Roberts K and Watsaon JD, (Eds.) Molecular Biology of the Cell. Garland Publishers, New York. Latest Edition.
7. Muller RF and Youngh ID, (Eds.) Emmery's Elements of Medical Genetics. Churchill Livingstone, New York. Latest Edition.

5. Additional reading:

- Emerging trends and updates have to be obtained from selected journals , it is mandatory to refer the journals and reviews .
- Students must go through the following journals regularly for current research in areas mentioned in the syllabus.

a. Epigenetic
b. Nature Medicine
c. Nature
d. Cell
e. Science
f. Nature Reviews
g. Cancer Letters
h. Diabetes
i. Diabetes Care

6. Course Plan:

Lectures	Topics
1-5	**Introduction to Molecular Biology and Molecular Genetics** DNA and genome, basic double helix structure, flow of genetic information, molecular basis of transcription and protein synthesis.
5-10	**Molecular mechanism of drug action** Receptor occupancy and cellular signaling systems such as G-proteins, cyclic nucleotides, calcium and phosphatidyl inositol. Ionic channels and their modulators.
10-20	**Endogenous bioactive molecules** such as cytokines, neuropeptides and their modulators, neurosteroids, nitric oxide, phosphodiestrase enzyme and protein kinase C, arachidonic acid metabolites, COX-2 regulators and their role in inflammation, endothelium derived vascular substances (NO, endothelins) and their modulators. Pharmacology of atrial peptides, reactive oxygen intermediates, antioxidants and their therapeutic implications.
20-23	**Introduction to Epigenetics** Epigenetic modifications and their function in regulating gene expression, DNA methylation, covalent histone modifications, histone variants, chromatin structure
23-35	**Epigenetic deregulation in diseases.** Diabetes: Definition, Genetics and Pathogenesis Oxidative stress in diabetes and its markers, different pathways of oxidative stress in diabetic complications. Cancer Definition, Genetics and Pathogenesis. Metabolic disorders, Free radicals in neurological and neurodegenerative diseases: Free radical scavengers in the treatment of brain injury.
35-37	**Apoptosis: pharmacological and clinical implications**
37-39	**Concept of gene therapy** and recent development in the treatment of various hereditary diseases.

7. Evaluation Scheme:

No.	Evaluation Component	Duration	Weight-age (%)	Date and Time	Nature of Component
1	Mid semester Exam	90 min	30	3/10 4:00 - 5:30 PM	CB
2	Continuous Assessment*		40		
5	Comprehensive Exam	180 min	30	2/12 AN	CB

*Continuous assessment will be based on theory covered in class. Topics and number will be announced in the class. It will be in terms of home assignments, tutorials, projects, laboratory, viva- voce and presentation/ seminars.

Attendance: Although attendance is not compulsory, regularity in theory classes will be decisive factor during grading, especially in borderline cases.

Chamber Consultation Hour: To be announced in the class.

Make-up policy: Generally make-up will be considered for regular students only (80% attendance in lecture classes). It is solely dependent on the "genuineness" of the circumstances. The make-up application should be personally given to instructor-in-charge.

Notices: Concerning this course will be displayed on Pharmacy Group notice board only.

Instructor In charge
PHA G645