Human Health and Disease

7 Chapter

1. What are the various public health measures you would suggest as a safeguard against infectious diseases?

Ans: Public health measures are preventive measures that are taken to check the spread of various infectious diseases. These measures should be taken to reduce contact with infectious agents. Some of these methods are:

(1) Personal and public hygiene should be maintained: One of the most important methods of preventing infectious diseases is the maintenance of personal and public hygiene. Personal hygiene involves maintaining a clean body, consumption of healthy and nutritious food, drinking clean water, etc. Whereas public hygiene involves proper disposal of waste material, excreta, periodic cleaning, and disinfection of water reservoirs.

(2) Isolation of infected persons: To prevent the spread of air-borne diseases such as pneumonia, chickenpox, tuberculosis, etc., it is essential to keep the infected person in isolation to reduce the chances of spreading these diseases.

(3) Vaccination: The protection of the body from communicable diseases by administering some agent that mimics the microbe inside the body is known as vaccination. It provides both active and passive immunization to the body. Various vaccines are available for the treatment of many diseases such as tetanus, polio, measles, mumps, etc.

(4) Vector Eradication: Many diseases such as malaria, filariasis, dengue, and chikungunya spread through vectors. By providing a clean environment and preventing the breeding of mosquitoes these diseases can be prevented easily. By not allowing water to stagnate around residential areas, the breeding of mosquitoes can be prevented. To keep our environment healthy, regular cleaning of coolers should be done, also the use of mosquito nets, and insecticides such as malathion in drains, ponds, etc. should be considered. Fish such as Gambusia are introduced in ponds to control the breeding of mosquito larvae in stagnant water.

2. In which way has the study of biology helped us to control infectious diseases?

Ans: In the field of biology, various advancements once a person starts taking alcohol or drugs have helped us in gaining a better understanding to fight against various infectious diseases. Biology has helped us in studying the life cycle of various parasites, pathogens, and vectors along with their modes of transmission and controlling measures. Vaccination programs against several infectious diseases such as smallpox, chickenpox, tuberculosis, etc. have helped nearly

eradicate these diseases. In the preparation of newer or safer drugs and vaccines, biotechnology has helped a lot. In treating infectious diseases the antibiotics have also played a very important role.

3. How does the transmission of each of the following diseases take place?
(a) Amoebiasis
(b) Malaria
(c) Ascariasis
(d) Pneumonia

Ans:

Disease	Causative Organism	Mode of Transmission
(a) Amoebiasis	Entamoeba histolytica	It is a vector-borne disease and it spreads by the means of contaminated food and water. The housefly is the vector involved in the transmission of this disease.
(b) Malaria	Plasmodium spp.	It is a vector-borne disease that spreads by the biting of the female Anopheles mosquito.
(c) Ascariasis	Ascaris lumbricoides	It spreads via contaminated food and water through fecal-oral transmission.
(d) Pneumonia	Streptococcus pneumoniae	It spreads through the sputum of an infected person via droplet infection.

4. What measure would you take to prevent water -borne diseases?

Ans: Water-borne diseases like cholera, typhoid, hepatitis B, etc. spread by drinking contaminated water. By ensuring proper disposal of sewage, excreta, and periodic cleaning habits we can prevent ourselves from water-borne diseases. Along with these, measures such as disinfecting community water reservoirs, boiling and filtering drinking water, etc. should also be observed.

5. Discuss with your teacher what 'a suitable gene' means, in the context of DNA vaccines.

Ans: In the context of DNA vaccines, a 'suitable gene' refers to a specific DNA segment that can be injected into the cells of the host body to produce specific proteins. The specific proteins kill the specific disease-causing organism in the

body of the host and it also provides immunity to the host body.

6. Name the primary and secondary lymphoid organs.

Ans: The names of primary and secondary lymphoid organs are as follows:
(a) Primary lymphoid organs - The bone marrow and the thymus.
(b) Secondary lymphoid organs - The spleen, lymph nodes, tonsils, Peyer's patches of the small intestine, and appendix.

7. The following are some well-known abbreviations, which have been used in this chapter. Expand each one to its full form:
(a) MALT
(b) CMI
(c) AIDS
(d) NACO
(e) HIV

Ans: The abbreviations with their full forms are as follows:
(a) MALT – Mucosa – Associated Lymphoid Tissue
(b) CMI – Cell-Mediated Immunity
(c) AIDS – Acquired Immunodeficiency Syndrome
(d) NACO – National AIDS control organization
(e) HIV – Human Immunodeficiency Virus

8. Differentiate the following and give examples of each:
(a) Innate and acquired immunity

Ans:

Innate immunity	**Acquired immunity**
It is a non-pathogen-specific type of defense mechanism.	It is a pathogen-specific type of defense mechanism.
It is inherited from parents and protects the individual from birth.	It does not remain present in the individual from birth but is acquired after birth.
This type of immunity provides barriers against the entry of foreign infectious agents.	It operates by providing primary and secondary responses, which are mediated by B-lymphocytes and T-lymphocytes.
It does not have a specific memory.	It is characterized by immunological memory.

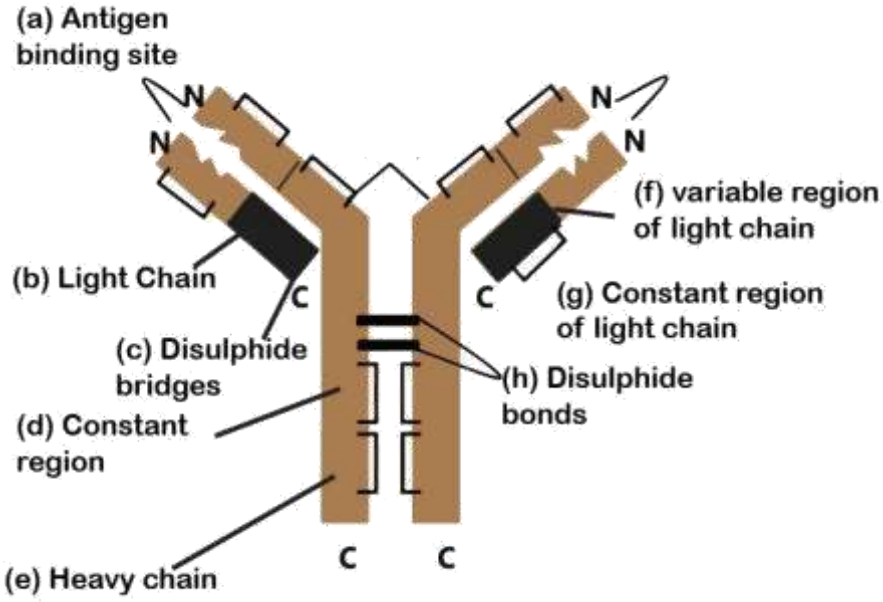
(b) Active and passive immunity

Ans:

Active immunity	**Passive immunity**
It is a type of acquired immunity in which the body produces its antibodies against disease-causing antigens.	It is a type of acquired immunity in which readymade antibodies are transferred from one individual to another.
It has a long-lasting effect.	It does not have a long-lasting effect.
It is slow and takes time in producing antibodies and giving the response.	It is fast and provides immediate relief.
Microbes are injected inside the body through the process of vaccination. This is an example of active immunity.	The transfer of antibodies that are present in the mother's milk, to the infant is an example of passive immunity.

9. Draw a well -labeled diagram of an antibody molecule.

Ans: A well-labeled diagram of an antibody molecule is drawn below.



In diagram
(a) Antigen binding site
(b) Light chain

(c) Disulphide bridges
(d) Constant region
(e) Heavy chain
(f) Variable region of light chain
(g) Constant region of light chain
(h) Disulphide bonds

10. What are the various routes by which transmission of the human immunodeficiency virus takes place?

Ans: AIDS (Acquired Immunodeficiency Syndrome) is caused by the Human Immunodeficiency Virus (HIV). The various modes of transmission of this virus are:
(a) Making unprotected sexual contact with an infected person.
(b) Transfusion of an infectedof an infected person's blood to a healthy person.
(c) Sharing of infected needles and syringes.
(d) Through the placenta from an infected mother to a child.

11. What is the mechanism by which the AIDS virus causes deficiency of the immune system of the infected person?

Ans: AIDS (Acquired Immunodeficiency Syndrome) is caused by the human immunodeficiency virus (HIV) through sexual or blood-blood contact. After entering the human body, HIV attacks and enters the macrophages. The RNA of the virus replicates with the help of enzyme reverse transcriptase and gives rise to viral DNA, inside the macrophages. After this, the viral DNA is incorporated into the host DNA and directs the synthesis of virus particles. Simultaneously, HIV enters into the helper T-lymphocytes. There it replicates and produces viral progeny. Now, these newly formed progeny viruses get released into the blood, attacking other healthy helper T lymphocytes in the body. As a result, the number of T-lymphocytes in the body of an infected person decreases progressively and hence decreases the immunity of a person.

12. How is a cancerous cell different from a normal cell?

Ans: The differences are given below in the table.

Normal cell	Cancerous cell
The normal cells show the property of contact inhibition. Therefore, when these cells come into contact with other cells, they stop dividing.	The cancerous cells lack the property of contact inhibition. Therefore they continue to divide, thereby forming a mass of cells or tumors.

After attaining a specific growth level, the normal cells undergo the process of differentiation.	They do not undergo differentiation.
At a particular location, the normal cells remain confined.	These cells do not remain confined at a particular location. They move into neighboring tissues and disturbs their function.

13. Explain what is meant by metastasis.

Ans: Metastasis Property is exhibited by malignant tumors. and it is the pathological process of spreading cancerous cells to the different parts of the body. These cells divide uncontrollably, forming a mass of cells called tumors. From the tumor, some cells get sloughed off and enter into the bloodstream. Through the bloodstream, these cells reach different parts of the body, and therefore, by dividing actively at their position they begin the formation of new tumors

14. List the harmful effects caused by alcohol/drug abuse.

Ans: Alcohol and drugs have several adverse effects on the individual, his family, and society. The list of harmful effects is given below:

(A) Effects of alcohol:

(a) Effects on the individual: Alcohol harms the body of an individual. The consumption of excess alcohol by an individual causes damage to the liver and the nervous system. This results in the appearance of other symptoms such as depression, fatigue, aggression, loss of weight, and appetite in the individual. Sometimes, extreme levels of alcohol consumption may also lead to heart failure, resulting in coma and death. Also, pregnant women should avoid alcohol as it may inhibit the normal growth of the baby.

(b) Effects on the family:

Consumption of excess alcohol by any family member is having devastating effects on the family. It may lead to several domestic problems such as quarrels, frustrations, insecurity, etc.

(c) Effects on society:

(i) Rash behavior
(ii) Malicious mischief and violence
(iii) Deteriorating social network
(iv) Loss of interest in social and other activities

(B) Effects of drugs: An individual who is addicted to using drugs can create

several problems not only for himself but also for his family too.

(a) Effects on the individual:

Drugs harm the central nervous system of an individual which results in the malfunctioning of several other organs of the body such as the kidney, liver, etc. In these individuals, the spread of HIV is most common because they share common needles while injecting drugs into their bodies. On both males and females drugs have long-term side effects which include increased aggressiveness, mood swings, and depression.

(b) Effects on the family and society: A person addicted to drugs creates problems for his family and society too. That person becomes frustrated, irritated, and anti-social.

15. Do you think that friends can influence one to take alcohol/drugs? If yes, how may one protect himself/herself from such an influence?

Ans: Yes, I think that friends can highly influence a person to take drugs or alcohol. Following steps should be taken by a person for protecting himself/herself against drug abuse:

(a) Increase your willpower to stay away from alcohol and drugs. For curiosity and fun, one should not experiment with alcohol.

(b) Avoid the company of drug-taking friends.

(c) Seek help from parents and peers.

(d) Take proper knowledge and counseling about drug abuse and devote your energy to other extracurricular activities.

(e) If symptoms of depression and frustration become apparent, seek immediate professional and medical help from psychologists and psychiatrists.

16. Why is it that it is difficult to get rid of this habit once a person starts taking alcohol or drugs? Discuss it with your teacher.

Ans: Drug and alcohol consumption has an inherent addictive nature related to euphoria and a short-lived feeling of well-being. Repeated intake of medicine increases the tolerance level of the body's receptors, resulting in more consumption of medicine.

17. In your view what motivates youngsters to take to alcohol or drugs and how can this be avoided?

Ans: Many factors are liable for motivating youngsters towards alcohol or drugs. The initial causes of motivation are curiosity, the need for adventure and excitement, experimentation. Some youngsters start consuming drugs and alcohol to beat negative emotions (such as stress, pressure, depression,

frustration) and to excel in various fields. Several mediums like television, the internet, newspaper, movies, etc. are also responsible for promoting the idea of using alcohol for fun to the younger generation. Among these factors, reasons such as unstable and unsupportive family structures and peer pressure can also lead an individual to depend on drugs and alcohol. Preventive measures that work against addiction to alcohol and drugs too are given below:

(a) Parents should motivate and try to increase the willpower of their children.

(b) Parents should educate their children regarding the ill effects of alcohol. They should provide them with proper knowledge and counseling regarding the consequences of addiction to alcohol.

(c) It's the responsibility of the parent to discourage a toddler from experimenting with alcohol. Youngsters should be kept far away from the company of friends who consume drugs.

(d) Children should be encouraged to devote their energy to other extra-curricular and recreational activities.

(e) Proper professional and medical help should be provided to the child if sudden symptoms and depression and frustration are observed.