

HUMAN HEALTH AND DISEASE

The state of complete physical, mental and social well being is called health. Health simply does not simply means disease free condition or physical fitness. Health is affected by-

- i. Genetic disorders
- ii. Infection from microbes or other organisms.
- iii. Life style

Good health can be maintained by' Balanced diet. Personal hygiene, Regular exercise, Awareness about the disease and their effect,. Immunization against the infectious disease , Proper disposal of onstage, Control of vectors, and Maintenance of hygienic food and water.

- The diseases which are easily transmitted from infected person to healthy persons are called infectious disease and diseases which cannot be transmitted from one person to other are called non-infectious disease.

Common Diseases in Humans

- The disease causing microorganisms like bacteria, virus, fungus, protozoa, helminths are called pathogen.
- The pathogen can enter the body by various means and multiply and interfere with normal vital activities resulting in morphological and functional damage.

Name Of disease /test	Causal Organisms	Symptoms	Effects
Typhoid / Widal test	<i>Salmonella typhi</i>	Sustained high fever, weakness, stomach pain, constipation.	Intestinal perforation and death may occur in severe cases.
Pneumonia	<i>Streptococcus pneumoniae</i> and <i>Bacteriophages</i>	Fever, cough, chest pain and headache.	Inflammation of lung with fluid leading to severe problems in respiration.

Common cold	Rhino viruses	Nasal congestion and discharge, sorethroat, cough and headache,	Infect the nose and respiratory passage.
Malaria	Plasmodium (P. vivax, P. falciparum)	Chill and high fever recurring 3 to 4 days	Parasites multiply within liver cells and then attack the RBCs.
Amoebic dysentery	Entamoeba histolytica	Constipation, abdominal pain, cramps, stool with mucous and blood clot	Infect the large intestine
Ascariasis	Ascaris (Helminthes)	Internal bleeding, muscular pain, fever, anemia etc.	Healthy person get infected through water, vegetable etc.
Elephantiasis or filariasis	Wuchereria (W. bancrofti and W. malayi)	Inflammation in the lower limb and genital glands.	Lymphatic vessels of lower limbs get blocked.
Ringworms	Trichophyton, Microsporum and Epidermophyton	Appearance of circular scaly lesions on various part of body	Infects the skin, nail and scalp.

Life cycle of Plasmodium

Plasmodium enters the human body as small sporozoites through the bite of it female anopheles mosquito and multiplies within the liver cells. Later attacks the RBCs resulting the rupture with release of toxic substance, haemozoin, which is responsible for high fever and chill recurring every three to four days.

Malarial parasite requires two parasites, human and anopheles mosquito to complete their life cycle. Female anopheles is vector of this disease to human beings.

pathogen first time produces a response called primary response of low intensity. Subsequent encounter by same pathogen produce highly intensified response called secondary response or an anamnestic response due to memory of first encounter.

- Primary and secondary responses are carried out with the help of B-lymphocytes and T-lymphocytes.. B-lymphocytes produce an army of protein called antibodies each having two light and two heavy chains.
- + Different types of antibodies produced in blood include IgG, IgM, IgE etc. They are called humoral immune response due to presence in blood.

Active Immunity	Passive Immunity
1. Antibodies are produced in the host body. 2. It is slow and takes time to give its full effective response.	1. Ready-made antibodies are directly given to protect the body. 2. It is instant and acts quickly in response to antigen.

Allergies –

The exaggerated response of immune system, to certain antigens present in the environment is called allergy. The substance to which such immune response is produced is called allergens. The antibodies produced to these are IgE types. Allergy is due to secretion of chemicals like histamine and serotonin from the mast cells.

Human immune system can distinguish between self and foreign molecules or foreign bodies. Sometimes, due to genetic or unknown reasons, the body attacks self-cells. This results in damage to the body and is called auto-immune disease. Rheumatoid arthritis is due to this effect.

Immune system in the body: the human immune system includes lymphoid organs, tissue, cells and soluble molecules like antibodies.

- Lymphoid organs are the organs where origin and maturation and proliferation of lymphocytes occur. Primary lymphoid organs include bone marrow and thymus.
- After maturation lymphocytes migrate to secondary lymphoid organ like spleen, lymph nodes, tonsils, Peyer's patches of small intestine and appendix. They provide the sites for interaction of lymphocytes with antigens.
- There is lymphoid tissue also located within the lining of respiratory, digestive and urogenital tract called mucosal associated lymphoid tissue (MALT). It constitutes 50% of lymphoid tissues in human.

AIDS (Acquired Immune Deficiency Syndrome) was first reported in 1981. It is caused by HIV (human immunodeficiency virus), a retrovirus. Transmission of HIV virus occurs by-

1. Sexual contact with infected person
2. Transfusion of contaminated blood and blood products
3. Sharing infected needles as in intravenous drug abusers
4. Infected mother to her child through placenta.

Diagnostic test for AIDS is ELISA (enzyme-linked Immuno-sorbent assay).

NACO (national AIDS control organisation) and other NGOs are doing a lot to educate people about AIDS.

Cancer is one of the most dreaded diseases of human beings and is a major cause of death all over the world. Normal cells show a property called contact inhibition by virtue of which contact with other cells inhibit their uncontrolled growth. Cancer cells lost this property.

Cancerous cells continue to divide giving rise to masses of cells called tumors. There are two kinds of tumors-

- **Benign tumors-** remain confined to original location and do not spread to other parts of the body.
- **Malignant tumors-** cells grow rapidly, invading and damaging the surrounding normal tissues. Metastasis is the most dangerous property of these tumors.
- **Causes of cancer** - cancerous neoplastic cell may be induced by physical, chemical and biological agents called carcinogens. Cancer-causing viruses called oncogenic viruses have genes called viral oncogenes.
- **Cancer detection and diagnosis-** Cancer detection is based on biopsy and histopathological study of the tissue, blood and bone marrow test for increased cell count. Radiography, CT (computed tomography), MRI (magnetic resonance imaging) are very useful to cancers of internal organs.
- **Treatment of Cancer-** the common method for treatment of cancer includes surgery, radiation therapy and immunotherapy. Several chemotherapeutic drugs are used to kill cancerous cells. They have side effects like loss of hair, anaemia. Biological response modifiers such as interferon which activate the immune system.

Drugs and Alcohol Abuse

Commonly abused drugs include opioids, cannabinoids and coca alkaloids obtained from flowering plants and a few from fungi.

Opioids are the drugs which bind to specific opioid receptors present in our central nervous system and gastrointestinal tract. Heroin commonly called smack is chemically diacetylmorphine which is a white, odourless, bitter crystalline compound. It is extracted from the latex of poppy plant (*Papaver somniferum*).

- **Cannabinoids** are a group of chemicals which interact with cannabinoid receptors present in the brain. Natural cannabinoids are obtained from the inflorescence of the plant *Cannabis sativa*. They include marijuana, hashish, charas and ganja.

⁴⁺ **Dependence** is the tendency of the body to manifest a characteristic and unpleasant withdrawal syndrome if regular dose of drug/alcohol is abruptly discontinued. It includes anxiety, shakiness, nausea and sweating.