CARCINOGENESIS:

- Cancer results from genetic alterations in genes that control cell proliferation, differentiation, apoptosis.
- They target 3 regulatory genes: proto oncogenes, tumor suppressor genes and apoptosis regulator genes.
- Tumor results from clonal expansion of single progenitor cell (monoclonal)

PHENOTYPICAL FEATURES OF NEOPLASMS:

- 1. Excessive growth (self sufficiency in growth signal, insensitivity to growth inhibitory signals, evade apoptosis, limitless replication potential, sustained angiogenesis)
- Local invasion
- 3. Metastasis
- 4. Tumor progression (acquire greater malignant potential over time leading to accelerated growth, invasiveness and ability to spread. These phenotypes differ for each cell subpopulation. The tumor begins as monoclonal population, but by the time it's clinically evident, the cells are heterogenous. Genetically they are subclones with different characteristics.)

EFFECT OF NEOPLASM ON THE HOST:

- Obstruction – bronchial > bacterial pneumonia, biliary duct > jaundice, urinary tract > UTI, hydronephrosis
- Pressure effect – compress large veins, increase intracranial pressure, spinal cord compression
- Hormonal effects - by endocrine neoplasms. Secrete hormones like ACTH, PTH, insulin, oestrogen and androgens.
- High levels of blood proteins - eg. Immunoglobulins, leading to renal impairment, hyperviscosity syndrome, coagulation defects.
- Blood loss
- Paraneoplastic syndrome
- Cachexia: weight loss, anorexia and anemia due to hypermetabolic state.
- Enzyme production eg. Alkaline phosphatase
- Oncofetal antigen expression: CEA, a-fetoprotein. These can serve as tumor markers