

<p>Pathogen</p>	<p>Disease-causing organisms</p> <p>E.g. bacteria, viruses, fungi, protozoans, etc.</p>
<p>Typhoid fever</p>	<p>Pathogen- <i>Salmonella typhi</i> (bacteria)</p> <p>Mode of infection- contaminated air, utensil, etc.</p> <p>Symptoms- stomach ache, constipation, intestinal perforation, etc.</p> <p>Test- Widal test</p>
<p>Pneumonia</p>	<p>Pathogen- <i>Streptococcus pneumoniae</i>, <i>Haemophilus influenzae</i> (bacteria)</p> <p>Mode of infection- contaminated food and water</p> <p>Symptoms- fever, chills, cough, alveoli gets filled with fluid, respiratory problems</p>

Common cold

Pathogen- Rhinoviruses

Mode of infection- through cough and sneeze of an infected person or things

Symptoms- nasal congestion, cough, headache, etc.

Malaria

Pathogen- *Plasmodium vivax*, *P. malaria* (protozoan)

P. falciparum - malignant malaria

Mode of infection- insect bite of an infected female *Anopheles* mosquito (vector)

Symptoms- high fever, chills, etc.

Plasmodium Sporozoites

Infectious stage, produced in the gut of mosquito after fertilisation, migrates to the salivary glands of the mosquito

Injected to human by mosquito bite, reaches liver of the host then to RBCs in the blood, reproduces asexually

Haemozoin

Released by rupture of RBCs caused by *Plasmodium* sporozoites

Causes chills and relapsing high fever

Plasmodium Gametocytes

Sexual stage, produced in the RBCs of human

Female *Anopheles* takes up gametocytes with the sucked blood

Fertilisation takes place in the mosquito gut

Amoebiasis (Amoebic dysentery)

Pathogen- *Entamoeba histolytica* (protozoan)

Mode of infection- contaminated food and water by faeces of an infected person

Carrier- Houseflies

Symptoms- constipation, abdominal pain, excess mucus and blood in the stool

Ascariasis

Pathogen- *Ascaris* (helminth)

Mode of infection- contaminated fruits, vegetables and water by faeces of an infected person

Symptoms- muscular pain, fever, internal bleeding, anaemia, blockage of intestine

Elephantiasis (filariasis)

Pathogen- *Wuchereria bancrofti* and *W. malayi* (helminth)

Mode of infection- transmitted by mosquito bite

Symptoms- inflammation in the lymphatic vessels of lower limb

Ringworm

Pathogen- *Microsporum*, *Trichophyton* and *Epidermophyton* (fungi)

Mode of infection- soil or by using a contaminated towel, comb, etc.

Symptoms- dry and scaly lesions on the skin, nails, scalp, etc.

Gambusia

A fish

It feeds on insect larvae

Used to control and eliminate vectors of many diseases

Innate immunity

Present by birth

Non-specific defence

Skin, mucus, saliva, WBCs, cytokine, etc.

Cellular barrier

Specialised cells, which can phagocytose and kill microbes

WBCs or leukocytes, macrophages

E.g. Neutrophils, monocytes, Natural killer cells

Cytokine

Small protein molecules secreted by virus-infected cells

E.g. Interferons, Interleukins, tumour necrosis factor, etc.

Acquired immunity

Acquired in one's lifetime, pathogen specific, involves B and T lymphocytes

Primary response- when exposed to a pathogen for the first time, low intensity

Secondary response- on re-exposure of the same antigen, anamnestic response, highly intensified response

Antibodies

Immunoglobulins produced by B-lymphocytes

Contains 4 peptide chains; 2 light and 2 heavy (H_2L_2)

E.g. IgM, IgG, IgE, IgA, IgD

Humoral immune response

A type of acquired immunity

Antibody-mediated

B-lymphocytes produce antigen-specific antibodies in the circulatory system

Cell-mediated immunity (CMI)

A type of acquired immunity

T-lymphocytes mediated

CMI is responsible for graft rejection

Active immunity

The immune response on the exposure of an antigen

Antibodies are produced specifically to the antigen

During immunisation or vaccination, attenuated microbes are injected to induce active immunity

Passive immunity

Readymade antibodies are given to protect against a foreign antigen

Colostrum- the first milk of mother, contains IgA- provides protection to infants

IgG antibodies can cross the placenta and provide passive immunity to the growing foetus

Allergy

Intense immune response on exposure to allergens

IgE mediated response

Mast cell secretes histamine, serotonin

Auto-immune disease

When our immune system fails to distinguish self cells from foreign antigens and starts attacking self cells

E.g. Rheumatoid arthritis

Primary lymphoid organs

Lymphocytes mature here

Bone marrow- B-lymphocytes

Thymus- T-lymphocytes

Secondary lymphoid organs

Lymphocytes migrate here after maturation and interact with antigens

E.g. spleen, tonsils, lymph nodes, Peyer's patches in the small intestine, appendix

Mucosa-associated lymphoid tissue (MALT)

Present in the digestive, respiratory and urogenital tracts

Accounts for 50 percent of lymphoid tissues

AIDS

Acquired Immunodeficiency Syndrome

Caused by HIV virus, a retrovirus

Transmitted through body fluids, sexually, using infected needles and can cross placenta too

Test- ELISA (Enzyme-linked immunosorbent assay)

HIV replication

In Macrophages- forms DNA by reverse transcription and gets inserted into host cell genome producing multiple copies

In T_H cells- replicate and attacks other T-lymphocytes, decreasing the number of T-lymphocytes

Tumours

Cells, lose regulatory mechanism and contact inhibition, show uncontrolled division and proliferation

Benign- remain confined to the original location

Malignant- neoplastic cells, invade surrounding tissues

Metastasis

Cells from malignant tumours slough off and spread to different parts through the circulatory system and form new tumours in different parts of the body

Opioids

Heroin/ smack -diacetylmorphine

Obtained from the latex of *Papaver somniferum*

It is a depressant and analgesic, produces euphoria

Cannabinoids

Obtained from the inflorescence of *Cannabis sativa*

E.g. Marijuana, hashish, etc.

Cocaine

Coca alkaloid, commonly known as coke or crack

Obtained from *Erythroxylum coca*

Interferes with dopamine transport

Commonly abused drugs

Barbiturates, amphetamines, benzodiazepines, LSD, etc.

Atropa belladonna and *Datura* also show hallucinogenic properties

Nicotine

An alkaloid present in tobacco

Stimulates the release of adrenaline and nor-adrenaline from adrenal glands

Increases blood pressure and heart rate