Health,Common Diseases in Human & Immunity

1 Mark Questions

1.Why is secondary immune response more intense than the primary immune response in humans?[All India 2014]

Ans. Since, the secondary immune response is based on the memory of primary response,i.e. first encounter with antigen. The second generated immune response is more fast having higher affinity for antigen, and therefore more intense than primary immune response.

2.Name any two types of cells that act as 'cellular barriers' to provide innate immunity in humans.[Delhi 2014]

Ans.Certain type of leucocytes (such as PMNL- neutrophils, monocytes) and natural killer cells are two types of cells that act as 'cellular barriers' to provide innate immunity in humans

3.Name the two intermediate hosts on which the human liver fluke depends to complete its life cycle so as to facilitate parasitisation of its primary host [Delhi 2014]

Ans.The human liver fluke requires two intermediate hosts, i.e. freshwater snail and fish to complete their life cycle and facilitate parasitisation of its primary host

4.How does haemozoin affect the human body when released in blood during malarial infection? [Foreign 2014]

Ans. The release of toxic haemozoin by the ruptured RBCs during malarial infection accounts for recurrence of high fever and chill every 3-4 days.

5.What is an autoimmune disease? Give an example. [Foreign 2014]

Ans. The abnormal response of an immune system in which it fails to recognise 'self and 'non-self' and start destroying its own cells and molecules is called autoimmune disease. Rheumatoid is an example of autoimmune disease which destroys articular cartilage and fusing bones

6.When does a human body elicit an anamnestic response? [All India 2013; Delhi 2011 C]

Ans. Second encounter of the organism with same antigen or pathogen elicits anamnestic or secondary response for which body have memory of first encounter.

7.State two different roles of spleen in the human body? [All India 2012]

Ans. The two roles of spleen in human body are:

(i) Spleen acts as a filter to trap blood-borne microorganisms.

(ii) It is also a large reservoir of erythrocytes

8.How do interferons protect us?[All India 2012]

Ans.Interferons produced by virus-infected cells protects the non-infected cells from viral infection by inhibiting its replication and making cells resistant to viral infection

9.Why do pollen grains of some flower trigger sneezing in some people?[Foreign 2012]

Ans.Pollen grains are allergens and cause allergy in some people due to release of chemicals i ike histamine and serotonin from mast cells

10.What is it that prevent a child to suffer from a disease he/she is vaccinated against? Give one reason. [Delhi 2010]

Ans. Vaccination produce antibodies in large numbers, which protect the child by neutralising the pathogenic agents during infection.The vaccine also generate memory B and T-cells.

11.How does malaria differ from chikungunya with reference to their vectors?[All India 2010 C; Delhi 2008]

Ans.Malaria is spread by the vector, i.e. Anopheles mosquite, whereas chikungunya is spread by the vector, i.e. Aedes

12.Malaria, typhoid, pneumonia and amoebiasis are some of the human infectious diseases. Which one of these are transmitted through mechanical carriers. [Foreign 2010]

Ans.Amoebiasis is transmitted through mechanical carrier, i.e. houseflies

13.How does colostrum provide initial protection against disease to newborn infants? Give one reason.[Delhi 2009]

Ans.Colostrum contains antibody IgA that provides protection against disease, thus protecting the newborn infants

14.Some allergens trigger sneezing and wheezing in human being. What causes this type of response by the body? [Delhi 2009]

Ans.Immune system of the body produce exaggerated response (allergy) against allergens and release chemicals like histamines and serotonin from mast cells. This is the cause of sneezing and wheezing, in response to these allergens.

15.Name the type of cells, the AIDS virus enters into after getting in the human body. [All India 2009]

Ans.AIDS virus enter into macrophages after getting in human body

16.Where are mucosal associated lymphoid tissues present in the human body and why? [All India 2009]

Ans. The Mucosal Associated Lymphoid Tissues (MALT) are present in the lining of the major tracts,i.e.

respiratory, digestive and urogenital tracts. MALT constitutes about 50% of the lymphoid tissue in human body that elicits immune response to antigens along mucosal surfaces.

17.A boy of ten years had chickenpox. He is not expected to have the same disease for the rest of life. Mention how it is possible? [All India 2009]

Ans.(i)The antibodies developed in his body would circulate in body fluids and neutralise the pathogenic agent during subsequent encounters.
(ii) Further memory B-celis and T-cells are retained in the system, which trigger a more intense and quick response against the same antigen, thus preventing the occurrence of same disease in his life

18.What types of virus causes AIDS? Name its genetic material?[All India 2009]
Ans.Retrovirus causes AIDS. RNA is its genetic material

19.What causes swelling of lower limbs in patients suffering from filariasis? [Delhi 2008]
Ans.Wuchereria bancrofti and Wuchereria malayi, the filarial worm lives for many years in the lymphatic vessels of lower limb, cause inflammation and swelling.

20.What role do macrophages play in providing immunity to humans?[All India 2008]
Ans. Macrophages destroy the microbes (by phagocytosis) and provide protection against diseases.

21.How do neutrophils act as a cellular barrier to pathogens in humans?[HOTS; All India 2008]
Ans.Neutrophils in blood can phagocytose and destroy the microbes thus acting as cellular barrier to pathogens.

22.Name the two types of cells in which the HIV multiplies after gaining entry into the human body.[All India 2008]
Ans.HIV multiplies first in macrophages and then in helper T-cells or lymphocytes

23.In what way are monocytes a cellular barrier in immunity? [hots; Foreign 2008]
Ans. Since, monocytes can phagocytose and destroy the pathogens in blood, they act as cellular barrier

24.High fever, loss of appetite, stomach pain and constipation are some of the symptoms seen in a patient. How would the doctor confirm that the patient is suffering from typhoid and not amoebiasis? [Foreign 2008]
Ans.Typhoid can be confirmed by widal test.

25.Give the scientific name of the pathogen causing malignant malaria in humans.[Foreign 2008]
Ans. Plasmodium falciparumcauses malignant malaria in humans.

26.It was diagnosed by a specialist that the immune system of the body of a patient has been suppressed. Name the disease the patient is suffering from and its causative agent. [HOTS; Delhi 2007]
Ans.Patient is suffering from AIDS disease. Where in the immune system gets suppressed making the person susceptible to infections caused by pathogens. The causative agent of the disease is HIV (Human Immunodeficiency Virus).

27.How do virus infected cells provide innate immunity to healthy cells?[HOTS; Delhi 2007 C]
Ans. Virus-infected cells secrete proteins called interferons, which protect non-infected cells from viral infection. Thus, providing innate immunity to healthy cells

2 Marks Questions

28.List the symptoms of ascariasis. How does a healthy person acquire this infection? [All India 2014]

Ans. The symptoms of ascariasis, caused by roundworm include internal bleeding, muscular pain, fever, anaemia and blockage of intestinal passage A healthy person accquires this infection through consumption of water, vegetables or fruits contaminated with eggs of parasite Ascaris

29.Name an allergen and write the response of human body when exposed to it [Delhi 2014 C]

Ans.The allergen can be pollen grains, spores or dust particles.

When the allergens are inhaled or enter body system, they stimulate body to produce IgE antibodies and trriger an anti-allergic reaction. The chemical such as histamine and serotonin are released from mast cells, in respons to allergen, thereby causing dilation of blood vessels. The other symptoms of allergy, i.e. sneezing, watery eyes, running nose, etc

30.Differentiate between active and passive immunity. [Delhi 2014 c]

Ans.Differences between active and passive immunity

Active immunity	Passive immunity
Develops when body's own cells produce antibodies in response to infection or vaccine.	Develops when antibodies produced in other organisms are injected or administered into a person to counter act antigen.
Slow in response but long lasting effects.	Provides immediate relief but short lived.

31.How does a vaccine for a particular disease immunise the human body against that disease? [Delhi 2013c]

or

Why is a person with cuts and bruises following an accident administered tetanus antitoxin? Give reasons. [All India 2013]

Ans.During vaccination for a particular disease, an antigen or antigenic protein or pathogen which is in inactive form is introduced into the body which induces mild immuneresponse. The vaccine generates antibodies that neutralises the toxin/pathogen and produces memory B or T-cells, which recognise the pathogen in the subsequent encounters and produce antibodies.

or

Tetanus is a disease caused by Mycobacterium tetani. A person with cuts and bruises following an accident is administered tetanus antitoxin because this toxin contains antibody against the pathogen. This inactivates the pathogen (called passive immunity).

32.A patient showed symptoms of sustained high fever, stomach pain and constipation, but no blood clot in stools. Name the disease and its pathogen. Write the diagnostic test for the disease. How does the disease get transmitted?[Delhi 2013 C]

Ans.Typhoid is the disease that show symptoms, i.e. high fever, stomach pain and constipation.

Its causative agent is Salmonella typhi. Widal test is used for its diagnosis.Typhoid is transmitted through contaminated food and water

33.(i) Highlight the role of thymus as a lymphoid organs.

(ii) Name the cells that are released from the above mentioned gland. Mention how they help in immunity? [Delhi 2012]

Ans.(i)Thymus is a primary lymphoid organ of the immune system. Maturation of lymphocytes occur in it. T-cells produced in the bone marrow get mature in thymus and are released from here.

(ii) T-cells are released from thymus, upon maturation. They themselves do not produce antibodies, but help B-cells to produce them. They are also responsible for Cell Mediated Immune (CMI) response.

34.Name the parasite that causes filariasis in humans. Mention its two diagnostic symptoms. How is this transmitted to others?[Delhi 2012]

Ans.Wuchereria *(W.* bancrofti *and* W. malayi) are the filarial worms that cause filariasis in humans.

Diagnostic Symptoms

(i) Collection of fluid causes swelling in arms, breasts, legs and genital region.

(ii) Inflammation in lower limbs, resulting in deformities.

It is transmitted to a healthy person through the bite of the female mosquito vector, Culex.

35.(i) Name the protozoan parasite that causes amoebic dysentery in humans.

(ii)Mention two diagnostic symptoms of the disease.

(iii)How is this disease transmitted to Others? [Delhi 2012,2009]

Ans.(i)Entamoeba histolytica is a protozoan parasite in the large intestine of human, which causes amoebiasis (amoebic dysentery).

(ii) Diagnostic Symptoms

- Abdominal pain and cramps.
- Stools with excess mucous and blood clots.

(iii) The disease is transmitted by houseflies. They act as mechanical carrier as they transmit the parasite from faeces of infected persons to food products, thereby contaminating them

36.Name the two special types of lymphocytes in humans. How do they differ in their roles in immune response? [All India 2012]

Ans.Two types of lymphocytes are:

(i) B-lymphocytes or B-cells (ii) T-lymphocytes or T-cells

B-lymphocytes and T-lymphocytes are:

B-lymphocytes	T-lymphocytes
They produce antibodies against antigen.	They stimulate B-cells to produce antibodies.
They do not respond to organ transplant.	They react to organ transplant.

37.(i) Name the group of virus responsible for causing AIDS in humans. Why are these virus so named?

(ii)List any two ways of transmission of HIV infection in humans other than sexual contact? [All India 2012]

Ans.(i)Retrovirus is the group of virus causing AIDS in humans. They contain RNA as genetic material and with the help of enzyme reverse transcriptase they make DNA on RNA template. Thus, they are called retrovirus.

(ii) (a) By sharing infected needles.

(b) By transfusion of blood contaminated with HIV

38.Why is an antibody represented H_2L_2 ?[Foreign 2012]

Ans.Antibody is represented as H_2L_2 because each antibody molecule has four peptide chains, i.e. two small light (L) chains and two longer heavy (H) chains.

39.Name the different types of cell providing cellular barrier responsible for innate immunity in humans.[Foreign 2012]

Ans. Cellular barriers are provided by:

(i) Certain types of WBC like polymorphonuclear leukocytes and monocytes in blood.

(ii) Macrophages in tissue

40.List any two emergent circumstances, when a medical doctor would recommend injection of a pre-formed antibody into the body of a patient and why? [HOTS; Delhi 2011C]

Ans.(i) In case of snake bite, quick immune response is required and we cannot wait for the body to produce antibodies.

(ii) In tetanus, it is infected with some deadly microbes to which quick immune response is required

41.How is an allergic reaction caused by an allergen? Name the drug that can reduce the symptoms of allergy? [All India 2011 C]

Ans.Allergens can produce IgE type of antibodies. There is release of histamine and serotonin like chemicals from mast cells, which cause allergic reactions.The use of drug anti-histamine, adrenalin and steroids quickly reduce the symptoms of allergy.

42.Name the two types of immunity in a human body. Why are cell mediated and humoral immunities so called?[Delhi 2011]

Ans.Types of immunity system in human are:

(i) Innate immunity, acquired immunity or humoral immunity system and cell mediated immunity system.

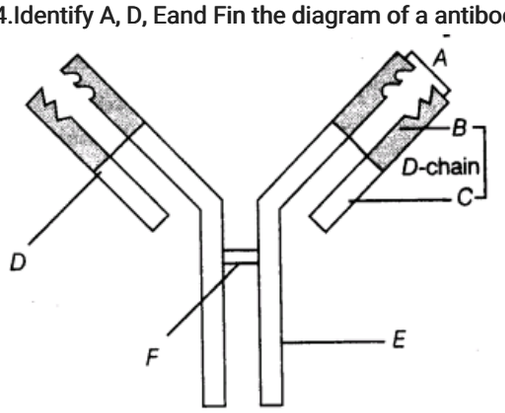
(ii) Cells mediated immunity is so called as it involves specialised cells, the T-lymphocytes. Humoral immunity is so called because it includes antibodies, which are found circulating in body fluid, the blood (humors-body fluids).

43.Write the scientific names of the causal organisms of elephantiasis and ringworm in humans. Mention the body parts affected by them. [Delhi 2011]

Ans.(i)Elephantiasis is caused by Wuchereria bancrofti and W. malayi. These affect lower limbs and genital organs.

(ii) Ringworm is caused by Microsporum, Trychophyton and Epidermophyton. They affect the skin, nails and scalp.

44.Identify A, D, Eand Fin the diagram of a antibody molecule given below:



Ans.A-Antigen binding region D-Light chain
E -Heavy chain
F -Disulphide bond/bridge

45.Name the host and the site, where the following occur in the life cycle of a malarial parasite
(i)Formation of gametocytes
(ii)Fusion of gametocytes [Delhi 2010]
Ans.(i)Formation of gametocytes occurs in erythrocytes (RBC) of human beings.
(ii) Fusion of gametocytes occurs in the intestine of mosquito

46.Define the term health. Mention any two ways of maintaining it.[All India 2010]
Ans. Health can be defined as a state of complete physical, mental and social well-being. It can be maintained by taking balanced diet, maintaining personal hygiene, regular exercise/yoga, vaccination against infectious diseases, etc

47.Why does a doctor administer tetanus antitoxin and not a tetanus vaccine to a child injured in a roadside accident with a bleeding wound?[HOTS; All India 2010]
Ans.In case of injury, tetanus antitoxin, i.e. preformed antibodies for tetanus are injected, as the child is infected with deadly microbes (tetanus-bacteria) to which fast immunisation is required.
If tetanus vaccine is injected, it will take sometime for the body to develop immunity and that will be too late and may prove fatal.

48.Identify A, B,C and D in the following table

Name of the human disease	Name of the causal bacterial virus	Specific organ or its part affected
Typhoid	*Salmonella typhi*	*A*
Common cold	*B*	*C*
Pneumonia	*Streptococcus pneumoniae*	*D*

[Foreign 2010]

Ans.A – Small intestine B – Rhinovirus
C – Nose, respiratory passage D – Alveoli of lungs.

49.The barriers in the innate immunity are given in the following table. Identify A, B, C and D. [Delhi 2010 c]

Types of barrier	Barriers
Physical	Skin, *A*
Physiological	*B*, in the eye
C	Interferon
Cellular	WBC, *D*

Ans.A-Lining of epithelium B-Tears C-Cytokine
D-Polymorphonuclear leukocytes

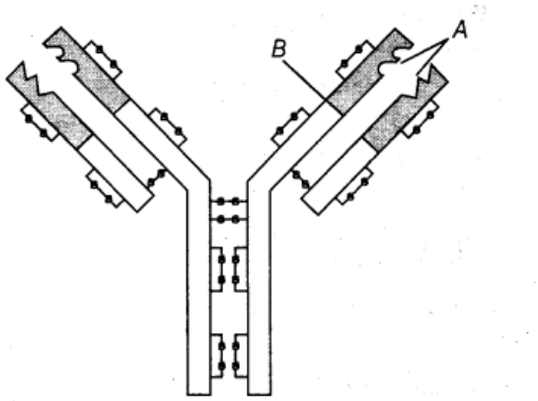
50.(i) How does a vaccine affect immunity?
(ii) How can we get immunisation against tetanus? [All India 2010]

Ans.(i) In vaccination, a preparation of antigenic proteins of pathogen or inactivated/ weakened pathogen (vaccine) are introduced into the body. The antibodies produced in the body against these antigens would neutralise the pathogenic agents during actual infection. The vaccines also generate memory B and T-cells.
(ii) Preformed antibodies for tetanus are directly injected to acquire quick immune response. This is called passive immunisation.

51.Why do normal cells do not show cancerous growth? [hots; ah India 2010]
Ans.Normal cells do not show cancerous growth as:
(i) Their growth and division are regulated by certain regulatory mechanisms.
(ii) They show the property of contact inhibition, by virtue of which contact with other cells inhibit their uncontrolled growth.

52.How do macrophages in the human body act as HIV factory?[All India 2010]
Ans.After entering the macrophage, the RNA of the virus replicates to form viral DNA by enzyme reverse transcriptase.
This viral DNA gets into the DNA of host cell and directs it to produce viral particles. The macrophages continues to produce virus and in this way acts as HIV factory

53.(i) What does the below diagram illustrate?
(ii)Name the parts labelled A and B
(iii)Name the type of cells that produce this molecule. [Delhi 2009]



Ans.(i)It shows antibody molecule.
(ii) A – Antigen-binding site B – Heavy chain
(iii) B-lymphocytes (B-cells) produce antibodies

54.State the effect of carcinogens on human body. Name the carcinogenic ionising and non-ionising radiations. Mention their carcinogenic effect. [All India 2010 C]
Ans. Carcinogens can transform normal cell into cancerous neoplastic cell. Carcinogenic ionising radiations are X-rays and gamma rays. Carcinogenic non-ionising radiations are UV-rays.These radiations cause damage to DNA, i.e. mutations that leads to transformation of normal cells into cancerous cell

55.list the specific symptoms of typhoid. Name its causative agent.[All India 2009]
Ans. Symptoms of typhoid are:
(i) Constant high fever (39-40°C)
(ii) Weakness and headache
(iii) Stomach pain
(iv) Loss of appetite
Intestinal (small intestine) perforation in severe cases which may cause death. Causative agent – Salmonella typhi

56.(i) Explain the property that prevents normal cells from becoming cancerous.
(ii)All normal cells have inherent characteristic of becoming cancerous. Explain.[HOTS; Foreign 2009]
Ans.(i)Contact inhibition is the property shown by normal cells. Due to contact with other cells, they inhibit their uncontrolled proliferation and growth.
(ii) All normal cells have oncogenes (c-onc) or protooncogenes. When activated under certain conditions, such genes could lead to oncogenic transformation of cells, i.e. they become cancerous,

57.What is colostrum? Why is it important to be given to the newborn infants?[Foreign 2009, Delhi 2009]
Ans.Colostrum is the milk produced by mother during initial days of lactation.Colostrum contains antibody IgA that provides protection against disease, thus protecting the newborn infants

58.How does spleen act as lymphoid organ? Explain. [Foreign 2009]
Ans. Spleen is a large, bean-shaped organ, which contain lymphocytes and phagocytes. It act as a filter to trap blood-borne microbes and contain large pool of erythrocytes, thus acts as secondary lymphoid organs.

59.Explain the response initiated when a dose of vaccine is introduced into the human body. [Delhi 2009]
Ans.When a dose of vaccine is administered in the human body, antibodies are produced in the body against these antigens. They would neutralise the pathogenic agents during actual infection.The vaccines also generate memory-B and T-cells, that recognise the pathogen quickly on subsequent exposure

60.How do normal cells get transformed into cancerous neoplastic cells? Mention the difference between viral oncogenes and cellular oncogenes. [Foreign 2008]
Ans. Normal cells are transformed into cancerous neoplastic cells due to physical, chemical or biological agents, which are known as carcinogens.
(i) Viral oncogenes Genes of viruses, which cause cancer.
(ii) Cellular oncogenes Genes present in normal cells, which become activated under certain conditions and cause oncogenic transformation of the cell.

3 Marks Questions

61.Community service department of your school plans a visit to a slum near the school with an objective educate the slum dwellers with respect to health and hygiene.
(i)Why is there a need to organise such visits?
(ii)Write the steps you will highlight, as a member of this department, in your interactions with them to enable them to lead a healthy life.[All India 2014]
Ans.(i)Slums are generally unauthorised and encroached colonies with no public facilities and organisation. Due to lack of education, cleanliness and other facilities and the poor living standard in terms of health, hygiene and nutrition such people are always at risk of acquiring infections. Therefore, there is a need to organise visits to slums so as to educate and crate awareness among them regarding the importance of hygiene.
(ii) The points to be highlighted while interacting with the slum people may be.

- Importance of cleanliness and hygiene of body as well as surroundings.
- Awareness and prevention of infectious diseases.
- Use of public facilities, i.e. toiletries.

- Consumption of properly cooked and hygienic food and water.
- Administration of vaccines to newborn children so as to prevent diseases.

62.(i) Name and explain going reason, the type of immunity provided to the newborn by the colostrum and vaccinations
(ii)Name the type of antibody:

- **present in colostrum**
- **produced in response to allergens in human body.[Foreign 2014]**

Ans.(i) The immunity provided to the newborn by colostrum and vaccinations is called passive immunity. This is because both in colostrum and vaccines the antibodies conferred are not produced by own body but are rather transferred passively to recipient's body. Such as IgA antibodies pass across the placenta or through milk (colostrum) to infants and provides passive immunity against infection.
(ii) The type of antibody present in

- colostrum is IgA.
- response to allergens in human body is IgE

63.(i)Name the causative organisms for the following diseases.
(a)Elephantiases
(b)Ringworm
(c)Amoebiasis
(ii)How can public hygiene help control such diseases? [Delhi 2014C]
Ans.(i)The causative agent or organism forfollowing diseases are:
(a)Elephantiasis is caused by Wuchereria bancrofti and W. malayi. These affect lower limbs and genital organs.
(b) Ringworm is caused by Microsporum, Trychophyton and Epidermophyton. They affect the skin, nails and scalp.
(c)Entamoeba histolytica is a protozoan parasite in the large intestine of human, which causes amoebiasis (amoebic dysentery).
(ii) Maintenance of public hygiene such as:

- keeping body and surroundings clean.
- consumption of clean drinking water, fruits and vegetables, etc.
- regular cleaning and disinfection of tanks and other water reservoirs, etc.
- All the above measures help controlproper disposal of waste and excreta.the increase in vectors of infectious diseases and their breeding places. Thus, there would be reduced chances of transmission of infectious diseases.

64.Name the cells HIV attacks first when it gains entry into a human body. How does this vims replicate further to cause immunodeficiency in the body?[Delhi 2013 C, 2010; All India 2010 C]
or
Trace the events occur in human body to cause immunodeficiency, when HIV gains entry into the body.[Delhi 2011; Foreign 2009]
Ans. The HIV virus attacks the macrophages cells in human body.
(i) RNA is replicated to form viral DNA by the enzyme reverse transcriptase.
(ii) Viral DNA now gets incorporated into the host cell's DNA and directs the infected cells to produce viruses.
(iii) Macrophages continue to produce virus particles and function as HIV factories.

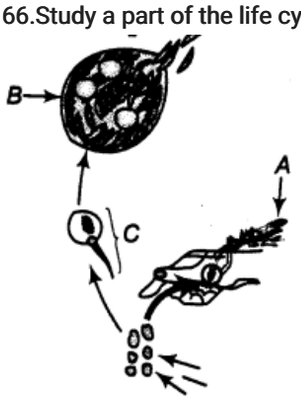
(iv) The virus particles enter helper T-lymphocytes in the blood, where they continue to replicate and produce viral progenies.
(v)The number of helper T-lymphocytes progressively decreases in the body of the infected person.
(vi) With the decrease in number of T-cells, the immunity also decreases. The person is unable to produce any immune response even against common bacteria like Mycobacterium, parasites like Toxoplasma, viruses and fungi.

65.Trace the life cycle of malarial parasite in human body, when bitten by infected female [All India 2012]

Ans.Life Cycle of Malarial Parasite (Plasmodium) in Human Body

Sporozoites are injected into body by female *Anopheles* mosquito
↓
Parasites (sporozoites) reach liver through blood
↓
Parasite reproduces asexually in liver cells and come out into blood by bursting of liver cells
↓
They enter red blood cells
↓
Parasite reproduces asexually in red blood cells and by bursting them release haemozoin, which causes cycles of fever, chill and shivering
↓
Released parasite enters new red blood cells and infect them
↓
Some continue asexual reproduction and others enter sexual stage and form gametocytes in RBCs, which are picked by *Anopheles* mosquito along their blood meal.

66.Study a part of the life cycle of malarial parasite given below.

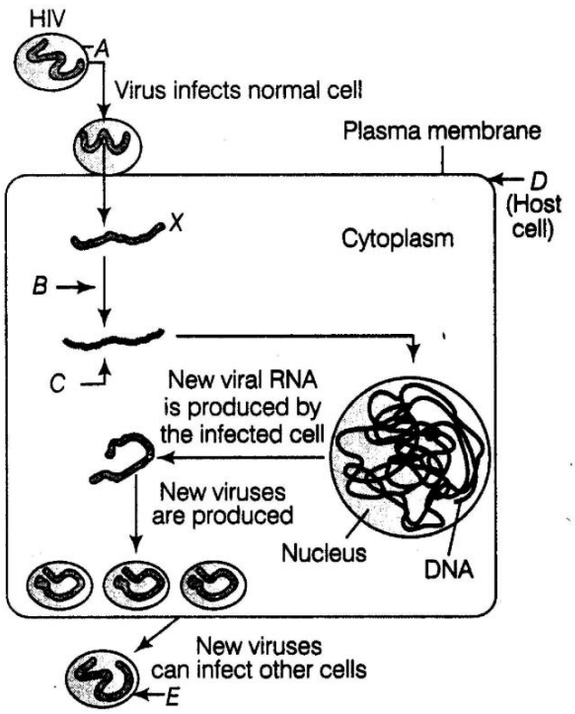


(i)Mention the roles of A in the life cycle of the malarial parasite.
(ii)Name the event C and the organ where this event occurs.
(iii)Identify the organ B and name the cells being released from it.[Delhi 2012]

Ans.(i)A is female Anopheles mosquito, these mosquito act as vectors and transmit the disease from patients to healthy individuals.
(ii) The event C is fertilisation. It occurs in the intestinal wall of mosquito.
(iii) B is salivary glands, sporozoites cells are released from it.

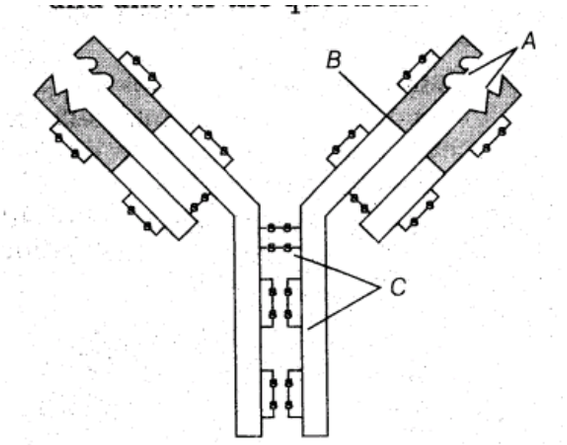
67.(i) Name the causative agent of typhoid in humans.
(ii) Name the test administered to confirm the disease.
(iii)How does the pathogen gain entry into the human body? Write the diagnostic symptoms and mention the body organ that gets affected in severe cases?[All India 2011]
Ans. *(i)* Salmonella typhi.
(ii) Widal test.
(iii) Pathogens enter the human body through contaminated food and water.
Symptoms of typhoid are:
(a) Constant high fever (39-40°C)
(b) Weakness and headache
(c) Stomach pain
(d) Loss of appetite
Intestinal (small intestine) perforation in severe cases which may cause death. Causative agent – Salmonella typhi

68.Study the diagram showing replication of HIV in humans and answer the following questions accordingly.



(i)Write the chemical nature of the coat
(ii)Name the enzyme B acting on X to produce molecule C. Name C.
(iii)Mention the name of the host cell D the HIV attacks first when it enters into the human body.
(iv)Name the two different cells the new viruses E subsequently attack. [All India 2011]
Ans.(i)A – Protein coat
(ii) B – Reverse transcriptase C – It is viral DNA
(iii) Macrophage (animal or human cell)
(iv)Macrophages and helper T-cells.

69.Identify A, B and C in the schematic diagram of an antibody given above and answer the questions.



(i)Write the chemical nature of an antibody.
(ii)Name the cells that produce antibodies in humans.
(iii)Mention the type of immune response provided by an antibody.[Delhi 2010]
Ans.A – Antigen binding site B – Light chain C – Heavy chain
(i) Antibodies are proteinaceous in nature.
(ii) B-lymphocytes
(iii) Humoral immune response

70.An antibody molecule is represented as H_2L_2. Explain. [Delhi 2010,2009 c]
Ans.Antibody is represented as H_2L_2 because each antibody molecule has four peptide chains, i.e. two small light (L) chains and two longer heavy (H) chains.

71.Mention the name of the causal organism, symptoms and the mode of transmission of the disease amoebiasis. [All India 2010]
Ans.Causal organism of amoebiasis -Entamoeba histolytica.
(i) **Symptoms** are constipation, abdominal pain and cramps, stool with excess mucus and blood clots.
(ii) **Mode of transmission** is through contaminated food and water.

72.(i) All human beings have cellular oncogenes but only few suffer from cancer disease.Give reasons.
(ii)How is a malignant tumour different from a benign tumour?[Foreign 2010]
Ans.(i) All cells have cellular oncogenes or proto-oncogene, which code for certain growth factors. Under certain conditions, they get activated and lead to oncogenic transformation causing cancer.
This transformation is induced by physical, chemical and biological factors called carcinogens.
(ii) Differences between benign and malignant tumour are:

Benign tumour	Malignant tumour
These tumours remain limited to their original location.	These tumours have neoplastic cells which separate and move to other sites.
These cause less damage to the body.	These cause more damage to the body.
Metastasis does not occur.	Metastasis is the main feature.

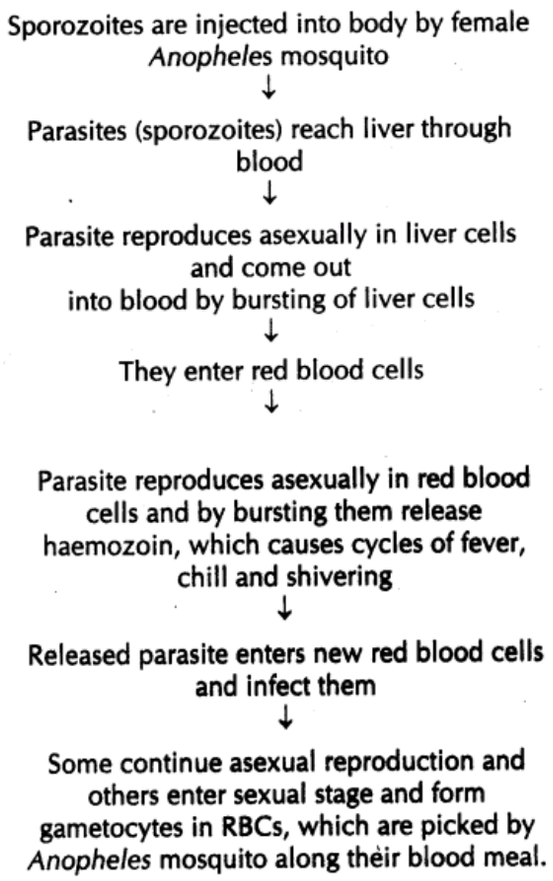
73.Trace the life cycle of Plasmodium in humans from the stage of entry until it is picked up by the female Anopheles. [All India 2010; Delhi 2008]
Ans. Life cycle of Plasmodium (malarial parasite)

(i) The infected female Anopheles mosquito transfers the infectious form of Plasmodium, i.e. sporozoites to the human body by biting.
(ii) Sporozoites reach the liver cells, where they multiply.
(iii) This is followed by their attack on red blood cells resulting in the rupture of RBCs.
(iv) Ruptured RBCs release a toxin called haemozoin, responsible for recurring fever, chills and shivering.
(v)The parasite enter female Anopheleswhen they bite an infected person.
(vi)In the body of mosquito, they fertilise and multiply in stomach wall.
(vii)Sporozoites are then again transferred to the human body by mosquito bite.

74.Give the scientific name of the parasite that causes malignant malaria in humans.At what stage does this parasite enter the human body? Trace its life cycle in human body. [Delhi 2009]

Ans. Plasmodium falciparumcauses malignant malaria. It enters into human body in sporozoites form.

Plasmodium **Life Cycle of Malarial Parasite** (Plasmodium) in Human Body



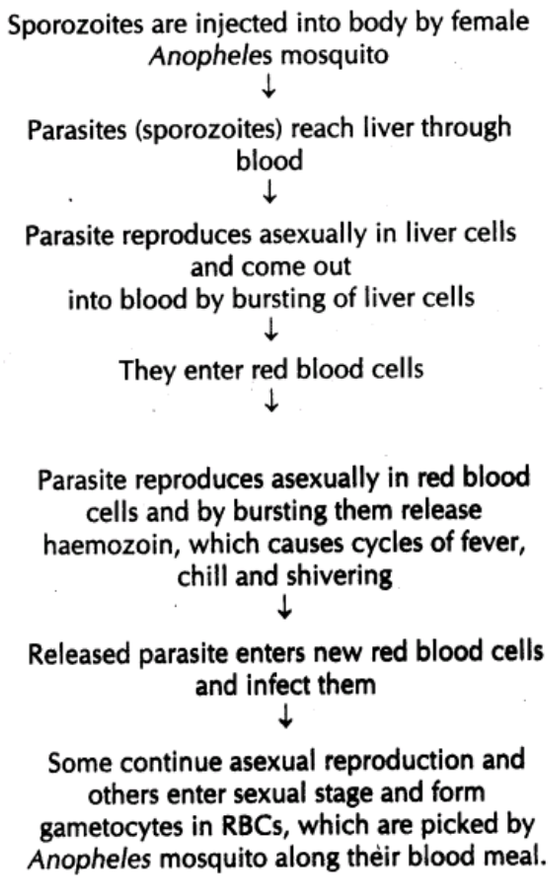
75.(i) Name the respective forms in which the malarial parasite gains entry into.
(a)Human body
(b)Body of female
(ii)Name the hosts where the sexual and asexual reproduction occur respectively.
(iii)Name the toxin responsible for the appearance of symptoms of malaria in human. Why do these symptoms occur periodically?[Delhi 2003]

Ans.(i) (a) Sporozoite
(b) Gametocytes
(ii) Sexual reproduction occurs iri mosquito and asexual reproduction takes place in human body.
(iii)Haemozoin is the toxin. The parasites after entering the fresh RBCs take 48-72 hours to complete the erythrocytic cycle. Then they burst to release toxic substance called haemozoin.

So, the symptoms like chill and high fever occur periodically

76.(i) Why do the symptoms of malaria not appear immediately after the entry of sporozoites into the human body when bitten by female Anopheles? Explain.
(ii) Give the scientific name of the malarial parasite that causes malignant malaria in humans.[HOTS; All India 2009]

Ans.(i)Malarial parasite completes its asexual cycle in liver cells and then it attacks the Red Blood Cells (RBCs) resulting in their rupture. The ruptured RBCs release toxic substance called haemozoin that is responsible for the symptoms of malaria like chill and high fever. Thus, no symptoms appear in the infected person between the period, the parasite enters the body and till RBCs release haemozoin,
(ii) Plasmodium falciparumcauses malignant malaria. It enters into human body in sporozoites form.
Plasmodium **Life Cycle of Malarial Parasite** (Plasmodium) in Human Body



77.A person is suffering from amoebiasis. Mention the pathogen that causes it and one organ of the body that get affected. Give three symptoms and one mode of its transmission. [All India 2009 c, 2008]

Ans. Amoebiasis is caused by Entamoeba histolytica, Organ infected-small intestine, which gets perforated or blocked in severe cases Symptoms Constipation, abdominal pain, stool with excess mucus and blood clots. It can be transmitted by carriers as houseflies form infected faeces to food products and water.

78.How is innate immunity different from the immunity that you require through vaccines? Describe any two ways by which innate immunity can be accomplished?[Foreign 2009; All India 2008]

Ans.Differences between innate immunity and acquired immunity are

Innate immunity	Acquired immunity
It is non-specific.	It is pathogen specific.
It is present from birth and inherited from parents.	It develops after birth and through vaccination.
It does not cause side effects.	It may cause certain reactions against vaccination.

Innate immunity can be accomplished by:
(i) Physiological barriers like tears in eyes, acid in stomach, saliva in mouth, etc
(ii) Cytokinine barriers, i.e. interferons produced by virus-infected cells to protect non-infected cells from viral infection

79.A person is suffering from ascariasis. Mention the pathogen causing the disease and an organs of the body affected. Write three symptoms and one mode of transmission of the disease.[All India 2009 C]

Ans.Pathogen for ascariasis – Ascaris lumbricoides.
(i) Organ affected – Intestine.
(ii) Symptoms – Abdominal pain, indigestion, muscular pain, fever, etc.
(iii) Mode of transmission – Through contaminated vegetables, fruits and water

80.(i) Name the infective stage of Plasmodium, which Anopheles mosquito takes in along with the blood meal from an infected human.
(ii)Why does the infection cause fever in humans?
(iii)Give a flow chart of the part of the life cycle of this parasite passed in this insect.[Foreign 2008; All India 2008]

Ans.(i) Gametocyte.
(ii) The parasites first multiply within the liver cells and then attack red blood cells resulting in their rupture. This cell bursting leads to the chill/shivering and fever due to the release of toxic chemical substance haemozoin.

(*iii*) Female *Anopheles* mosquito takes up gametocyte
↓
Fertilisation and development occur in mosquito's intestine
↓
Mature sporozoites released from intestine and migrate to the salivary glands of mosquito **(1)**
↓
Released into the host's body while sucking blood, along with saliva.

81.(i) List any two situations, when a medical doctor would recommend injection of preformed antibodies into the body of a patient. Name this kind of immunisation and mention its advantages.
(ii) Name the kind of immunity attained when instead of antibodies, weakened antigens are introduced into the body. [Delhi 2008 C]

Ans.(i)A doctor would recommend preformed antibodies in injured person in an accident on snake bites and tetanus. Type of immunisation is passive immunisation.
Its advantages are:
(a)Provides immediate relief.

(b)Used either prophylactically or therapeutically.
(ii)This type of immunity is called active immunity. In this, a preparation of antigenic proteins of pathogen or inactivated/weakend pathogens (vaccine) are introduced into the body. It is a slow process as takes time to develop antibodies against antigen

5 Marks Questions

82.Explain the process of replication of a retrovirus after it gains ' entry into the human body.[All India 2014]

Ans.The HIV virus attacks the macrophages cells in human body.
(i) RNA is replicated to form viral DNA by the enzyme reverse transcriptase.
(ii) Viral DNA now gets incorporated into the host cell's DNA and directs the infected cells to produce viruses.
(iii) Macrophages continue to produce virus particles and function as HIV factories.
(iv) The virus particles enter helper T-lymphocytes in the blood, where they continue to replicate and produce viral progenies.
(v)The number of helper T-lymphocytes progressively decreases in the body of the infected person.
(vi) With the decrease in number of T-cells, the immunity also decreases. The person is unable to produce any immune response even against common bacteria like Mycobacterium, parasites like Toxoplasma, viruses and fungi.

83.(i) Cancer is one of the most dreaded diseases. Explain 'contact inhibition' and 'metastasis' with respect to disease.
(ii)Name the group of genes that have been identified in normal cells that could lead to cancer. How do these genes cause cancer?
(iii)Name any two techniques that are useful in detecting cancers of internal organs.
(iv)Why are cancer patients after given a-interferon as part of the treatment? [Delhi 2014]

Ans.(i)'Contact inhibition' is the property exhibited by normal cells. It prevents their uncontrolled proliferation when they are in contact with other neighbouring cells. But cancerous cells seem to have lost this property and continue to divide despite being in contact with other cells, which leads to masses of cells called tumours.'Metastasis' is the property exhibited by malignant tumours which grows rapidly, invades, neighbouring tissues and is capable of reaching distant sites through blood and lymph thus, spreading malignant tumours to other organs or parts of body.
These two properties make 'cancer' one of the dreaded diseases.
(ii) The group of genes called oncogenes or proto-oncogenes in normal cells could lead to cancer.
These genes are present in inactivated or suppressed form. Some factors, i.e. physical, chemical or biological called carcinogens are capable of activating these oncogenes and thus transforming normal cells into cancerous one.
The two techniques useful jn detecting cancers of internal organs, are CT (Computed Tomography) and MR1 (Magnetic Resonance Imaging).
(iv) As tumour cells are capable of avoiding recognition and destruction by immune system, the cancer patients are given a-interferons which are biological response modifiers. It helps activate the immune system and destroy tumours.

84.(i) Name and explain any four lymphoid organs present in humans.
(ii) Categorise the named lymphoid organs as primary or secondary lymphoid organs, giving reasons.[Foreign 2014]

Ans.(i)The four lymphoid organs are:

- **Bone marrow** Major lymphoid organs as all blood cells, i.e. lymphocytes are formed and (3-lymphocytes mature here.
- **Thymus** T-lymphocytes mature in thymus, and responsible for both cellular and humoral immune response.
- **Spleen** Bean-shaped organ comprising of single mass of lymphoid tissues. In foetal stage produce all type of blood cells but only lymphocytes in adult stage.
- **Lymph nodes** These are small solid structures composed of lymphoid tissue. They produce lymphocytes and plasma cells, and also act as filters for lymph.

(ii) The above described lymphoid organs named bone marrow and thymus can be grouped under primary lymphoid organs because these act as organs where both B and T lymphocytes mature and acquire their antigenic specificity.
Whereas the spleen and lymph nodes are considered as secondary lymphoid organs where the lymphocytes undergo proliferation and differentiation. These are the site of acquired immune response to antigens and formation of effector cells.

85.A person in your colony has recently been diagnosed with AIDS. People/ residents in the colony want him to leave the colony for the fear of spread of AIDS.
(i)Write your view on the situation, giving reasons.
(ii)List the possible preventive measures that you would suggest to the residents of your locality in a meeting organised by you so that they understand the situation.
(iii)Write the symptoms and the causative agent of AIDS.[All India 2013]
Ans.(i)AIDS is not contagious, i.e. it does not spread by shaking hand, talking and use of common utensil.So, there is no need of fear to live with the AIDS patient.
(ii) Some preventive and safe steps to be suggested are:

- Taking HIV unaffected blood from blood bank, ensuring the use of only disposable needles and syringes in all public and private hospitals and clinics.
- free distribution of condoms in public.
- advocating safe sex and promoting regular checkup for HIV in population.

(iii) AIDS is caused by Human Immunodeficiency Virus (HIV), a retrovirus. This virus attacks on T-helper cells thus destroying the immune system.The common symptoms of AIDS are weakness, fever, weight loss, regular illness, etc