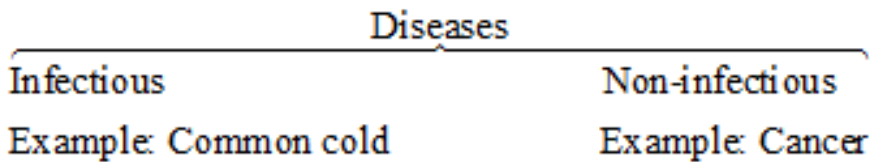


Human Health and Disease

- **Disease** is characterised by various signs and symptoms.



Infectious diseases

- It spreads through infectious agents that include bacteria, viruses, protozoans and fungi.
 - **Bacterial diseases**
 - **Typhoid fever:** *Salmonella typhi*; Widal test is used for confirmation of typhoid
 - **Pneumonia:** *Streptococcus pneumoniae* and *Haemophilus influenzae*; it infects the alveoli of lungs
 - Other examples include **dysentery, plague, diphtheria**
 - **Viral diseases**
 - **Common cold:** Spreads through Rhino viruses
 - **Protozoan diseases**
 - **Malaria:** Pathogen is *Plasmodium*; malarial parasite requires two hosts: humans and female anopheles mosquito; malarial parasite reproduces asexually in the human host while in the mosquito host it reproduces sexually
 - **Amoebiasis (amoebic dysentery):** *Entamoeba histolytica*
 - **Helminthes diseases**
 - **Ascariasis:** Pathogen is *Ascaris*
 - **Elephantiasis or filariasis:** Pathogen is *Wuchereria bancrofti*
 - **Fungi**
 - **Ringworms:** Caused by fungi which belong to genera *Microsporum*, *Trichophyton* and *Epidermophyton*

- **Immunity**
- Ability of the body to fight infectious agents
- On the basis of the immunity possessed by the body, immunity can be innate immunity and acquired immunity.
 - **Innate immunity** is a non-specific type of defence mechanism.
 - It has four types of barriers –
 - **Physical barrier:** Example, skin covering of the body, secretion of mucous in the respiratory tract
 - **Physiological barrier:** Example, acid in the stomach, tears from the eyes
 - **Cellular barrier:** Example, monocytes and lymphocytes in blood
 - **Cytokine barrier:** Example, interferon
 - **Acquired immunity** is a specific type of defence mechanism. It shows two types of responses: primary response and secondary response.
 - **It involves two types of lymphocytes –**
 - **B lymphocytes:** Show humoral immune response
 - **T lymphocytes:** Show cell mediated immunity (CMI)
- On the basis of production of antibodies, immunity can be further categorised as –
 - **Active immunity:** Body produces its own antibodies against antigens
 - **Passive immunity:** Readymade antibody is transferred from one individual to another
 - Colostrum (contains antibodies IgA) is an example of passive immunity provided by the mother to her child.
- **Vaccination:** It is the protection of the body from communicable diseases by administration of agents (called vaccines) that mimic the microbes. Vaccines

are available against tetanus, polio, etc.

- **Antibodies:** Special, proteinous chemicals produced by B-lymphocytes present in our blood, in response to the entry of any foreign pathogen on our body.

AIDS (Acquired immunodeficiency syndrome)

- It can spread –
 - through sexual contact with the infected person
 - from the mother to her child, through the placenta
 - infected blood transfusion
 - by the use of infected syringe
- It is caused by HIV virus (a retro virus) and has RNA as genetic material. HIV stands for Human Immunodeficiency Virus.
- When HIV virus enters the host cell, the viral RNA gets converted into viral DNA, which gets incorporated into the host DNA and starts producing new virus particles.
- Diagnostic test for AIDS: ELISA (enzyme-linked-immunosorbent serologic assay)

Treatment –No permanent cure; antiretroviral therapies can prolong the life of patient

Prevention of AIDS

- Ensuring use of disposable syringes
- Screening blood from blood banks
- Advocating safe sex

Cancer

- Tumour caused by abnormal and uncontrolled cell division. It is of two types –
 - **Benign tumour:** Remains confined to a particular location and does not spread
 - **Malignant tumour:** Cells divides and invades new locations by getting transported through blood to distant sites

- **Metastasis:** Property of malignant tumour to invade the distant body parts, thereby initiating formation of new tumours.
- **Carcinogen:** Cancer-causing agents; e.g., X-rays, UV rays
- **Cancer detection and diagnosis:** Techniques involved are radiography, computed tomography and magnetic resonance imaging.
- **Treatment of cancer:** Involves techniques like radiotherapy, chemotherapy and immunotherapy.

Drugs and alcohol abuse includes –

- ☐ Opioids: Example, Heroin (extracted from *Papaver somniferum*)
- ☐ Cannabinoids: Example, marijuana, hashish, charas, ganja (obtained from *Cannabis sativa*), cocaine (obtained from *Erythroxylum coca*)

- **Adolescence and Drug abuse**

Adolescence is the period during which the child becomes matured. It is between 12 – 18 years of age.

- **Causes of drug abuse –**

- ☐ Curiosity
- ☐ Adventure
- ☐ Excitement
- ☐ Experimentation
- ☐ Stress or pressure to excel in examination

- **Effects of drug/alcohol abuse –**

- ☐ Reckless behaviour
- ☐ Malicious mischief
- ☐ Violence
- ☐ Drop in academic performance
- ☐ Depression, isolation, aggressiveness, etc.

- **Prevention and control –**

- ☐ Avoid pressure
- ☐ Counselling and education
- ☐ Take help from parents and peers
- ☐ Take professional and medical help