| Vaccinations & Diseases it Prevents | | | |
|---|---|---|---|
| **SR** | **Vaccination** | **Disease** | **Age-group** |
| **1** | DPT | Diphtheria, tetanus, Pertussis | 2-4 months |
| **2** | OPV (Oral polio Vaccine) | Polio | 2 months to 10 years |
| **3** | BCG (Bacille Calmette-Guerin) | Tuberculosis | 2-4 months |
| **4** | Hepatitis B | Hepatitis B | Birth-18 months |
| **5** | MMR | Measles , Mumps, Rubella | 12 month-6 years |
| **6** | IIV | influenza | 6-months |
| **7** | Hib | Haemophilus influenza type-B | 2-5 months |
| **8** | TT | Tetanus Toxoid | 14-16 years |
| **9** | VAR (Varicella) | Chickenpox | 12-18 months |

**AIDS (Acquired Immuno Deficiency Syndrome)** was first reported in 1981 in USA.

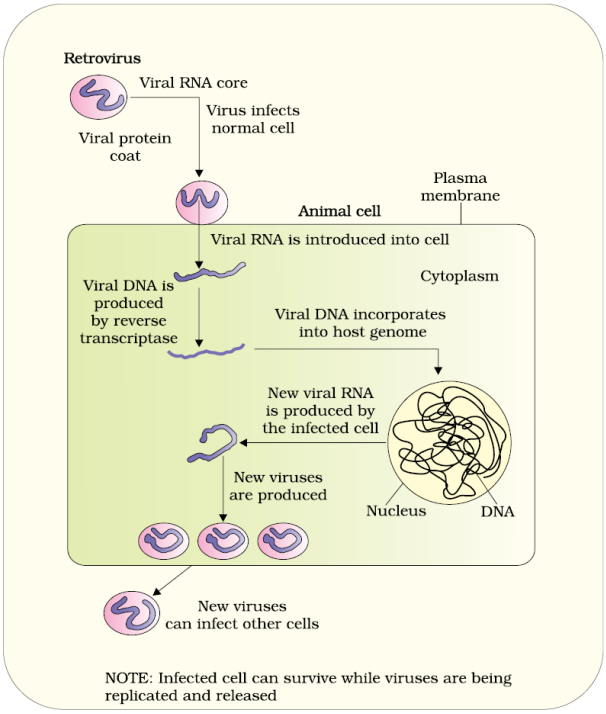
(i) Killed 25 million people all over the world in 25 years.
(ii) Caused by Human Immunodeficiency Virus (HIV) that belongs to the group of viruses called retrovirus (RNA virus).

**Que: How is HIV transmitted from one person to another?**

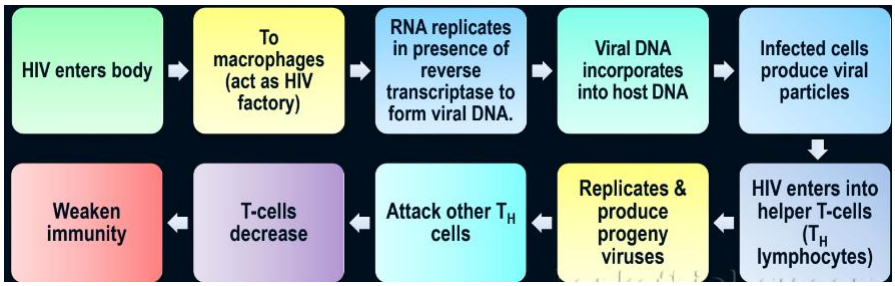
(a) Sexual contact with infected person.
(b) Transfusion of contaminated blood and blood products.
(c) Sharing infected needles (by drugs abusers)
(d) Infected mother to unborn child through placenta.

**Que: Which category of people are susceptible to HIV infection ?**

(a) Drug addicts, who take intravenous drug injections.
(b) Individuals who are involved with multiple sexual partners.
(c) Individuals who require repeated blood transfusion.
(d) Children born to HIV positive mother.




**Modes of HIV infection:**




- As a result, person cannot produce any immune response even against common bacteria like Mycobacterium, , viruses, fungi and parasite like *Toxoplasma* (causes infection -muscle pain, fever and headache for weeks).
- **ELISA (Enzyme Linked Immuno Sorbent Assay)** is a widely used diagnostic test for AIDS.
- Treatment with **anti-retroviral drugs** is only partially effective.

**Que: What are the preventive measures for HIV infection?**

**Ans:** AIDs have no cure, so prevention is the best option:
(a) National AIDS Control Organisation (NACO) set-up in 1991 and other NGOs educate people about AIDS.
(b) Role of WHO to prevent HIV infection:
* Ensure use of disposable syringes and needles.
* Ensure keeping blood banks safe from HIV.
* Free distribution of condoms.
* Prevention of drug abuse.
* Discouraging unsafe sex and encouraging regular HIV check-up.

**Que: What do you understand by the statement 'Don't die of ignorance'?**

**Ans**: Don't Die of Ignorance was a 1987 public health campaign by the British government in response to the rise of HIV/AIDS in the United Kingdom. The government believed that millions of people could become infected and a leaflet was sent to every home in the UK so that people take proper precautions against HIV/AIDs.

**Cancer** – Abnormal or uncontrolled growth of cells result in formation of tumor (masses of cells)

(i) Most dreaded disease responsible for death all over the world (over 1 million in India).

| | Normal Cell | Cancerous Cell |
|---|---|---|
| **Contact Inhibition (Contact with other cell inhibit the cell Growth)** | **Positive** | **Negative** |
| **Invasiveness (Direct extension & penetration by cancer cells into neighbouring tissue)** | **Negative** | **Positive** |
| **Mortality** | **Mortal** | **Immortal** |
| **Telomerase Enzyme** | **Decrease after 50th generation leads to Apoptosis (Cell Death)** | **Telomerase Enzyme is active cell divides infinitely** |

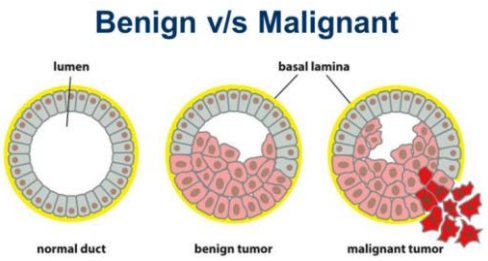
(ii) In our body, cell growth and differentiation is highly controlled and regulated by the following genes but **mutation in these genes** leads to uncontrolled growth and formation of cancerous cell.

| Proto Oncogene (Normal Function) | Tumor Suppressor Gene |
|---|---|
| • Regulate Cell Growth<br>• Control Metabolism | • Check cell division. Eg: P53 (G1- checkpoint)<br>• Check Apoptosis (Tell cells to die at the right time) |

**(iii) Angiogenesis property of Tumor-** Formation of blood vessels to transport nutrients & $O_2$ towards cancer cells.

**(iv)Types of Tumor:**

| Benign Tumor | Malignant Tumor |
|---|---|
| • They are enclosed in connective tissue (capsulated) hence confined to place of its origin.<br>• May grow in size but do not spread to other parts.<br>• Cause little damage but can cause pain if presses a vital organ.<br>• Can become a malignant tumor if its covering connective tissue is broken. | • They are not enclosed by any connective tissue.<br>• Mass of proliferating cells (**neoplastic** or tumor cells) grow rapidly, invade and damage surrounding tissue.<br>• Due to active division & growth they starve normal cell by competing for nutrients<br>• **Metastasis -** Cell sloughed from tumor reach the other sites via blood where they form new tumor. |




**Carcinogen-** Cancer Causing Agents

| Physical Agents | Chemical Agents | Biological Agents |
|---|---|---|
| Ionizing radiation like X-rays & gamma rays & non-ionizing rays like UV rays cause DNA damage leading to change in neoplastic transformation. | Tobacco Smoke (Major cause of lung cancer), vinyl chloride, caffeine, nicotine, mustard gas, benzopyrene, dyes, paints etc. | Cancer causing -**Oncogenic viruses** have viral oncogenes.<br>Cellular oncogenes (c-onc) or proto oncogenes present in normal cells when activated become oncogenic. |

**Types of Cancers**

| Carcinomas (85%) | Sarcomas (1%) | Leukaemia's /Lymphomas |
|---|---|---|
| Ectodermal<br>Eg: Epithelial tissue (Skin), Breast, Lung etc | Mesodermal<br>Eg: Bone, Muscles etc | Body Fluid<br>Eg: Blood cancer (WBCs)<br>Lymphoma (Lymph node cancer) |

(v) **Cancer detection & diagnosis:**

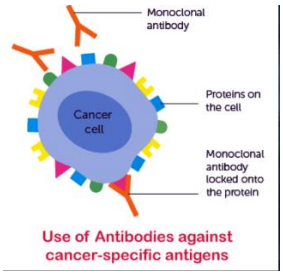
(1) **Biopsy** and histopathological studies (A thin piece of suspected tissue is sustained & examined under microscope)
In case of leukaemia- Blood and bone marrow tests for increased cell counts.

(2) **Imaging technique:**

a) **Radiography** by X-rays, to detect cancer of the internal organs.

b) **Computed Tomography (CT)** using X-rays, to generate a 3-D image of internal tissue.

c) **MRI** (Magnetic Resonance Imaging)Use of Magnetic field & non-ionising radiation to detect pathological and physiological changes in living tissue.



Use of Antibodies against cancer-specific antigens

(3) **Use of Monoclonal Antibodies** against cancer-specific antigens.

(4) **Molecular Biology Technique:** To detect cancer inherited gene in individual – such individuals should avoid carcinogens eg: tobacco.

(vi) **Treatment of Cancer**:

(a) **Surgery**

(b) **Radiation therapy** Tumour cells are irradiated by lethal doses of radiation, without damaging surrounding cells.

(c) **Chemotherapy** Using chemotherapeutic drugs to kill cancer cells. (Side effects- hair loss, anaemia etc)

(d) **Immunotherapy** Biological modifiers like alpha-interferons are used to activate the immune system and helps in destroying the tumour.

Most cancers are treated by the combination of Surgery, Radiotherapy & Chemotherapy.