Aids to Health

Health is a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity.

Immunity

- It can be defined as the ability of an organism to resist the attack of antigens or pathogens.
- Various harmful substances, such as pollutants and pathogens, may enter our body through different ways.
  The defence system of our body works at two levels:
  A. Local Defence System: This system prevents the entry of germs.
  B. Immune System: This system deals with the germs after they have entered the body tissues.

Local Defence System

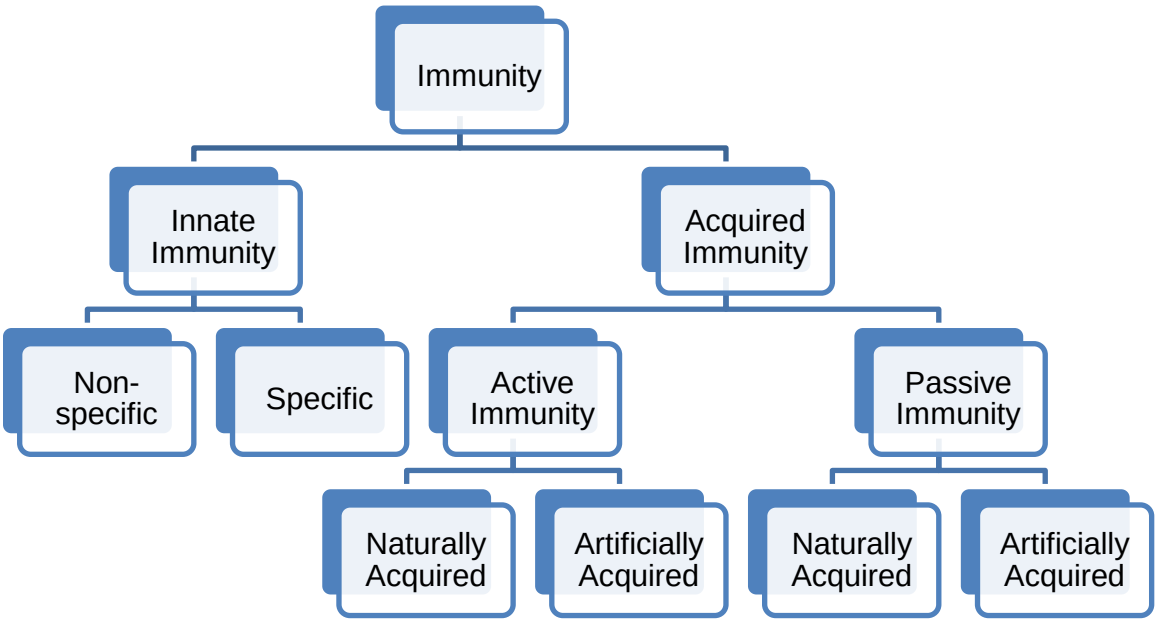
1. Protective Mechanical Barriers	
Skin	• Skin is made of the protein keratin which is almost impermeable to germs. • Any scratch or cut in the skin provides an entry for germs. • The clotting of blood plugs the cut and prevents the entry of germs.
Hair	• Hair inside the nostrils traps dust which carries germs.
Mucus	• It is a slimy secretion of the epithelial lining of various organs. • Mucus secreted by the epithelial lining traps bacteria and prevents their entry into the body.
2. Thrown out, if entered	
Coughing, Sneezing, Vomiting	• These are three direct methods to throw out germs or foreign particles which have entered the body.
3. Germ-killing Secretions	
Saliva, Sweat, Tear, Nasal Secretions	These secretions help in killing germs.
Hydrochloric acid	• It is secreted by the stomach. • It kills the germs which have entered the body along with food.
4. Germ-fighting White Blood Cells (WBCs)	
WBCs	• WBCs engulf germs and destroy them by the process of **phagocytosis**.

Merits of the Local Defence System

• Work instantaneously.
• Effective against a wide range of potentially infectious agents.

Immune System

Immunity can be classified into two main categories:



1. Innate Immunity: It is inherited from the parents.
I. Non-specific Innate Immunity: General natural resistance to all infections.
II. Specific Innate Immunity: Natural resistance to a particular kind of germ.

2. Acquired Immunity: Resistance to a disease is acquired during the lifetime of an organism.
I. Actively Acquired Immunity: Resistance is developed due to a previous infection.
II. Passively Acquired Immunity: Immunity is provided from an outside source in the form of antibodies.
a. Naturally Acquired Passive Immunity: Mother's antibodies reach the foetus through the placenta.
b. Artificially Acquired Passive Immunity: Antiserum injections are given to stimulate the production of antibodies.

Differences between Active Immunity and Passive Immunity

Active Immunity	Passive Immunity
• Produced by one's own body.	• Received from an outside source.
• Induced by infections or by contact with immunogens.	• Readymade antibodies are provided.
• Provides effective and long-lasting protection.	• Protection is less effective and does not ensure protection against subsequent infections.

Antigen: It is a chemical found on the surface membranes of germ cells.

Toxin and Antitoxin/Antibodies

Any poisonous substance produced by an animal, plant or bacterium is known as a **toxin**.
Examples: Snake venom, sting poisons of insects

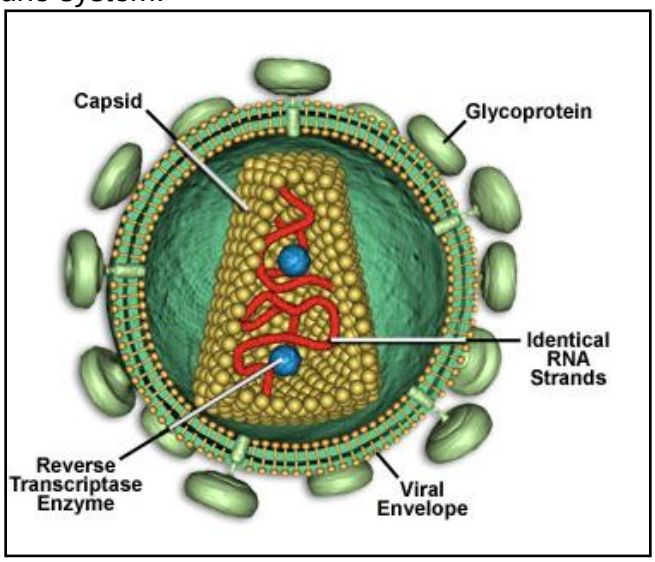
An **antibody** is a blood serum protein produced in response to injected antigens.
Example: Antivenins for snake venoms

Characteristics of Antibodies

- They belong to a class of proteins called immunoglobulins.
- They are produced by lymphocytes.
- Our body can produce a variety of antibodies.
- Antigen-specific, i.e. they can act only on a particular antigen.

AIDS (Acquired Immunodeficiency Syndrome)

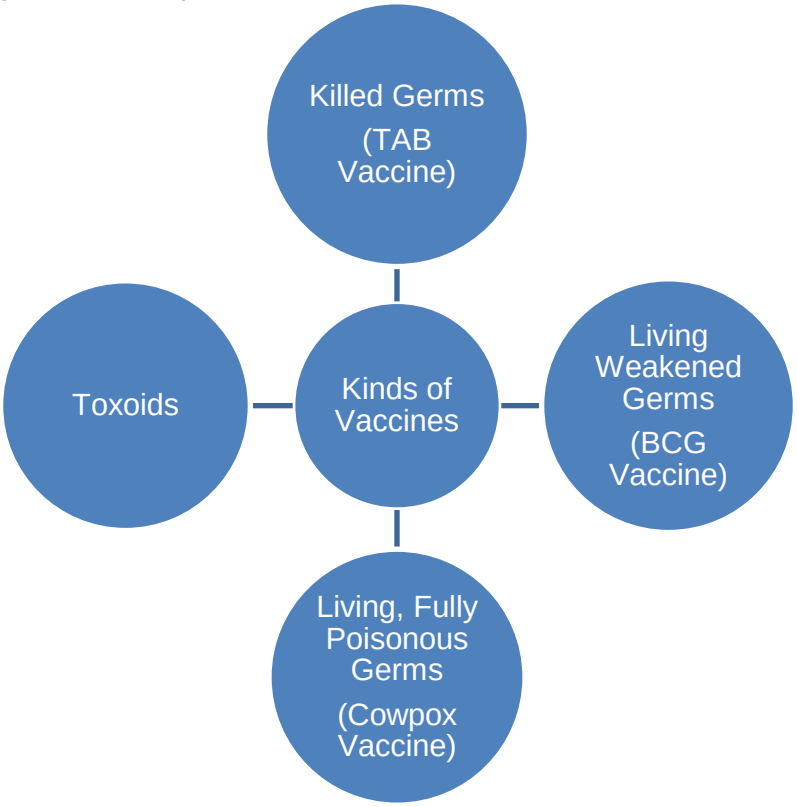
- AIDS is caused by the infection of the Human Immunodeficiency Virus (HIV).
- This virus attacks the immune system.



- HIV infects T-cells.
- When T-cells die, they release newly formed viruses which infect more cells.
- HIV is transmitted by
  - ✓ Sexual intercourse
  - ✓ Sharing contaminated needles
  - ✓ Blood transfusion
  - ✓ From infected mother to the unborn foetus
- **World AIDS Day** is on **1 December.** It is a day to create awareness about the severity of AIDS and the protective measures available.

Vaccination and Immunisation

Vaccination: It is the introduction of any kind of dead or weakened germs into the body of a living being to develop immunity against the respective disease.

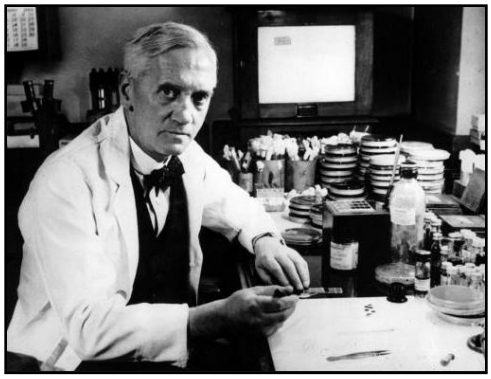


Immunisation: It is developing resistance to disease-producing germs or their toxins by introducing killed germs or germ substances to induce the production of specific antibodies.

Antiseptics and Disinfectants

Antiseptics	Disinfectants
• They are mild chemical substances which kill germs when applied on the body.	• Strong chemical substances which are applied on spots and places where germs thrive and multiply.
• Examples: Lysol (dilute), carbolic acid, iodine, benzoic acid, mercurochrome, boric acid	• Examples: Cresol, phenol, Lysol, 40% formalin, lime, Bordeaux mixture, DDT

Antibiotics are chemical substances produced by some microorganisms and can kill or inhibit the growth of other microorganisms.
Alexander Fleming (1881–1995) discovered the first antibiotic—penicillin.

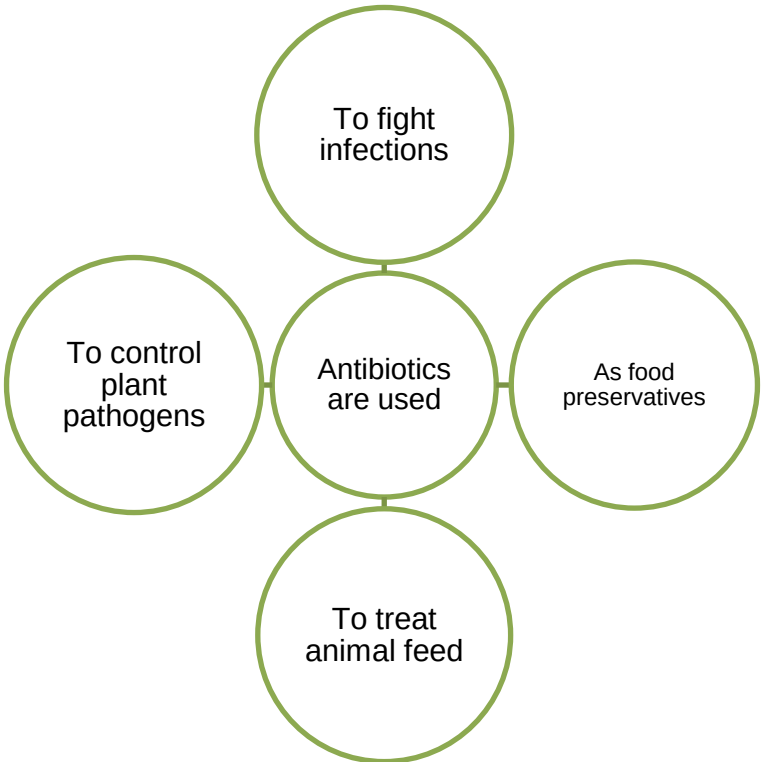


Alexander Fleming

Sources of Antibiotics

- Penicillin has been commercially produced from the species *Penicillium chrysogenum*.
- Streptomycin is a widely used antibiotic. It is obtained from the bacterium *Streptomyces*.

Uses of Antibiotics



- In 1930, a group of chemicals known as **sulphonamides** was discovered which proved to be effective in many types of bacterial diseases. Examples: Sulphadiazine and sulphanilamide.