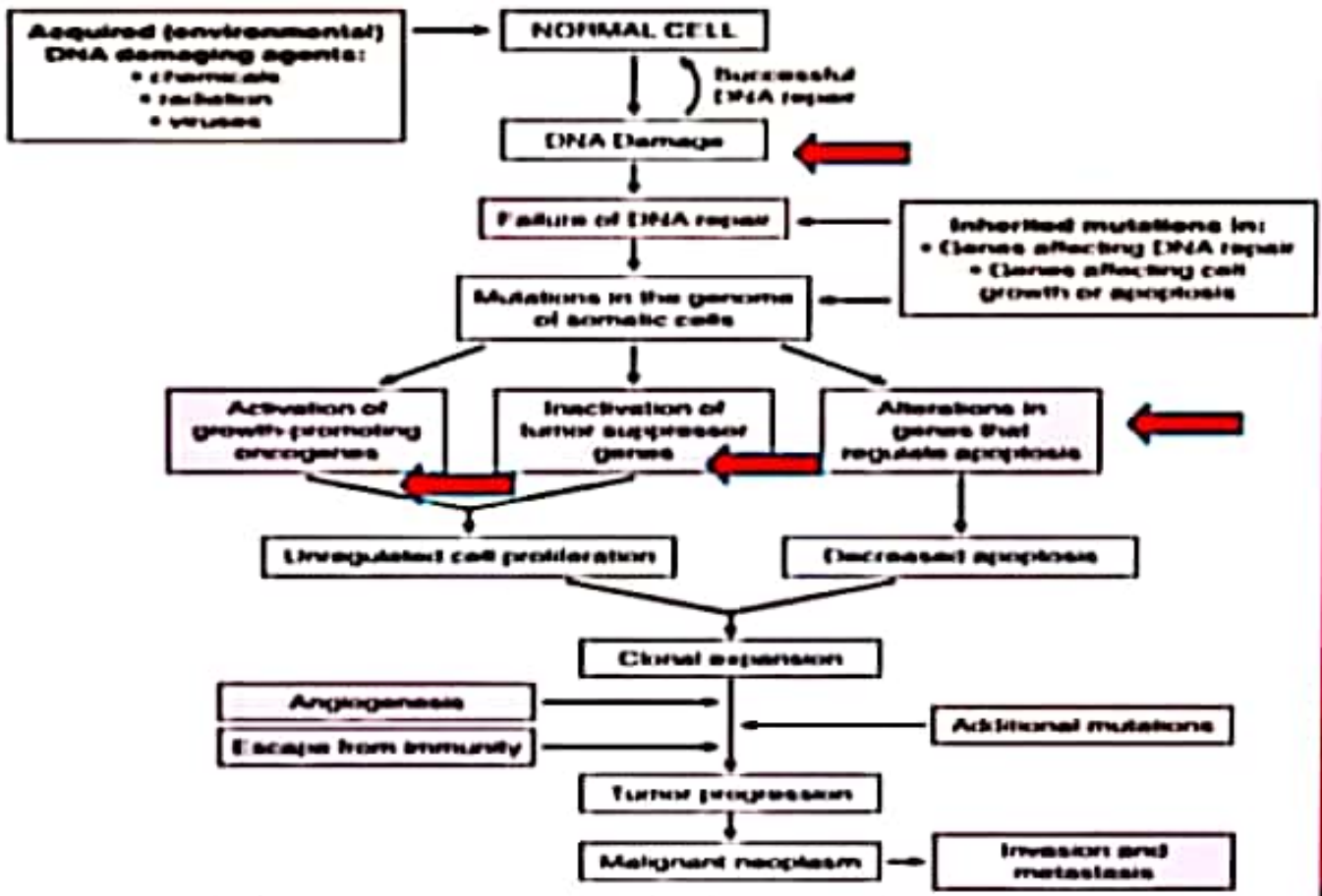


## **Molecular Basis of Carcinogenesis:-**

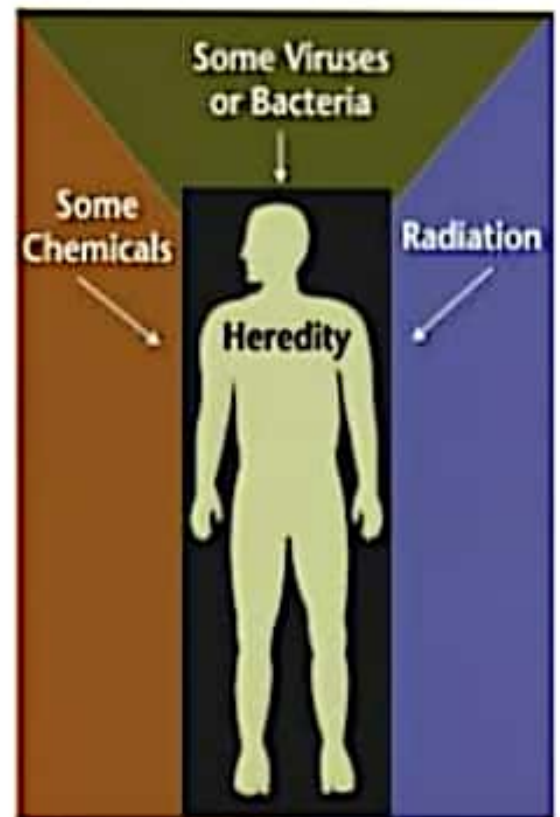
- ▶ Genes control cell division by cytokines.
- ▶ Four important classes of regulatory genes (for cell division):
  1. Promoters - Proto-oncogenes
  2. Inhibitors - Tumor or Cancer-suppressor genes - p53
  3. Genes regulating Apoptosis.
  4. DNA repair genes.



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# *What causes Cancer?*

- Cancer is caused by alterations or mutations in the genetic code
- Can be induced in somatic cells by:
  - Carcinogenic chemicals
  - Radiation
  - Some viruses
- Heredity - 5%



- ***What is the molecular basis of cancer?***
- Cancer is a genetic disease.
  - Mutations in genes result in altered proteins
    - During cell division
    - External agents
    - Random event
  - Most cancers result from mutations in somatic cells
  - Some cancers are caused by mutations in germline cells

## • ***Theories of cancer genesis***

### Standard Dogma

- Proto-oncogenes (Ras – melanoma)
- Tumor suppressor genes (p53 – various cancers)

### Modified Dogma

- Mutation in a DNA repair gene leads to the accumulation of unrepaired mutations (xeroderma pigmentosum)

### Early-Instability Theory

- Master genes required for adequate cell reproduction are disabled, resulting in aneuploidy (Philadelphia chromosome)