
IV Year B.Tech. Biotechnology I - Semester	L	T	P	To	C
	4	-	-	4	4

BT 417 CANCER BIOLOGY (ELECTIVE-IV)

Course Description & Objectives:

To acquaint students with the biological principles of cancer as well as the human dimensions of the disease and its therapies. To introduce the students to important and current concepts in Cancer Biology and Cancer Genetics and the lectures are organized into broad thematic groups dealing with Cell - Autonomous Mechanisms, Non Cell-Autonomous Mechanisms Organ Systems and Therapeutic Approaches.

Course Outcomes

Student acquires knowledge on

1. Causes of cancer at molecular level like cell cycle regulation and mutations
2. Different forms of cancer, diet and cancer
3. Physical and chemical carcinogenesis
4. Molecular cell biology of cancer like signal targets of cancer, oncogenes, tumor suppressor genes, growth factors and receptors etc.,
5. Invasion and metastasis of cancer

UNIT- I : Fundamentals of Cancer Biology :

Regulation of cell cycle, mutations that cause changes in signal molecules, effects on receptor, signal switches, tumour suppressor genes, modulation of cell cycle in cancer, different forms of cancers, diet and cancer.

UNIT- II : Principles of Carcinogenesis :

Natural History of carcinogenesis, Theory of carcinogenesis, Chemical carcinogenesis, targets of chemical carcinogenesis. metabolism of carcinogenesis. principles of physical carcinogenesis, x-ray radiation-mechanisms of radiation carcinogenesis.

UNIT- III : Principles of Molecular Cell Biology of Cancer :

Signal targets and cancer, activation of kinases; Oncogenes, identification of oncogenes, retroviruses and oncogenes, detection of oncogenes. Oncogenes / proto oncogene activity. Growth Factor and Growth Factor receptors that are Oncogenes. Growth factors related to transformation.

UNIT-IV : Principles of Cancer Metastasis :

Clinical significances of invasion, heterogeneity of metastatic phenotype, metastatic cascade, Basement membrane disruption three - step theory of invasion, proteinases and tumour cell invasion

UNIT-V : Detection & Cancer Therapy :

Cancer screening, early and advanced detection, Detection using biochemical assays, tumor markers, molecular tools for early diagnosis of cancer. Different forms of therapy, chemotherapy, radiation therapy, Use of signal targets towards therapy of cancer; Gene therapy. Immuno therapy: advantages and limitations.

TEXT BOOKS:

1. Maly B.W.J -"Virology A Practical Approach", IRLI Press, Oxford, 1987.
2. Dunmock N.J And Primrose S.B. - "Introduction to Modern Virology", Blackwell Scientific Publications, Oxford, 1988.

REFERENCE BOOKS:

1. Margaret A Knowlies, Peter J Selby - Introduction to the Cellular & Molecular Biology of Cancer, Oxford, 4th Edition, 2005.
2. Raymond W. Ruddon - Cancer Biology, Wiley Publications, 4th Edition, 2007.
3. Robert T.A. Weinburg - The Biology of Cancer, Garland Science, First Edition, 2007.

