**Course: Advance Bio Informatics**

**Module Title: Cell Cycle and Cancer**

**Module No: 155**

**Cell Cycle and Cancer**

* Cancer is a cell cycle disease in which all regulatory controls go haywire. It allowing the tumor cells to divide in an unstrained manner.

**Perturbation of Checkpoint Controls**

* Several oncoviruses and oncogenes disrupt the regulatory controls for the entry of the cell from G1to S phase.
* Several DNA viruses produce oncoproteins which target the Rb transcription repressor gene to induce aberrant growth of cells.

Cancer is a genetic disorder in which the normal control of cell growth is lost. Cancer genetics is now one of the fastest expanding medical specialties. At the molecular level, cancer is caused by mutation(s) in DNA, which result in aberrant cell proliferation. Most of these mutations are acquired and occur in somatic cells. However, some people inherit mutation(s) in the germline. The mutation(s) occur in two classes of cellular genes: oncogenes and tumor suppressor genes.

Transformation of proto-oncogene to oncogene is the result of gain in function through:

* Over-expression of the gene, or duplication (such as amplification) to produce increased onco-protein
* Activation or formation of fusion gene by translocation
* Alteration of the gene product to produce transforming proteins