

8. HUMAN HEALTH AND DISEASES

COMMON INFECTIOUS DISEASES IN MAN

BACTERIAL DISEASES

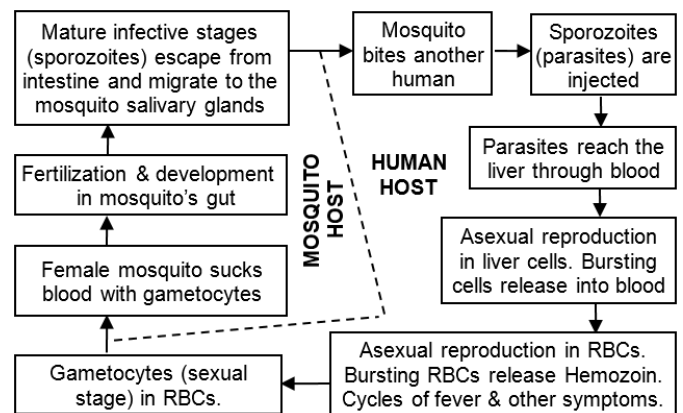
- a. Typhoid:** Pathogen is *Salmonella typhi*.
- **Mode of transmission:** It enters small intestine through food & water and migrates to other organs via blood.
 - **Symptoms:** Sustained high fever (39°-40° C), headache, weakness, stomach pain, constipation & loss of appetite. Intestinal perforation and death may occur.
- Widal test** is used for confirmation of the disease.

PROTOZOAN DISEASES

- a. Malaria:** Pathogen is *Plasmodium sp.* (*P. vivax*, *P. malariae* & *P. falciparum*).
- Most serious malaria is caused by *P. falciparum*.
- **Mode of transmission:** By female *Anopheles* mosquito.

- **Symptoms:** Haemozoin (toxin released by *Plasmodium*) causes chill and high fever recurring every 3-4 days.

Life cycle of Plasmodium



HUMAN IMMUNE SYSTEM

IMMUNITY

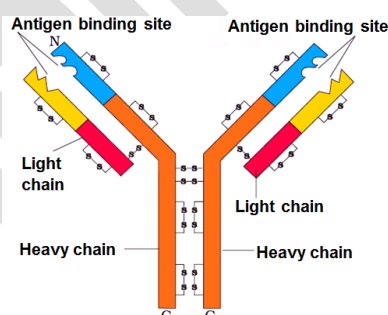
It is 2 types: Innate and Acquired.

1. Innate (inborn) immunity

- It is the *non-specific* immunity present at the time of birth.
 - It includes 4 types of **Barriers**:
- Physical barriers:** Prevents entry of microbes. E.g. *Skin*, *Mucus coating* of the respiratory, gastro-intestinal and urino-genital tracts. Mucus traps microbes.
 - Physiological barriers:** They prevent microbial growth. E.g. gastric HCl, saliva, tear etc.
 - Cellular barriers:** **Phagocytes** like *WBC [Polymorphonuclear leukocytes (PMNL) or neutrophils, monocytes and natural killer lymphocytes], macrophages* etc.
 - Cytokine barriers:** Virus infected cells secrete a cytokine protein called *interferon*. It protects non-infected cells from further viral infection.

2. Acquired (adaptive) immunity

- It is *pathogen specific* immunity developed during lifetime.



Structure of an antibody molecule:

An antibody has **4 polypeptide chains**: 2 **light chains** and 2 **heavy chains** (H₂L₂).

AIDS (Acquired Immuno Deficiency Syndrome)

- It is caused by **HIV (Human Immunodeficiency Virus)**, a **retrovirus** having RNA genome.

Transmission: www.bankofbiology.com

- Sexual contact with infected person.
- Transfusion of contaminated blood & blood products.
- Sharing of infected needles.
- From infected mother to her child through placenta.

Diagnosis:

- **ELISA test** (Enzyme-linked immuno-sorbent Assay).

Prevention of AIDS:

- **“Don’t die of ignorance”:** Educate people about AIDS through organisations like **National AIDS Control Organisation (NACO)**, **Non-Governmental Organisations (NGOs)**, **WHO** etc. WHO started the following programmes:
 - Make blood (from blood banks) safe from HIV.
 - Use disposable needles and syringes.
 - Advocate safe sex and free distribution of condoms.
 - Control drug abuse.
 - Regular check-ups for HIV in susceptible population.

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CANCER

- Cancer is an abnormal and uncontrolled multiplication of cells resulting in the formation of tumour (masses of cells).

Types of Tumours

- **Benign tumours:** Confined to the place of its origin. They do not spread to other parts. Cause little damage.

- **Malignant tumours:** Mass of proliferating cells (**neoplastic or tumour cells**) that grow rapidly, invade and damage the surrounding normal tissues. Due to active division and growth, they starve normal cells by competing for nutrients. Cells sloughed from tumours reach other sites via blood where they form a new tumour. This is called **metastasis**.

Treatment of cancer

- **Radiotherapy:** Tumour cells are irradiated lethally, without damaging surrounding normal tissues.
- **Chemotherapy:** Use of chemotherapeutic drugs. Many drugs have side effects like hair loss, anaemia etc.

- **Immunotherapy:** The patients are given **biological response modifiers** (e.g. α - interferon) which activates their immune system and helps in destroying the tumour.
- **Surgery.**

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DRUGS, SMOKING AND ALCOHOL ABUSE

Effects of Drug/alcohol abuse

- Reckless behaviour, vandalism and violence.
 - Coma and death due to respiratory failure, heart failure or cerebral haemorrhage.
 - Drugs mixed with alcohol may cause death.
 - Damage of nervous system and liver cirrhosis.
 - Mental and social distress to family and friends.
- Social problems like stealing and spread of infectious diseases (e.g. AIDS, hepatitis B).
 - Use of drugs and alcohol by pregnant woman affect the foetus (Foetal alcohol syndrome or FAS).
 - Loss of sexual drive and necrospemia.
 - Misuse of drugs by athletes (e.g. narcotic analgesics, anabolic steroids, diuretics & certain hormones to increase muscle strength and bulk and to promote aggressiveness).

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