MANIPAL UNIVERSITY JAIPUR

School of Basic Sciences

Department of Biosciences
Course Hand-out

Cell Biology: Structure and Dynamics | BT 1107 | 4 Credits | 3 1 0 4

Session: 2018-2019| Faculty: Dr. Mousumi Debnath | Class: I year

A. Course Outcomes: At the end of the course, students will be able to:

[BT 1107 .1]. Recall structure and function of prokaryotic and eukaryotic cells (both plant and animal cells).

[BT 1107 .2]. Understand an overview of cell cycle comprising G1, S, G2 and M phases; division of cells in both somatic and germ cells in both plant and animal cells.

[BT 1107 .3]. Understand ultra- and fine-structure of difference cell organelles such as mitochondria, nucleus, golgi apparatus etc.

[BT 1107 .4]. Differentiate and relate the role of each and every cell organelle of the cell and their role in enabling cell performing necessary cellular responsibilities such as cell division, metabolism etc.

[BT 1107 .5]. Appraise different cell signalling pathways and how the pathways transmit signals from environmental response to gene expression to maintain cellular homeostasis.

[BT 1107 .6]. Investigate the mechanisms by which different cellular insults make cells become diseased which finally led to illness or death.

[BT 1107 .7]. Investigate recent advancements cell biology research and technologies that has enabled us understanding the structure and function of the cell with deep understanding and increase employability skills

B. SYLLABUS

History and introduction of cell, cell theory, **eukaryotic and prokaryotic cells**, different models of cell membrane and structure of cell wall, **active & passive transport**. **Cell organelles**: Endoplasmic reticulum, Golgi complex, Mitochondria, Chloroplasts, Ribosome, Liposome, Peroxisomes, Nucleus, lysosomes, Vacuole, Cytosol and **Cytoskeleton** (Microtubules, Microfilaments and Intermediate filaments). **Discovery, morphology and structural organization of chromosome**- chemical composition and karyotype, special types of chromosome: salivary gland and lamp brush chromosomes. **Cell Division**: mitosis & meiosis, cell cycle. **Cell signalling**: Hormones and their receptors, cell surface receptor, signalling through G-protein coupled receptors, signal transduction pathways. **Cellular communication**: cell adhesion and roles of different adhesion molecules, gap junctions, **extracellular matrix**, integrins. **Cell Senescence and Programmed Cell Death (PCD)**.

C. TEXT BOOKS

1. *Rastogi. S.C. Cell Biology, Tata Mc Graw Hill Pub. Co. New Delhi, 2010.*
2. *Gupta. P. K. A Text Book of Cell and Molecular Biology, Rastogi Publications, Merrut, 2012.*

D. REFERENCE BOOKS

1. *Alberts B., Bray D., Lewis J., Raff M. and Watson J.D.. Molecular Biology of the Cell, Garland Publishing Inc. New York, 2008.*
2. *Robertis D., Cell and Molecular Biology, Waverly International, New York, 2011.*
3. *Lodish H., Berk A. , Zipursky S.L. , Matsudiara P., Baltimore D., and Darnell J., Molecular Cell Biology, WH Freeman & Co., New York, 2013.*

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