

## Chapter - 40

### Important and common Human Diseases

Healthy and fit body is a state of mental and social wellness. All living organisms including human have tendency to live healthy and disease free life. Health means proficiency in physical and physiological capacity, ability to fight against infection, mental maturity and execution of healthy social activities by organisms according to their age, heredity and sex. Its possibility is high in natural and pollution free environment. But with increasing population and industrialization, residential environment of human being is getting polluted and with increasing in urban population, dirtiness and diseases are increasing. According to World Health Organization (WHO) when all human body parts work properly and having a fair and desired balance with each other and with external environment then in such condition body is considered to be healthy and disease free. Therefore body parts of a healthy person show normal structure and physiology and that person is mentally, and socially healthy and normal. On the other hand, abnormality in general activities of any body part due to any reason is called diseased state. Disease is that disorganized activity or disorder which is caused due to infection, contaminated nutrition, genetics, environmental or mental imbalance.

**1. Infections** - It is caused by biological factors which are known as pathogens, i.e. virus, mycoplasma, chlamydia, bacteria, fungi, protozoa, helminthes etc.

**2. Nutritional Disorders** - These are caused by excess or deficiency of vitamins, mineral salts and energy giving nutrition.

**3. Biochemical Disorders** - It is caused by excess or deficiency of biochemicals for example hormone, enzyme, urea, uric acid, and creatinine.

**4. Exogenous Chemical Disorders** - Pollutants and allergens cause these diseases.

**5. Life Style Disorders** - These are caused by food choices, lack of exercises, sitting habits, addictions etc.

**6. Mechanical Disorder** - It is caused by organ fractures, sprain, joint fracture, getting hurt.

**7. Degenerative Disorders** - These are related to old age. For example atherosclerosis, hypertension, heart disease, arthritis.

**8. Genetic Disorders** - These are caused by defective genetics. For example colorblindness, haemophilia, down syndrome.

**9. Mental Disorders** - These are caused by social, personal and disruptive changes.

Diseases have two broad categories congenital diseases and acquired diseases. Acquired diseases are further divided into infectious diseases and non infectious disease.

**Congenital Diseases** - These diseases are present in a person since birth. Congenital diseases are genetic (e.g. sickle cell anemia), disorders related with physiology and development (e.g. hair lips) and transferred by placenta (e.g. German chicken pox, syphilis diseases).

**Acquired diseases** - These diseases are caused by various reasons after birth i.e. infection, disruption, diet, addiction, stress, mutation etc.

Acquired diseases are again divided into two types-

1. Infectious disease
2. Non infectious disease

**1. Infectious Diseases** - These diseases are caused by pathogens and parasites. These can be transferred from an infected person to a healthy person. Therefore infectious diseases are also called communicable disease. Transmission may be direct or by factors such as blood and serum (non-infectious).

**(i) Contagious Disease** - These diseases are spread by direct contact in a healthy person. For example ring worm, conjunctivitis.

**(ii) Non contagious Diseases** - These diseases can spread by infected factor carrier (e.g. Dengue, Malaria), blood, serum (AIDS, Typhus fever).

**2. Non infectious Diseases** - These diseases are caused by factors than pathogens. These can't be spread by contact from one person to another person. Therefore non- infectious diseases are also known as non-communicable disease. By these reasons they are connected to each person, e.g. Cancer, allergy, deficiency diseases, injuries etc. These may be of various types -

**(i) Deficiency Diseases** - It is caused due to less availability of any essential component of diet in less amount. For example kwashiorkor, blood impairment (deficiency), beriberi.

**(ii) Degenerative Diseases** - These diseases are caused due to weakness or old age e.g. atherosclerosis.

**(iii) Allergy** - By the presence of foreign substances the person becomes highly stressed e.g. rhinitis (nasal related).

**(iv) Addiction** - These diseases are caused by addictive drugs, alcohols and tobacco.

**(v) Mental Disorders** - These diseases are related with stress, anxiety, mental disabilities, madness, schizophrenia and psychosis.

**(vi) Cancer** - It is one of the main causes of death in which cells divide continuously, crushing of normal cells, dying of cells due to starvation and starting loss of essential organs.

## I. Infectious Disease

Many diseases are caused by different germs in human body. These diseases are called infectious diseases. They reach to a person through direct or indirect contacts.

### (A) Diseases Caused by Bacteria

#### 1. Leprosy, Hansen's disease

It is bacterial disease. Its pathogenic bacterium is *Mycobacterium leprae*. Each type of leprosy is infectious disease.

Nervous system, muscles, skin etc. of body are affected in it and causes deformity in fingers. The symptoms of this disease begin to appear from 1 to 7 years.

The disease spreads through discharge released from wounds. It is also spread by staying with patient for a long time. Leprosy occurs only in human.

Leprosy is mainly of three types :-

- (i) Tuberculoid
- (ii) Lepromatous
- (iii) Border line

#### Symptoms of Leprosy Deformity in fingers

- (i) Patient of tuberculoid leprosy has high immunity power. Rashes appear on skin in this disease. Wounds also appear on skin. Hands feet's and fingers are twisted.
- (ii) Patient of lepromatous leprosy has low resistance power. Bacteria aggregate and appear like globi in this disease. Lumps emerges on the surface, wounds also occur and number of wounds increases. This type of leprosy is highly infectious.
- (iii) Patient of border line leprosy has symptoms of both above types. Rashes appear on the skin, lumps emerge and wounds also appear.

Leprosy patient should be kept in isolation from healthy normal person. Clothes and other things used by them should not be used. BCG vaccine is used for prevention of this disease. If whole organ is infected from disease, then it should be removed through surgery.



(A) Leprosy



(B) Diphtheria



(C) Pneumonia

Fig. 40.1 Symptoms of bacterial diseases  
(a) Leprosy (b) Diphtheria (c) Pneumonia

## 2. Tuberculosis

Generally tuberculosis is also found in human. In India out of 1000 people 15 are suffering from this disease. Deadly disease such as tuberculosis (T.B.) and pleurisy are caused by the effect of *Mycobacterium tuberculosis* named bacteria. Cough, fever occurs with this disease. Weight decreases, feels tiredness. With continuity of

disease the person becomes a structure of bones. Eyes become settle down. Appetite decreases by which person becomes weak. Germs from the person suffered from pulmonary leprosy enter in atmosphere through spitting, sputum, sneezing and coughing and these germs enter in the body of a healthy person through respiration. When there is less immunity power in the body then pathogens multiply rapidly in the body and come out with pus or mucus, sometimes blood also appears in the sputum.

This disease is spread through air and water. If the clothes, utensils etc. which are used by the patient are used by another person then the other person also gets infected from this disease.

Germs of this disease are also found in the milk of animals infected by tuberculosis. The person who remains in contact with a patient can also be infected.

As a preventive measure person should take special care. The diseased person should be kept in isolation. His clothes utensils etc. should be cleaned by boiling in hot water. The sputum feces etc. of the patient should be suppressed in soil. Contaminated water, food etc. should not be used. BCG vaccines should be vaccinated to avoid disease. Hookah, bidi, cigarettes used by other person should not be used.

## 3. Diphtheria

Diphtheria is a severe disease in human. This disease is caused by *Corynebacterium diphtheriae* named bacteria. Nose, throat and tonsils are affected from this disease and a toxic substance is secreted which gets absorbed and moves to blood. It may even cause human's death.

These bacteria are spread by touching fingers of patient; the bacteria are transmitted by touching dinner wares, toys, pencils etc. In addition to this droplets of fluid comes out by sneezing coughing of an infected person are inhaled by others then pathogens also enter into body.

To avoid diphtheria disease infected person should be kept in isolation. All children should be vaccinated from resistant vaccine of this disease. Pasteurized milk should be given to children.

#### 4. Tetanus

It is caused by *Clostridium tetani*. Tetanus disease is marked by headache and clenching of the jaw of the person. He cannot swallow food. Along with it, seem to cramps in the body. The symptoms of disease appear within 3-4 weeks after infection. Its effect can also cause human death.

Transmission of disease happens due to entry of pathogen in body through wounds from severed torn area.

To prevent the disease, Children should be vaccinated with resistant vaccine of tetanus. The use of tetanus toxoid is also beneficial. Tetanus antitoxin is an effective drug for the disease.

Previously tetanus disease was incurable, 80 to 90 percent patients suffering from it were died. Death can be avoided if treatment is given on time. Now days mostly there are not much death from this disease because it's treated timely. The frequency of this disease tetanus is high in developing countries where climate is hot.

#### 5. Pneumonia

It is bacterial disease. It is caused by *Diplococcus pneumoniae*. These are found in groups but sometimes found solitary.

Patient seems to be much cold and gets high fever in pneumonia disease. Septicemia and inflammation occur in liver and gall bladder. Patient feels chest pain. Due to deficiency of white blood cells (WBC) in blood, immunity power becomes reduced. Breathing also becomes difficult. Symptoms of disease appear in one to three days.

**For prevention of disease** - By giving special attention to personal hygiene and staying away from crowded houses can be avoided from germs. In addition, by keeping the patient in isolation and by avoiding the use of items used by him and dumping discharged phlegm etc. in the soil can prevent disease.

#### 6. Diarrhoea

This disease is caused by bacteria of *Shigella* group.

**Symptoms** - Excessive amount of water and electrolytes are expelled out from the body in this

disease which causes dehydration in the body.

Patient starts vomiting, mucus and blood also comes out along with faeces in this disease. Patient suffers from fever and weakness.

Boiled and filtered water should be used for prevention of the disease. The faeces and vomit expelled out by patient should be buried in soil. Food kept in open and rotten fruits should not be consumed.

#### 7. Meningitis

This disease is caused by *Neisseria meningitidis* bacteria. Pathogen infects the brain, spinal cord and spinal fluid. This disease results in sudden high fever, headache, restlessness, vomiting and inflammation. This disease spreads by contact. In addition inhalation of droplets produced by coughing and sneezing of patient transmits the disease. The symptoms of this disease appear from 2 to 10 days.

For prevention of the disease, clothes used by patient should be washed in boiled water. The phlegm, vomit and faeces of patient should be dumped in the soil.

#### 8. Gonorrhea

This disease is related to genital organs, which is caused by *Neisseria gonorrhoeae* bacteria.

**Symptom** - These bacteria attack at epithelial level of genitalia. Due to which a yellow colored discharge begins to secrete from urethra after 3 to 9 days of infection. Tends to irritate or inflammation in genital organs. Within few days urethritis develops in women and their menstrual cycle is also affected.

The germs also infect the valves of heart and cause endocarditis disease.

The bacteria of this disease are transmitted through sexual intercourse with diseased person. Sometimes disease transmits by touching or contacting the objects used by the patients.

**Prevention** - To prevent the disease, patient should be kept in isolation. Sexual intercourse with such patient should be avoided.

#### 9. Cholera

This bacterial disease is caused by *Vibrio*



**cholerae.**

**Symptoms** - Diarrhea and vomiting begin on the onset of this disease. This result leads to dehydration in body. Patient feels weakness and his body starts becoming cold. Urination stops. Cramps start in hands and feet's.

Disease is transmitted through water.

Cholera vaccine should be vaccinated for prevention of disease. The stale and rotten food items should not be consumed. The environment of house and its surrounding should be kept clean.

Solution of salt and sugar (ORS) is effective for treatment of disease. Liquid food starch of rice should be given to patient.

## 10. Typhoid

This disease is caused by *Salmonella typhi* bacteria.

### Symptoms-

- (i) The patient feels headache and becomes dull. Stomachache remains in patient.
- (ii) Patient gets fever up to F - F
- (iii) Pimple like small rashes comes out on the skin
- (iv) The patient suffers from loose motion and reduces urination.

The patient's fever is reduced after 15 days.

This disease transmits through water, food insect etc. it is also transmitted by mutual contact of persons.

For prevention of this disease excretory material from patient should be buried in the soil. Patient should take controlled diet. He should take fruit juices, eggs, milk, starch of rice etc. Patient should be kept in isolation. T.A.B. vaccines should be vaccinated.

## 11. Whooping Cough

This disease is caused by *Bordetella pertussis* bacteria in human. This disease stays for six weeks.

**Symptoms** - By infection of this disease the person suffers from intense cold and dry cough i.e. cough is not associated with mucus. Patient suffers from mild fever. Intensity of cough is so high that respiration becomes labored and produces a hoop hoop like voice.

As preventive measure child should be vaccinated with triple antigen vaccine (D.P.T.)

## (B) Diseases caused by Viruses

### 1. Acquired Immuno Deficiency Syndrome (AIDS)

Till now it was known that cancer is terrible and incurable disease, but in last few years it is discovered that AIDS is more terrible disease than cancer and death is sure in it. This disease is rapidly spreading in the world. It has been considered as the worst disease of this century. There is not any treatment available for it in today's modern era. On the basis of latest researches, it can be said that prevention is only available treatment.

AIDS is a viral disease that is caused by infection of RNA derived retrovirus, Human Immuno Deficiency Virus H.I.V. AIDS itself does not exhibit any symptom related to disease but because of its virus natural immunity system of body gets destroyed, as a result body becomes incapable to fight against the infectious diseases.

**Structure of HIV** - Surface of HIV is made of two layers of phospholipids (bilayer), in which two types of glycoproteins GP-120 and GP-41 are embedded (Fig. 40.2). The inner core part of virus contains two molecules of single stranded RNA by which reverse transcriptase molecule is associated. There are two protein coats covering RNA in which inner coat is made of P-24 proteins and outer coat is made of P-17 proteins.

With the help of reverse transcriptase enzyme HIV can synthesize DNA from RNA. Two different forms of HIV are found HIV-1 and HIV-2, out of which, at present HIV-1 is responsible for AIDS.

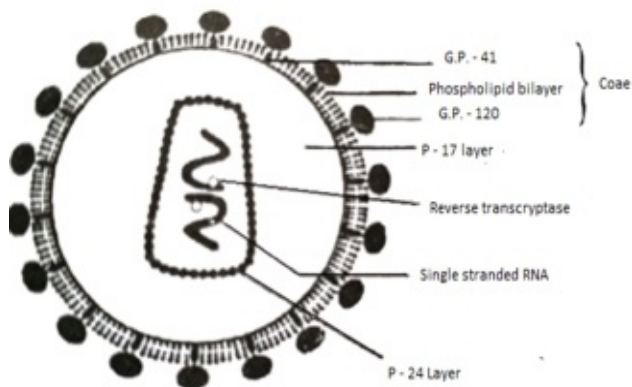


Fig. 40.2 Human Immuno Deficiency Virus (HIV)

AIDS virus can enter in healthy human body from a patient or carrier by following methods. This virus is present in blood and sexual fluid of patient.

1. Through unsafe inter course.
2. By blood transfusion of patient or carrier person.
3. By tissue or organ donation.
4. Use of infected needles by healthy person
5. By taking narcotic drugs through injections.
6. To the baby born by an infected mother.

Unfortunately the person infected from AIDS virus does not show any symptoms of AIDS and the person lives a normal life for many years. Such persons unknowingly infect other person. After entering in our body HIV slowly reduces immunity capacity to fight against diseases. As a result person suffers from many deadly diseases which ultimately results in death. The patient suffers from fever for long duration and excess loss of weight and sweats a lot.

Till now there is not any treatment available for AIDS. Hence this disease is very deadly. No vaccine is available for its prevention. Although scientist's throughout the world including India are continuously working hard to formulate an effective vaccine for treatment of AIDS. Some vaccines like HIV- HIG (HIV Hyper immunoglobulin), Biocin etc. have been developed but practically none of the vaccine can provide complete protection against this disease. Recently as per a report published in Journal of Virology (March, 2008), a group of researchers working in Albert Einstein college has successfully developed genetically transformed cytotoxic T- Lymphocytes (CTLs). Strong futuristic possibility is being expressed by the scientists to effectively destroy the HIV infected cells with the help of genetically modified lymphocytes. More and more publicity of preventive measures, safe sexual intercourse, secure blood exchange etc. are some preventive measures which should be adopted to protect our self from this disease.

The only way of prevention from this disease is to avoid the reasons which spread this disease.

1. Use disposable needle or clean sterilized

needle for injection whenever is needed.

2. Use safe blood free from HIV, obtained from authorized blood banks.
3. Sexual relationship should be restricted to one reliable partner only. Use nirodh (condoms) for safe sexual relations. Sufficient level of safety against AIDS can be achieved by using condoms.
4. Never use needles used by other human to administer narcotic drugs.
5. AIDS infected women should never conceive.

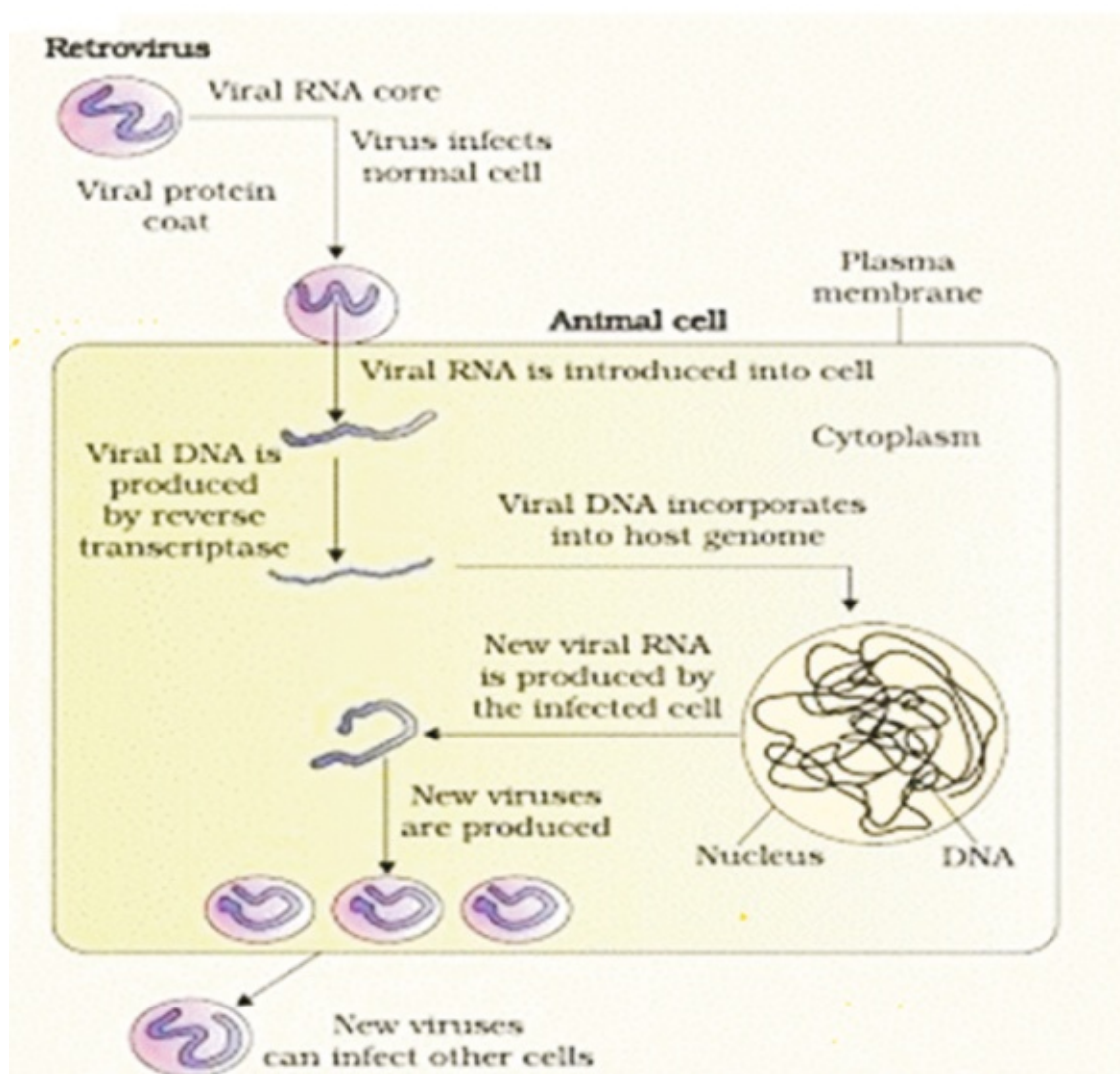
**Diagnosis-** 6 - 8 weeks after HIV infection, distinct immunological reactions starts to appear in the body. Following tests are used -

**(i) Enzyme Linked Immunosorbent Assay (ELISA Test)** - AIDS KIT is used in it which is with HIV antigens.

**(ii) Western Blot Test** - It is more reliable and exact test which is cheap and can be performed in short duration.

**Treatment** - Till now there is no any permanent and effective treatment of AIDS is possible only prevention from its causes is the cure. Although a few medicines have been formulated for treatment of AIDS but none has proved cent percent effective. These medicines are Azidothymidine (AZT), Foscarnet, Dideoxycytidine (DDC), Stavudine (D4T) etc. all are nucleotide analogues which stop synthesis of DNA (Gene) from viral RNA. Some other drugs are protease inhibitory like saquinavir or Invirase, Indinavir etc.

There are many myths about spreading of AIDS. But this disease does not spread through normal social contacts like shaking hands, living together in same house, playing together, reading and working, eating together, using same lavatory, coughing, sneezing, hugging etc. This disease even does not spread through biting of mosquito, bedbug's, moth and other insects. Hence it is important that we should never neglect the person affected from AIDS rather he should be treated sympathetically and help him to get complete medical facilities is our sacred duty.



**Note: Infected cell can remain alive while replication of virus are produced and release.**

Fig. 40.3 Replication of Retrovirus

First HIV infected person in our country was found in Chennai in 1986. So this disease is also known as a death warrant. For making the people around the globe aware of this disease from 1988, every year 1<sup>st</sup> December is celebrated as world's AIDS day.

Looking to the possibility of spreading of this disease as an epidemic, National AIDS control organization (NACO) was setup in India in 1992 which along with state level AIDS control committees works for controlling and prevention of AIDS.

## 2. Polio

Polio is a viral disease. Normally this disease is found in children as result they become handicapped.

This disease transmits through water and food items.

**Symptoms** - In initial stage of disease patients suffers from high fever, cough, cold, vomiting, loose motion etc. after 2-4 days patient finds him unable to move hands and legs. Many times virus of this disease enters in the brain and spinal cord due to which child starts getting fits and respiration rate

decreases.

For prevention of this disease Jonas Salk in America discovered a vaccine in 1952. Albert invented oral drug in 1955 for its cure. This drug is given to kids 3 times in first year of the birth, in interval of one month.

### 3. Rabies

This disease is caused by Rabies virus. The virus of this disease is found in the saliva of animals like mad dogs, cats, wolves, fox and monkey. After appearing symptoms of this disease death is certain. The disease caused by Rabies virus is called Hydrophobia which means fear of water.

**Symptoms** - The symptoms of this disease appears 4-5 days after biting the mad animal or dog. Inflammation and pain on bite site and fits come at the time of drinking any liquid. Patient does not allow anyone to come near him and foam comes out from his mouth. He fears of water.

For treatment of this disease, in addition to primary dressing at site of dog bite, dog should be kept in observation for at least 10 days. If after 10 days dog becomes mad or if it dies then resistant vaccines should be vaccinated in the patient's abdomen. For treatment of this disease, Louis Pasteur in 1885 discovered a vaccine. Such 14 Vaccines are administered in abdomen for 14 days. These are much painful because these vaccines are meant for abdominal muscles. Few years back; a new rabies vaccine was discovered. These vaccines are injected thrice on the hand. It is called as Merieux human diploid vaccine. These vaccines were firstly used in America in 1980 and now a day these are also used in India.

### 4. Mumps

This viral disease is found in children. This disease is also called as **epidemic parotitis**. Pathogen affects salivary glands. Especially parotid glands are swollen as a result of it difficulty occurs in swallowing food.

**Symptoms** - With occurrence of disease person feels cold and suffers from fever. Pain in head, throat and back portion of ear. Testes of an adult person swell and appear larger than normal and

sperms decrease in semen.

To avoid disease one should not come in direct contact with patient. The materials used by them should not be used.

For treatment of the disease at the swelling areas compressing from cold and hot bandage strips is beneficial. Aspirin should be used to get relief in pain.

### 5. Influenza

It is viral disease which is caused by Influenza virus. The effect of this disease is much in trachea and nasal chamber.

**Symptoms** - Pain occurs in patient's head, hands, legs and back, and shivering starts in body. Within 24 hours duration high fever (F) becomes. Tightness and pain seems in chest.

Disease is spread through saliva. By sneezing or speaking loudly particles of saliva spread across distances with this germ also dispersed.

For prevention of the disease surrounding area should be clean, stay away from patient's contact.

### 6. Jaundice

This fever is also caused by virus.

This disease is spread by contaminated food and water.

**Symptoms** - After getting this disease, patient suffers from fever, appetite starts decreasing. Patient is approaching delirium. Due to this disease patient feels vomits and headache. Person becomes weak and its liver swells. After some days of the disease eyes, nails of the patient appear yellow. Colour of his urine also becomes yellow.

For treatment of disease patient should be given complete rest. He should take fat free food and doctor's consultation should be followed properly.

### 7. Small pox

It is considered a highly contagious and chronic disease. Our country is eradicated from this disease. WHO has announced that this disease is completely eradicated from the earth.

Small pox is a viral disease. Virus of this disease is found in blood, larynx and nasal chamber of the patient.





Fig. 40.4 Infected child with small pox disease

This disease is spread by sneezing, Coughing and coming in contact with patient.

**Symptoms** - Patient suffers from high fever, his eyes become red and body becomes weak, as a result of which he remains dull. After three days of infection red rashes appear on the skin which are initially present on legs, hands and face after they appear in other body parts. A fluid is filled in these rashes. These rashes become dry after one day. At this time, patient suffers from high fever which subsides in one day and the rashes fall down in the form of crust.

The wounds should be washed with red medicine solution (potassium permanganate solution). The use of penicillin and sulfa drugs is beneficial. Children should be vaccinated with small pox vaccine.

## 8. Hepatitis

Hepatitis is a virus borne infectious disease. The children and adults are mainly affected by this disease. Although hepatitis is caused by six different types of viruses but among them the disease caused by two types of viruses is main and important.

**1. Hepatitis A** - Generally it is known as jaundice in which liver becomes damaged. This disease is caused by Hepatitis 'A' virus, HAV. Its infection is occurred by contaminated food and water. Pathogenic viruses are also found in human body during disease and after recovery and comes

out with fecal urine. This disease can be spread in the form of epidemic. Children and adults both are suffer from this disease. But it is more serious in adults.

**2. Hepatitis B** - It is also known as Serum Hepatitis which is caused by infection of Hepatitis B virus, HBV. This virus is a DNA virus and is more dangerous than HIV. Hepatitis B virus was discovered in the blood of an Australian tribal by Dr. Blumbarg in 1965. Therefore it is also called as Australian antigen. Dr. Blumberg was awarded Nobel Prize in 1977 for this discovery. It is transmitted through blood contact. It is normally found in adults. Hepatitis B virus spreads through followings -

- (i) Transfusion of infected blood
- (ii) By using of infected equipment or needles
- (iii) From infected pregnant lady to new born baby.
- (iv) By inter course with an infected partners.
- (v) Shaving beard of many persons with a single blade or using single needle for piercing nose and ears.

**Symptoms of Hepatitis B** - The person suffering from this disease shows the symptoms like fever, jaundice, vomiting, dark yellow urine, low appetite etc. If the disease remains untreated for long time, it can lead to liver cancer and where is possibility of interstitial swelling in liver.

In addition to above types of hepatitis C, D, E and G viruses also cause Hepatitis disease.

**Diagnosis** - As a result of antibody response action Hepatitis virus stimulates production of specific antibodies or many antibodies in the body. These antibodies are of IgM type. Therefore by the presence of different types of specific antibodies in body fluid (mainly serum), types of virus are identified.

## Preventive Measures and cure

1. Use fresh and clean water
2. Proper health facilities should be used for urination and defecation.
3. Always use disposable syringe and needles.
4. Equipment for operation should be completely sterilized.

5. Avoid transfusion of infected blood.
6. Safe sex should be made
7. For protection from Hepatitis virus one should go for vaccination. For prevention presently vaccines against Hepatitis A and B viruses are available.

### (C) Disease Caused by Protozoa

#### 1. Amoebiasis

Amoebiasis disease is also known as amoebic dysentery. This disease is caused by *Entamoeba histolytica* named protozoa.

**Symptoms** - In this disease trophozoite stage of pathogen enters in intestinal wall and secretes tissue decomposing enzymes, which decompose the cells. By this, in the form of small ulcer like outgrowths are formed on these places. Mucus is filled in them. These outgrowths burst in intestine and secrete mucus which comes out along with faeces.

Patient does not suffer from fever but motion comes with cramps in stomach. Pus and blood comes in motions. Patient becomes very weak.

Disease spreads through house fly, air and water.

For prevention of disease, boiled water should be used for drinking purpose. Uncovered food and other food items should not be consumed. House fly works as a mechanical carrier of this disease.

To cure these diseases medicines such as Emetine, Fumagillin, Metronidazole etc. Should be used.

#### 2. Diarrhoea/ Giardiasis

It is a protozoan disease which is caused by *Giardia* named flagellated protozoan. This enters in body through water, food etc. and reaches to intestine. This leads to functional irregularities in intestine.

##### Symptoms -

1. Patient suffers from loose motion due to this disease.
2. Stomachache and reduced appetite in patient.
3. Headache and restlessness.

To cure this disease, drugs such as Chloroquine, Camaquin, and Atabrine etc. are used.

#### 3. Trypanosomiasis

It is also called sleeping sickness. This disease is caused by *Trypanosoma gambiense*. It is transmitted tsetse fly *Glossina palpalis*.

This protozoan enters in lymphatic system of our body and secretes toxic substances which cause swelling in lymphatic system. From lymph *Trypanosoma* enters in cerebrospinal fluid of brain and therefore harms the brain.

**Symptoms**- Patient remains sleepy because of this disease.

Primaquine, Puromycin should be used to cure the disease.

#### 4. Malaria

This disease is caused by different species of *Plasmodium* named protozoan. *Plasmodium vivax*, *P. falciparum*, *P. malariae*, *P. ovale* and the most common species is *Plasmodium vivax*.

Disease is spreaded by biting of female anopheles mosquito.

**Life cycle of Plasmodium** - When female anopheles bites human then *Plasmodium* in the form of sporozoites enters in human body. Parasite multiplies in hepatic cells and red blood cells of human body. Haemozoin is formed which is reason for causing shivering, Chills, Fever. When mosquito bites infected human then gametocytes enters in parasite mosquito and next development of parasite completes in mosquito. By the process of

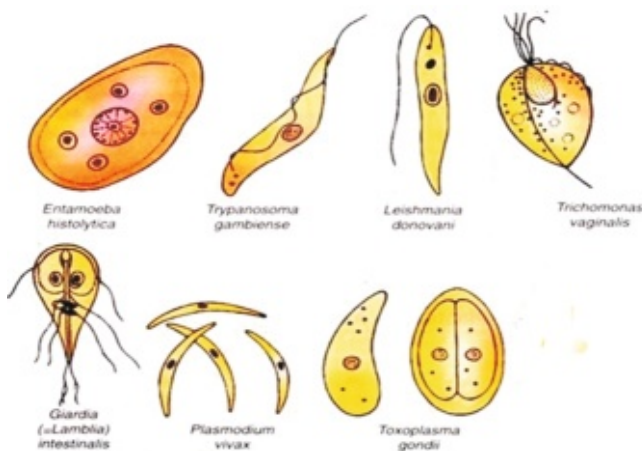


Fig. 40.5 Examples of Pathogens of phylum protozoa

gametogenesis gametes are formed and zygote is formed by fertilization. Further division of zygote again sporozoites are formed which enters in the salivary glands of mosquito. When mosquito bites human then sporozoites enters in his body. For treating this disease the effect of antimony compounds containing medicine provides special benefit.

**Symptoms** - When disease occurs it causes

headache. Patient feels nausea and vomiting starts. Coldness is followed by high fever. In the season of malaria one should take 300 mg quinine per day to protect from this disease. Boiled water should be used. Vegetables and fruits should be consumed only after proper washing. Still water should be drained out properly from house or from surroundings. D.D.T. Gamaxene, Kerosene oil should be sprayed to stop spreading of mosquitoes.

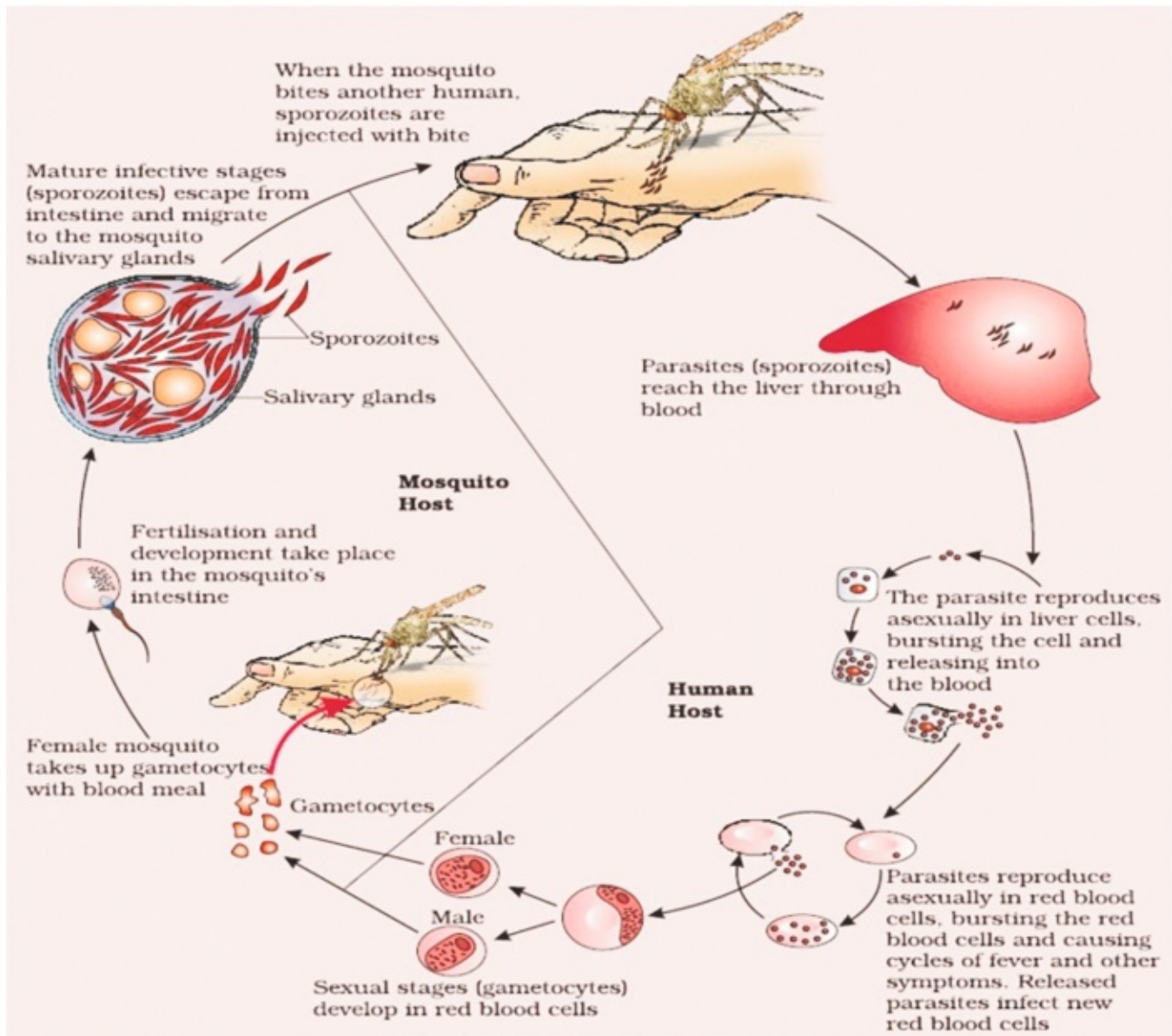


Fig. 40.6 Life cycle of Plasmodium



## 5. Leishmaniasis / Kala - Azar

This disease is caused by different species of *Leishmania*. *Leishmania* is a flagellated parasite which is found in blood of vertebrate. **Kala-Azar** is caused by *Leishmania donovani*.

**Symptoms** - Parasite of this disease blocks Reticulo Endothelial system in body, by which spleen is highly enlarged in size. It forms boils like bulges on the body, specially affects nasal chamber, mouth and pharyngeal region.

## 6. Trichomoniasis

This disease is caused by species of *Toxoplasma* which are flagellated protozoa. Most common species of *Trichomonas* is *Trichomonas vaginalis*. This protozoan lives in vagina of females and causes vaginitis disease.

**Symptoms** - In this disease, foamy substance is discharged from vagina of female and causes itching and burning in vagina.

## 7. Toxoplasmosis

This disease is caused by *Toxoplasma gondii* which is a sporozoan protozoon. It is found in all places of the world.

**Symptoms** - This parasite is found in cells of Reticulo Endothelial System and central nervous system. Hydrocephalus and chorioretinitis are symptoms of this disease.

## (D) Disease caused by Helminths

### 1. Ascariasis

This disease is caused by round worm *Ascaris*. As compared to adults, its frequency is more in children. The egg of this worm moves out through the fecal material of infected person and contaminates soil, water and plants. By consumption of contaminated food and water infect the healthy person.

Sometimes this worm reaches to blood stream by penetrating the epithelial layer of intestine, by blood it reaches to vital organs like kidney, spinal cord, brain, and muscles and cause severe damage. When they stay in lungs drastic hemorrhoid conditions are developed. Extreme case of infection may lead to severe pneumonia. Sometime fever,

anemia, leukocytosis, muscular pain, intestinal blockage and eosinophilia occur after its infection.

The adult worms often cause gastroenteritis and when they migrate in vermiform appendix, gall bladder and bile duct then swelling cause in these organs. The adult worm obtains their food from the food present in intestine of host. They also suck blood from the intestinal wall. This worm secretes poisons which cause neural symptoms like strains, fits, unconsciousness or deep sleep and nervousness.

### 2. Enterobiasis

This disease is caused by *Enterobius vermicularis*. These worms are also known as pin or seat worm.

They are present on the edge of anal part of rectum in human body. This disease is more prevalent in children as compared to adults.

**Symptoms** - Due to this disease itchiness is caused around anus. Appetite decreases and sleeplessness. While sleeping child gnashes teeth and urinates in bed. In girls these worms enter vagina and causes vaginitis disease.

### 3. Dracunculosis

This disease is caused by *Dracunculus*. It is known by the name of **Guinea worm** or **Naaru**. In human it is mainly found in subcutaneous tissues especially under skin layer of arms, legs and shoulders.

**Symptoms** - When female having eggs and try to come out from the skin of infected person to release embryo then first of all burning and itching occur at that place. Due to secretion of poisonous substances at this place by female worm, small blister is formed on the skin and anterior portion of female comes out. During coming out the worm from skin, generally local pain and inflammation can be observed. Generally blister is cured in few days.

For the treatment of disease worm is removed through surgery. In villages naaru worm that stays out the skin wrapping on wooden stick and pulling carefully the worm which is peeping out of the skin. In this process there are more chances of breaking



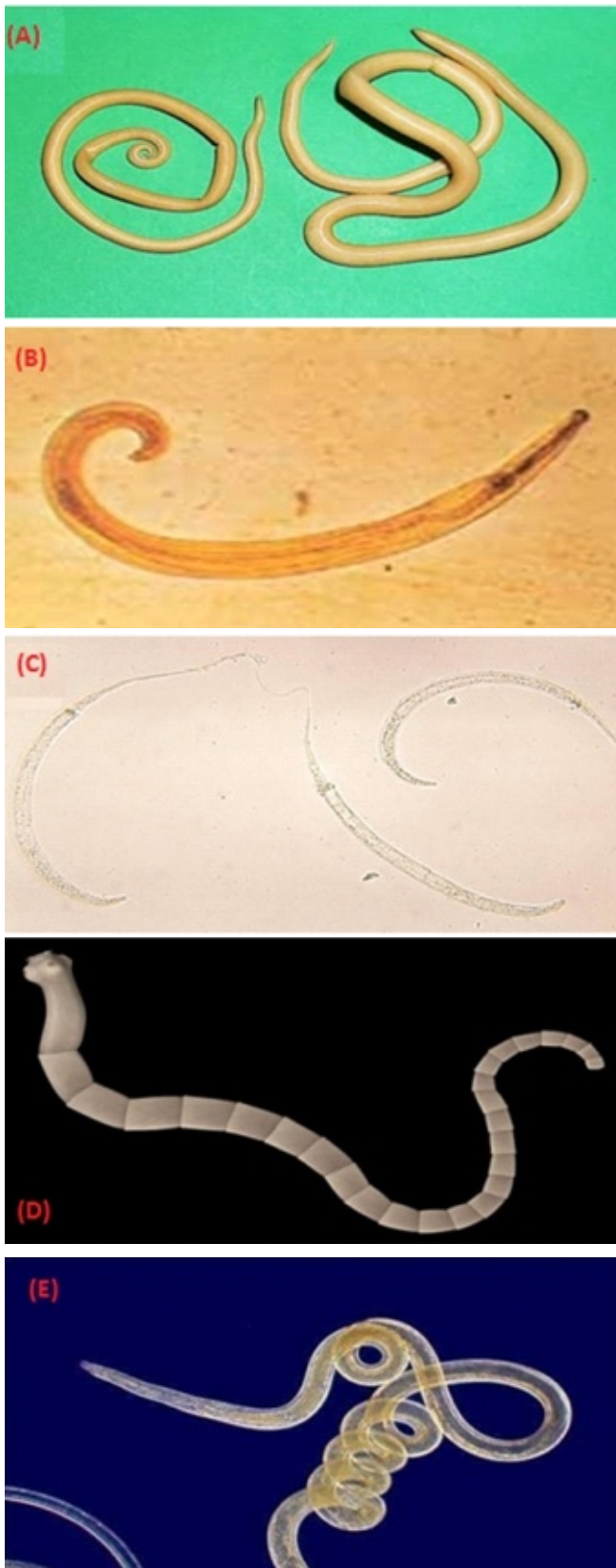


Fig. 40.7 Examples of Pathogens of phylum Helminths  
 A. Ascaris, B. Enterobius, C. Dracunculus,  
 D. Taenia, E. Phylaria

the worm inside the body.

#### 4. Taeniasis

This disease is caused by various species of Tapeworm.

**Symptoms** - The patient suffers from stomachache and keeps vomiting again and again. A condition of anemia arises. Patient feels excess hunger. Excess eating results in dyspepsia. The poisonous substances released by worm causes increase in number of eosinophil cell in blood and disorders in nervous system.

### II. Noninfectious Diseases

Infection is not caused by such diseases of body. Therefore these are called non-infectious diseases.

#### 1. Cancer

In medical field even today cancer is considered as one of the most deadly and complex disease. On the basis of tissue classification of tumors is specific. Main types are mentioned below -

(i) **Carcinoma** - Tumor originates from epithelial cells are called carcinoma. They normally originate on skin and surface of internal organs.

(ii) **Sarcoma** - Malignant tumor originates from connective tissue are called sarcoma. These are normally developed in mesodermal structures.

(iii) **Osteoma** - The tumor formed in bones are called osteoma.

(iv) **Fibroma** - The tumor formed in filamentous tissues are called fibroma.

(v) **Glioma** - Such type of tumors are formed in central nervous system and connective tissues of brain.

(vi) **Melanoma** - It is rapidly growing pigmented tumor which is developed from specific type of over growth of pigment present in skin.

(vii) **Lymphoma** - Cancer that develops in lymph nodes and other tissues of lymphatic system are called lymphoma.

On the basis of numerous symptoms pre cancer stage or tumor of cancer is investigated. Its major symptoms are as follows :-

1. Any swelling or blister or boil which does not

cure or reoccurs after getting cure.

2. Fluid discharge continuously or periodically from any pores of body.
3. Presence of any lump or lump like structure in tissues in breast may be cancer.
4. Indigestion or irregularity in stomach which occurs repeatedly.
5. Severe constipation and diarrhea and they appear repeatedly after curing.
6. Sudden loss of body weight.
7. Complaint of regular coughing or sore throat for long time.

### Cancer Treatment

Molecular biology is used to identify the genes of inherited susceptibility of persons toward some cancers. Detection of such genes is necessary which predisposes a person against specific cancer.

**1. Radiotherapy** - In this therapy cancer cells are destroyed by radiations.

**2. Chemotherapy (chemical Therapy)** - In this therapy cancer cells are treated with anti-cancer medicines. Alopecia and anemia are major side effects of this therapy.

Today most of the cancers are treated by a combination of surgery, radiotherapy and chemotherapy. r-Interferon is also used to destroy cancer cells which activate the immune system of the body which itself destroys cancer cells.

### Cancer :

Cellular differentiation in human body is a regular process but when this regulatory process ends and contacts inhibition (property of common cells) ends, cells divide in uncontrolled manner as a result of which undifferentiated group of cells is formed that is called tumor.

### Type of tumor :

1. Benign tumor
2. Malignant tumors

Benign tumors often are confined to their origin site. They don't have capacity to spread in other parts, therefore these are less harmful.

Whereas malignant tumor is called cancer and they spread to other parts from origin site, they start

forming new tumor; this property is known as metastasis.

**Causes of cancer** - The factors by which normal cells converted into cancer cells are called carcinogens. These factors could be physical (radiations), Chemical (Present in Tobacco smoke) and biological (Onco virus).

The ultraviolet radiations (non- ionizing radiations) cause skin cancer by causing mutation in DNA, while X-rays (ionizing radiations) cause Leukemia (blood cancer).

**Diagnosis** - The diagnosis of cancer is based on biopsy and blood or bone marrow testing for counting the increased number of cancer cells. As in case of Leukemia or blood cancer, in biopsy a doubtful tissue is carried out by microscopic testing of the stained thin section.

Radiography (using X-ray), computed tomography and Magnetic Resonance Imaging (MRI) are used for detection of cancer of internal organs. Intense magnetic field is used in MRI, while x-rays (ionizing radiations) are used in radiography. To defeat some cancer, antigens are used against cancer specific organs.

It is important for treatment of cancer that it should be diagnosed in initial stages. On beginning of tumor formation, cancer can be controlled easily. When tumor seems to affect nearby or distant tissues then it is difficult to control.

### 2. Allergy

Allergy is caused by excretion of histamine and serotonin from mast cells present in connective tissues.

Today allergy is the most common diseases in human. In this disease body becomes much sensitive towards some chemical and physical factors. Some food substances, drugs, dust, floral fragrance, pollen grains, chemicals, Sunlight, special type of clothes, winter, summer etc. cause sensitivity in body. Such factors are called allergens and disease caused by them is called allergy. Antibody made for allergens is IgE types. Symptoms of allergy include running nose, sneezing and difficulty in breathing. This disease is

mostly found in people whose immunity capacity is low. This disease can be inherited also.

### 3. Asthma

Asthma is an example of pulmonary obstruction disease. This disease is caused by contraction of respiratory bronchioles and as a result patient feels much difficulty in breathing. Because of breathing, dyspnea (pain in breath), cough and wheezing are causes. Due to susceptibility breathing allergy occurs in people less than 30 years of age. It is mostly occurred by pollen grains of plants. In old age people, it occurs due to non-allergy stimulants present in air such as dust and smoke etc.

#### Symptoms of disease

1. Red rashes occur on skin of patient
2. Patient feels difficulty in breathing.
3. Itchiness occurs on skin.
4. Patient catches cold and keeps sneezing again and again.

To prevent the disease person should try to avoid all those things that make him prone allergy.

For treatment of allergy it is important to know which substances causes allergy. Symptoms of allergy can be reduced by the use of antihistamine, adrenaline and steroids.

### 4. Hypertension

Blood flows with a specific pressure in human arteries but due to some special reasons arterial pressure increases. At this time systolic pressure of heart becomes more than 120 mm Hg and diastolic pressure is more than 80 mm Hg. In this way cardiac output increases in this disease.

If extra pressure sustains for a long period the chance of following dangerous results :-

- (i) Heart failure
- (ii) Brain stroke
- (iii) Kidney damage.

### 5. Myocardial infarction

Sudden reduction in blood supply to coronary artery is the main reason of this disease. The part of cardiac muscle where blood supply does not reach there oxygen supply is obstructed. As a result

cardiac muscles cannot work and in this way they can be considered dead. The myocardial infarction can also be considered as synonym of heart attack.

The major reasons of obstruction are formation of clot or thrombus, activation and aggregation of platelets in coronary vessels and formation of atherosclerosis in vessels.

**Symptoms** - Sever pain in chest that may generally persists for 30 minutes or more. Along with pain patient suffers from nausea, vomiting, and interrupted breathing. Pain spreads in body in the same way as angina. Intense myocardial infarction may cause patient's death.

### 6. Emphysema

This disease is also mostly found in humans. It is one of the chronic pulmonary diseases caused by side effects of smoking and air pollutants. Word emphysema means be excessive air in lungs. Lungs become inelastic in it. Generally it is due to destroy of alveoli or air chamber wall in large number. This results in formation of large sized emphysema lumen in place of small sized alveoli and elasticity of these large sized lumen decreases. Degradation of alveolar wall reduces the net surface area of the alveoli which affects gaseous exchange between alveoli and blood.

### 7. Cataract

This is most common eye disease found in our country. Malnutrition is the main reason of this disease. This disease is mostly common in old age. Along with increase of age, lens of eye becomes flat, dense and appears brown and at last becomes opaque by which vision of the patient lost. This disease is called cataract. Now a days, this disease is treated by surgical implanting the old lens with new one.

### 8. Glaucoma

This eye disease is also quite common in our country. This defect is mainly caused by filling of more fluid in vitreous chamber and aqueous chamber. A fluid is filled in vitreous chamber and aqueous chamber. Due to pressure of these fluids the wall of eye ball spreads and its layers remain at their own place. If this fluid becomes in more quantity

then the pressure increases. This is called glaucoma. Retina is damaged in this disease results in blindness.

## 9. Strabismus

This type of eye defect is found in many humans. This defect is due to eye muscles. Six eye muscles rotate eye ball in eye orbit. If anyone muscle among them becomes smaller or larger then eye ball appears to be some tilted in eye orbit. This is called as strabismus. This defect can be removed up to certain extent, through surgery.

### Important Points

1. Many types of diseases are found in human. Most of these diseases are caused by pathogens like virus, bacteria, fungi, protozoa, helminthes and arthropod.
2. Some diseases in human are caused by genetic and hormonal imbalancing.
3. Many diseases are non-infectious type.
4. Mutual interactions between pathogens and human organs are known as infection.
5. Diphtheria disease in human is caused by *Corynebacterium diphtheria*.
6. Tetanus is a suicidal disease and caused by *Clostridium tetani*. To avoid this disease, children should be vaccinated with an anti tetanus vaccine.
7. Gonorrhea is a disease related to genitalia. It is caused by *Neisseria gonorrhea*.
8. The relation of meningitis disease is with organs of nervous system.
9. Pneumonia, dysentery tuberculosis are bacterial diseases.
10. Leprosy is neither side effect of misdeed of previous birth nor genetically.
11. AIDS is a viral disease and caused by H.I.V. It is mostly caused by unprotected sexual contact.
12. Polio is caused by smallest virus and this disease is found in children.
13. Disease caused by rabies virus is known as hydrophobia. It is caused by biting of mad dogs.
14. Mumps, chicken pox, common cold, flu, yellow fever are also virus borne disease.
15. Amoebic dysentery is caused by *Entamoeba histolytica*.
16. Diarrhoea, trypanosomiasis, leishmaniasis and trichomoniasis are caused by flagellated protozoan.
17. Malaria is caused by *Plasmodium* and spread through biting of female *Anopheles* mosquito.
18. Helminthes parasites also cause many diseases in human mainly are taeniasis, cysticercosis, schistosomiasis, ascariasis, ancylostomiasis, guinea worm disease etc.
19. Many non-communicable diseases are also found in human out of them cancer is most dangerous. Its treatment is not identified till now.
20. Angina, myocardial infarction, hypertension, asthma, emphysema, cataract, hypermetropia, myopia, glaucoma, strabismus and other non-infectious diseases are also found in human.

### Practice Questions

#### Multiple choice Questions -

1. In which of following disease deformations in fingers are developed?  
(a) Tetanus (b) Leprosy  
(c) Tuberculosis (d) Pneumonia
2. Which type of following virus causes AIDS-?  
(a) Poliovirus (b) H.I.V  
(c) Rabies (d) Small pox virus
3. Kala Azar disease is caused by  
(a) *Entamoeba histolytica*  
(b) *Leishmania*  
(c) *Trypanosoma*  
(d) *Plasmodium*
4. Malaria is caused by biting of which mosquito  
(a) Male *Anopheles*  
(b) Female *Anopheles*



- (c) *Culex*  
(d) Tsetse fly
5. Guinea Worm disease is caused by  
(a) *Dracunculus* (b) *Ascaris*  
(c) *Enterobius* (d) *Taenia*
6. Treatment of which disease is possible only in initial stage  
(a) Cancer (b) Asthma  
(c) Emphysema (d) Allergy
7. Which of the following is genetic disease ?  
(a) Sickle cell anaemia  
(b) Hemophilia  
(c) Colorblindness  
(d) All of above

### Short Answer Questions -

1. What do you mean by infectious disease? Give two examples of disease.
2. Write short notes on Acquired Immune deficiency syndrome.

3. Write notes on followings  
(i) Amoebiasis  
(ii) Malaria  
(iii) Guinea worm diseases  
(iv) Cancer

### Essay type Questions -

1. Which are non-infectious diseases? Describe any two diseases in detail.
2. Describe protozoa borne diseases.
3. What are infectious diseases? Explain any two infectious diseases by giving their examples.

### Answer Key-

1 (b) 2 (b) 3 (b) 4 (b) 5 (a) 6 (a) 7 (d)