Wondershare EdrawMind

oncoviruses

- Cell growth is regulated by
  - Proto-oncogenes (cellular oncogene, c-onc)
    - codes
      - Growth factors
      - Receptors
      - Signal transduction proteins.
  - Tumor Suppressor Genes (Gatekeepers and Caretakers)
    - functions
      - inhibiting cell growth,
      - fixing broken DNA,
      - or causing a cell to die.
    - Examples: P53, Rb
- history
  - Oluf Bang and Vilhelm Ellerman who showed that avian erythroblastosis (a form of chicken leukemia) which is caused by avian erythroblastosis virus could be transmitted by cell-free extracts.
  - later confirmed for solid tumors in chickens in 1910-1911 by Peyton Rous.
- human oncovirus replication strategy
  - Create Conditions for replication:
    - Metabolic reprogramming.
    - Inducing angiogenesis.
  - Maximize virus production:
    - Prevent apoptosis until virion matures.
    - Immune evasion.
  - Multiply latent proviruses:
    - Cell survival.
    - Cell immortalization.
- mechanism
  - direct acting
    - insertional mutagenesis
      - integration deregulates expression of cellular oncogenes or tumor suppressor genes
    - Through the expression of its own oncogenes without the need to integrate (Ex, EBV).
  - indirect acting
    - triggering chronic inflammation and oxidative stress
      - HBV and HCV; chronic inflammation produced by persistent infection is a major risk to develop hepatocellular carcinoma (HCC).
    - by producing immunosuppression
      - HIV ; patients with low T cell counts frequently develop lymphomas associated with EBV or KSV infection
    - both mechanism
      - HBV and HCV
- DNA viruses
  - Human papilloma virus (HPV):
    - Causes transformation in cells through interfering with tumor suppressor proteins such as p53.
    - cause cervical cancer
  - Kaposi's sarcoma-associated herpesvirus (KSHV or HHV-8):
    - is associated with Kaposi's sarcoma, a type of skin cancer
  - Epstein-Barr virus (EBV or HHV-4):
    - is a herpes virus that's spread through saliva
    - increases the risk of Burkitt lymphoma, some types of Hodgkin's and non-Hodgkin's lymphoma and stomach cancer.
  - Human cytomegalovirus (CMV or HHV-5)
    - is associated with mucoepidermoid carcinoma and possibly other malignancies.
- Human T-cell leukemia virus I (HTLV-I),: Some T-cell leukemia.