CHAPTER 8

HUMAN HEALTH AND DISEASE

Q. 1. Malaria, typhoid, pneumonia and amoebiasis are some of the human infectious diseases. Which ones of these are transmitted through mechanical carriers?

Ans. Malaria and amoebiasis are transmitted through mechanical carriers.

Q. 2. Name the two intermediate hosts which the human liver fluke depends on to complete its life cycle so as to facilitate parasitisation of its primary host.

Ans. Snail and Fish

Q. 3. Why is Gambusia introduced into drains and ponds?

Ans. To feed on mosquito larvae so as to eliminate the vectors responsible for causing malaria.

Q. 4. How does haemozoin affect the human body when released in blood during malarial

infection?

Ans. Haemozoin is responsible for the chill and high fever recurring every three to four days during malarial infection

Q. 5. State two different roles of spleen in the human body.

Ans. Spleen is the secondary lymphoid organ that stores lymphocytes, it filters microbes and acts as a reservoir to store erythrocytes

Q. 6. Name any two physiological barriers that provide innate immunity?

Ans. Acid in stomach/saliva in mouth/tears in eyes.

Q. 7. What is it that prevents a child to suffer from a disease he/she is vaccinated against? Give one reason.

Ans. The immunological memory induced by the vaccine in a child prevents the recurrence of a disease.

Q. 8. How does colostrum provide initial protection against diseases to new born infants? Give one reason.

Ans. Colostrum contains several antibodies which are absolutely essential for developing resistance in the new-born babies.

Q. 9. Name two diseases whose spread can be controlled by the eradication of Aedes mosquitoes.

Ans. Dengue/Chikungunya/yellow fever/Eastern equine encephalitis/West Nile fever/Zika virus disease.

Q. 10. What are interferons?

Ans. Virus infected cells secrete proteins called interferons which protect non-infected cells from further viral infection.

Q. 11. "Pranay suffered from measles at the age of 10 years. There are rare chances of his getting infected with the same disease for the rest of his life." Give reason for the statement.

Ans. First exposure to the infection works as vaccination, the immune system of the body gets familiar with the nature of microorganisms and specific antibodies can be produced against infection.

Q. 12. In what way are monocytes a cellular barrier in immunity?

Ans. Monocytes can phagocytose (by the process called phagocytosis) and thereby destroy the pathogens.

Q. 13. 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?

Ans. By performing Widal test.

Q. 14. Millions of chickens were killed in West Bengal, Orissa and Maharashtra recently. What was the reason?

Ans. Millions of chickens were killed (culled) in West Bengal, Orissa and Maharashtra because they were found to be infected with H5N1 virus, the causal organism of Bird Flu.

Q. 15. Why do pollen grains of some flowers trigger 'sneezing' in some people?

Ans. Pollen grains trigger sneezing by causing allergic reaction.

Q. 16. How do interferons protect us?

Ans. Interferons protect non-infected cells from further viral infections, by creating cytokine barriers.

Q. 17. When does a human body elicit an anamnestic response?

Ans. At the time of secondary response.

Q. 18. State the functions of mast cells in allergy response.

Ans. Mast cells release chemicals like histamine and serotonin in allergic response.

Q. 19. What is an autoimmune disease? Give an example.

Ans. It is an abnormal immune response in which the immune system of the body starts rejecting its own body cells or 'self' cells and molecules. For example, rheumatoid arthritis.

Q. 20. Name two STDs which can be transmitted through contaminated blood.

Ans. Hepatitis-B and AIDS are the two STDs which can be transmitted through contaminated blood.

Q. 21. Name the category of the disease: Rheumatoid arthritis.

Ans. Auto-immune disease.

Short Answer Questions [2 marks]

Q. 1. Define the term 'health'. Mention any two ways of maintaining it.

Ans. Health is a state of complete physical, mental and social well-being. Good health is maintained by balanced diet/personal hygiene/regular exercise.

Q. 2. List the symptoms of ascariasis. How does a healthy person acquire this infection?

Ans. Symptoms of ascariasis: Internal bleeding, muscular pain, anaemia, blockage of intestinal passage. A healthy person can acquire this infection by intake of water, vegetables/fruits/foods contaminated with eggs of the parasite.

Q. 3. Name the causative organism of the disease amoebiasis. List three symptoms of the disease.

Ans. Entamoeba histolytica causes amoebiasis. Symptoms are constipation, abdominal pain/cramps, stool with excess mucous/blood clots.

Q. 4. Write the scientific names of the causal organisms of elephantiasis and ringworm in humans. Mention the body parts affected by them.

Disease	Causal Organism	Body parts affected
Elephantiasis	*Wuchereria bancrofti* and *Wuchereria malayi*.	Lymph vessels of lower limbs and genital organs.
Ringworm	*Microsporum*, *Trichophyton* and *Epidermophyton*	Skin, nails and scalp.

Q. 5. Identify a, b, c and d in the following table:

S. No.	Name of the human disease	Name of the causal bacteria/virus	Specific organ or its part affected
(*i*)	Typhoid	*Salmonella typhi*	*a*
(*ii*)	Common cold	*b*	*c*
(*iii*)	Pneumonia	*Streptococcus pneumoniae*	*d*

Ans. (a) small intestine (b) Rhino virus (c) nose and respiratory passage (d) alveoli of lungs

Q. 6. Write the biological (binomial) names of causal organisms of the following diseases:

(a) Typhoid (b) Pneumonia

Ans. (a) Salmonella typhi

(b) Streptococcus pneumoniae

Q. 7. Write the biological (binomial) names of causal organisms of the following diseases:

(a) Elephantiatis (Filariasis) (b) Amoebiasis

Ans. (a) Wuchereria bancrofti and Wuchereria malayi (b) Entamoeba histolytica

Q. 8. Name the host and the site where the following occur in the life-cycle of a malarial parasite:

(a) Formation of gametocytes]

(b) Fusion of gametocytes

	Host	Site of occurrence
(*a*) Formation of gametocytes	Human	Red blood cells
(*b*) Fusion of gametocytes	*Anopheles* mosquito	Intestine

Q. 9. Why does a doctor administer tetanus antitoxin and not a tetanus vaccine to a child injured in a roadside accident with a bleeding wound? Explain.

OR

Why is a person with cuts and bruises following an accident administered tetanus antitoxin? Give reasons.

Ans. Tetanus is caused by a microbe which has a deadly and fast action. Action of vaccine is slow and this delay may become fatal. Therefore, antitoxins are administered which neutralise the effect of the bacterial toxin.

Q. 10. A student on a school trip started sneezing and wheezing soon after reaching the hill station for no explained reasons. But, on return to the plains, the symptoms disappeared. What is such a response called? How does the body produce it?

Ans. Such a response is called allergic reaction or allergy. On exposure to allergens like dust, pollens, etc., chemicals like histamine and serotonin are released from the mast cells, resulting in an allergic response.

Q. 11. A young boy when brought a pet dog home started to complain of watery eyes and running nose. The symptoms disappeared when the boy was kept away from the pet.

(a) Name the type of antibody and the chemicals responsible for such a response in the boy.

(b) Mention the name of any one drug that could be given to the boy for immediate relief from such a response.

Ans. (a) Antibody: IgE; chemicals: Histamine and serotonin

(b) Drugs: Antihistamine, adrenalin, steroids.

Q. 12. Name and explain the two types of immune responses in humans.

Ans. The two types of immunity are active immunity and passive immunity. Active immunity: Immunity developed in the host body due to production of antibodies in response to antigens. Passive immunity: When ready-made antibodies are directly given to protect the body against foreign agents.

Q. 13. List the two types of immunity a human baby is born with. Explain the differences between the two types.

Ans. The two types of immunity a human baby is born with are innate and passive/acquired immunity. Innate immunity is a non-specific type of defence that provides barrier to the entry of antigens.

Passive immunity is a pathogen-specific type of defence in which readymade antibodies are directly given to protect body against foreign agents. The foetus receives antibodies through the placenta.

Q. 14. Name the two types of immune systems in a human body. Why are cell-mediated and humoral immunities so called?

Ans. The two types of immune systems in a human body are innate and adaptive immunity. Humoral immunity is called so because it consists of antibodies that are present in humors or body fluids, whereas cell-mediated immunity is provided by T-cells and defends body against viruses, fungi and some bacteria which enter host cells. T-cells recognise non-self cells and kill them.

Q. 15. Explain the relationship between B-lymphocytes and T-lymphocytes in developing an immune response.

Ans. B-lymphocytes produce antibodies to fight pathogen. T-lymphocytes do not produce antibodies but help B cells to produce them. They can also destroy pathogen directly.

Q. 16. Name the two special types of lymphocytes in humans. How do they differ in their roles in immune response?

Ans. B-lymphocytes and T-lymphocytes are the lymphocytes in humans. B-cells produce pathogen specific antibodies and are responsible for humoral immune response. T-cells help the B-cells to produce antibodies and are responsible for cell-mediated immunity.

Q. 17. What is colostrum? Why is it important to be given to the newborn infants?

Ans. The milk that comes out of the mammary glands during initial days of lactation is called colostrum. It contains several antibodies (IgA most abundantly), absolutely essential for developing resistance in the new-born babies.

Q. 18. Describe the role of lymph nodes in providing immunity.

Ans. Lymph nodes trap microorganisms or other antigens. These trapped antigens activate lymphocytes present in the lymph and cause an immune response.

Q. 19. State the functions of primary and secondary lymphoid organs in humans.

Ans. Primary lymphoid organs are the sites where immature lymphocytes differentiate into antigen sensitive lymphocytes.

Secondary lymphoid organs are the sites where the lymphocytes interact with antigens and proliferate to become effector cells.

Q. 20. (a) Name one primary and one secondary lymphoid organ in the human body.

(b) How do they differ in their functions?

Ans. (a) Primary lymphoid organ: Bone marrow/thymus. Secondary lymphoid organ: Spleen/Lymph nodes/Mucosal associated lymphoid tissue (MALT).

(b) Primary lymphoid organs are the sites where immature lymphocytes differentiate into antigen sensitive lymphocytes. Secondary lymphoid organs are the sites where the lymphocytes interact with antigens and proliferate to become effector cells.

Q. 21. (a) Name the lymphoid organ in humans where all the blood cells are produced.

(b) Where do the lymphocytes produced by the lymphoid organ mentioned above migrate and how do they affect immunity?

Ans. (a) Bone marrow.

(b) The lymphocytes produced migrate to secondary lymphoid organs like spleen, lymph nodes, etc. They trap the microorganisms thereby activating the lymphocytes present in the lymph nodes and produce an immune response.

Q. 22. (a) Highlight the role of thymus as a lymphoid organ.

(b) Name the cells that are released from the above mentioned gland. Mention how they help in immunity.

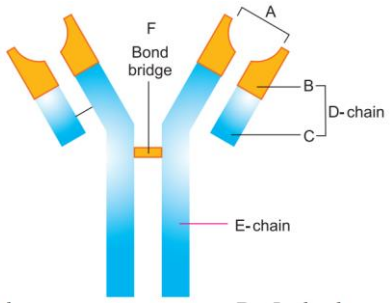
Ans. (a) Immature lymphocytes differentiate into mature T-lymphocytes and become antigensensitive in thymus.

(b) T-lymphocytes are released from thymus. T-cells help B-cells to produce antibodies and provide cell-mediated immunity.

Q. 23. How does spleen act as a lymphoid organ? Explain.

Ans. The spleen is a large bean-shaped organ. It mainly contains lymphocytes and phagocytes. It acts as a filter of the blood by trapping blood-borne microorganisms. Spleen also has a large reservoir of erythrocytes.

Q. 24. Identify A, D, E and F in the diagram of an antibody molecule given below:



Ans. A—Antigen binding site D—Light chain

E—Heavy chain F—Disulfide bridge.

Q. 25. Why is tobacco smoking associated with rise in blood pressure and emphysema (oxygen deficiency in the body)? Explain.

Ans. Tobacco has nicotine that stimulates the release of adrenaline and noradrenaline which raise blood pressure. Smoking tobacco releases carbon monoxide which reduces the concentration of haem-bound oxygen. This causes emphysema.

Q. 26. When you go for a trek/trip to any high altitude places, you are advised to take it easy and rest for the first two days. Comment, giving reasons

OR

Why do tribes who live in high altitude of Himalayas experience discomfort in respiration? How do they get adapted to survive in such a situation?

Ans. At high altitudes it is advised to take easy due to low oxygen availability. This may also cause altitude sickness. It is also advised to take rest because body compensates the low oxygen availability during rest by increasing RBC production and decreasing the binding capacity of haemoglobin, in turn increasing the breathing rate.

Q. 27. What would happen to immune system, if thymus gland is removed from the body of a person?

Ans. Thymus is the primary lymphoid organ. In thymus gland, immature lymphocytes differentiate into antigen-sensitive lymphocytes. If thymus gland is removed from the body of a person, his immune system becomes weak. As a result the person's body becomes prone to infectious diseases.

Q. 28. Why an immunosuppressive agent is taken after an organ transplant?

Ans. Our immune system is capable to differentiate between 'self' and 'non-self' cells/tissues. The graft (grafting) is a non-self tissue which may be rejected by our immune system. So, to prevent the rejection, immunosuppressants are taken after the transplant.

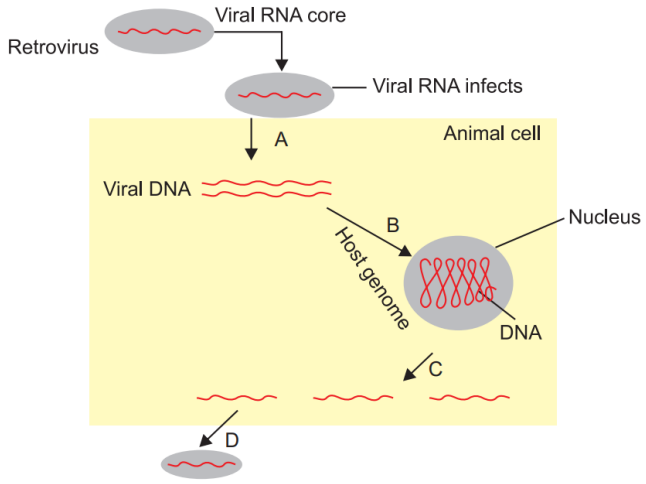
Q. 29. How are auto-immune diseases different from immunodeficiency disease? Give one example of each in human.

S. No.	Auto-immune disease	Immunodeficiency disease
(*i*)	When the immune system of the body starts attacking 'self-cells' and molecules, the disease is called auto-immune disease.	When the immune system fails to function properly against pathogen or antigen, it is called immunodeficiency disease.
(*ii*)	For example, rheumatoid arthritis.	For example, AIDS.

Q. 30. In the metropolitan cities of India, many children are suffering from allergy/asthma. What are the main causes of this problem? Give some symptoms of allergic reactions.

Ans. Allergy is the exaggerated response of the immune system to certain antigens present in the environment. In metropolitan cities lifestyle is responsible in lowering of immunity and sensitivity to allergens. More polluted environment increases the chances of allergy in children. Some symptoms of allergic reactions are sneezing, watery eyes, running nose and difficulty in breathing.

Q. 31. Identify A, B, C and D in the replication of HIV (retrovirus).



Ans. (A) Reverse transcription.

(B) Viral DNA incorporates into host genome.

(C) New viral RNA produced by infected cell.

(D) New viruses can infect other cells.

Q. 32. Name the cells that act as HIV factory in humans when infected by HIV. Explain the events that occur in the infected cell.

OR

Name the type of cells the AIDS virus first enters into after getting inside the human body. Explain the sequence of events that the virus undergoes within these cells to increase their progeny.

Ans. Macrophages/Helper T-cells act as HIV factory. The virus enters macrophages or helper T-cells where RNA genome of the virus forms viral DNA with the help of the enzyme reverse transcriptase. The viral DNA then gets incorporated into host cell's DNA and directs infected cells to produce new virus particles.

Q. 33. What is "withdrawal syndrome"? List any two symptoms it is characterised by.

Ans. It is the state experienced by addicts when their regular dose of alcohol/drug is abruptly discontinued. It is often characterised by anxiety, shakiness, nausea and sweating.

Q. 34. How does smoking tobacco in human lead to oxygen deficiency in their body?

Ans. Smoking increases the carbon monoxide (CO) content in the blood which has greater affinity to haemoglobin than oxygen. CO forms a stable bond with haemoglobin and does not allow binding of oxygen. Smoking also damages alveolar walls, which reduces respiratory surface (emphysema).

Q. 35. (a) Name the source plant of heroin drug. How is it obtained from the plant?

(b) Write the effects of heroin on the human body.

OR

Name an opioid drug and its source plant. How does the drug affect the human body?

Ans. (a) The source drug of heroin is poppy plant (Papaver somniferum). It is derived by acetylation of morphine, which is obtained from the latex of the poppy plant.

(b) Heroin is a depressant and slows down the body functions.

Q. 36. Name the plant source of the drug popularly called "smack'. How does it affect the body of the abuser?

Ans. Plant source of 'smack' is Papaver somniferum or poppy. Smack is a depressant and slows down body functions.

Q. 37. Name the plant source of cocaine. How does it affect the human body?

OR

Name the drug obtained from Erythroxylum coca and write its effects on the human body.

Ans. Plant source of cocaine is Erythroxylum coca. It has a potent stimulating action on central nervous system, producing a sense of euphoria and increased energy. Excessive dosage of cocaine causes hallucinations.

Q. 38. Name the plant source of ganja. How does it affect the body of the abuser?

OR

From which plant are cannabinoids obtained? Name any two cannabinoids. Which part of the body is affected by consuming these substances?

Ans. Cannabinoids are obtained from the inflorescence of the plant Cannabis sativa. Marijuana, hashish, charas, ganja are some cannabinoids. These chemicals interact with cannabinoid receptors of the body, mainly present in the brain. Cardiovascular system is affected adversely.

Q. 39. Name the blank spaces a, b, c and d in the table given below:

S. No.	Name of the drug	Plant source	Organ system affected
(*i*)	*a*	Poppy plant	*b*
(*ii*)	Marijuana	*c*	*d*

Ans. (a) Morphine (b) Central nervous system (c) Cannabis sativa (d) Cardiovascular system.