

Swami Rama Himalayan University

Ph.D. Syllabus for Entrance Examination

Cancer Biology

UNIT – I

Introduction, growth characteristics of cancer cells; Morphological and ultrastructural properties of cancer cells. Types of growth: hyperplasia, dysplasia, anaplasia and neoplasia. Nomenclature of neoplasms. Differences between benign and malignant tumors. Epidemiology of cancer, common cancer worldwide, India.

UNIT –II

Cancer biology and biochemistry-Biological basis of cancer/Molecular biology of cancer Aberrant metabolism during cancer development; Tumor markers; cellular proto-oncogenes- oncogene activation. Growth factors-EGF, TNF- and TGF- and growth factor receptors. Signal transduction in cancer. Role of transcription factors.

UNIT -III

Etiology/Carcinogens: Oncogenic Viruses, Physical factors, Chemical Factors, Dietary Factors, Life Style, carcinogenesis- Initiation, promotion and progression. Free radicals, antioxidants in cancer; Hormone mediated carcinogenesis in humans.

UNIT – IV

Cell Cycle Regulation-Tumor suppressor genes p53, p21, Rb, BRACA1 and BRACA2. Telomeres, Telomerase, and Immortality; cell- cell interactions, cell adhesion-invasion And metastasis - VEGF signaling, angiogenesis; Apoptosis in cancer-Cell death by apoptosis, role of caspases; Death signaling pathways: mitochondrial and death receptor pathways.

UNIT V

Cancer Control strategies: Primary prevention, Early Diagnosis, Common Symptom, Prediction of aggressiveness of Cancer, Cancer treatment Modalities: Palliative care, pain control, end of life care, Different forms of therapy: advantages and limitations. Common anticancer drugs, Psychosocial issues in cancer care.