

(BT546) CANCER BIOLOGY AND THERAPY

Objectives of the Course :

1. To acquaint students with the biological principles of cancer as well as the human dimensions of the disease and its therapies.
2. To introduce the students to important and current concepts in Cancer Biology and Cancer Genetics and the lectures are organized into 4 broad thematic groups:
 - a) Cell-Autonomous Mechanisms (e.g., tumor suppressor and oncogene function, DNA repair pathways, senescence, apoptosis),
 - b) Non Cell-Autonomous Mechanisms (e.g., tumor microenvironment, hypoxia, angiogenesis).
 - c) Organ Systems (e.g., pancreatic cancer, hematopoietic malignancies)
 - d) Therapeutic Approaches.

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. Cancer screening and early detection, Detection using biochemical assays, tumor markers, molecular tools for early diagnosis of cancer.

UNIT II : Principles of Carcinogenesis:

Theory of carcinogenesis, 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 factors related to transformation. Telomerases.

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 : New Molecules for Cancer Therapy :

Different forms of therapy, chemotherapy, radiation therapy, detection of cancers, prediction of aggressiveness of cancer, advances in cancer detection. Use of signal targets towards therapy of cancer; Gene therapy.

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.