



NCERT SOLUTIONS

CHAPTER - 8

**HUMAN HEALTH
AND DISEASE**

BIOLOGY CLASS 12

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Q1. What are the various public health measures, which you would suggest as safeguard against infectious diseases?

Answer: The various public health measures against infectious diseases includes the following –

- **Education:** People should be educated about infectious diseases so that they may protect themselves against the infections.
- **Isolation:** To prevent the spread of air-borne diseases such as pneumonia, chicken pox, tuberculosis, etc., it is essential to keep the infected person in isolation to reduce the chances of spreading these diseases.
- **Vaccination:** People should get vaccinations to avoid infection. Vaccination is available against cholera, typhoid, TB etc.
- **Sanitation:** Sanitary surroundings can prevent spread of diseases. Public hygiene includes – suitable disposal of waste & human excreta; periodic cleaning and disinfection of water sources; observing normal practices of hygiene in public catering. Personal hygiene includes keeping the body clean, intake of clean drinking water, vegetables, fruits etc.
- **Eradication of vectors:** The breeding places of vectors should be destroyed & adult vectors killed by appropriate methods.

Q2. In which way has the study of biology helped us to control infectious diseases?

Answer: The science that makes a study of diseases is called pathology, though in a broad sense it includes diagnostic, prophylactic and curative measures too. Pathology is a study of diseases of all kinds though we will confine ourselves to the diseases caused by a pathogenic organism, the reaction of the host as shown in the form of symptoms, the diagnosis made through a study of their symptoms, etiology of the pathogenic organism and finally steps undertaken to cure the host of its diseases, by eradicating and if it is not possible, by controlling the pathogen. In this way the study of biology helped us to control infectious diseases.

Q3. How does the transmission of each of the following diseases take place?

- (a) Amoebiasis
- (b) Malaria
- (c) Ascariasis
- (d) Pneumonia

Answer:

- **Amoebiasis:** It is usually contracted by ingesting water or food contaminated by amoebic cysts.
- **Malaria:** It is transmitted from one person to another by the female Anopheles mosquito. The mosquito picks up the parasite along with the blood when it bites an infected person. When this mosquito bites another healthy person, the parasites migrate into his blood with the saliva, which the mosquito injects before sucking up blood to prevent its clotting.
- **Ascariasis:** Transmitted through water, vegetables, fruits etc. contaminated with the eggs of the parasites.
- **Pneumonia:** Spreads by cough & sneezes, by sharing drinking glass & eating utensils with an infected person.

Q4. What measures would you take to prevent water borne diseases?

Answer: Water borne diseases can be prevented by

- Oral rehydration
- Health education

- Control of reservoirs
- Immunization
- General hygiene, pure water

Q5. Discuss with your teacher what a suitable gene means, in the context of DNA vaccines.

Answer: A 'suitable gene' refers to a specific DNA segment which can be injected into the cells of the host body to produce specific proteins. This protein kills the specific disease-causing organism in the host body and provides immunity.

Q6. Name the primary and secondary lymphoid organs.

Answer:

- (a) Primary lymphoid organs include the bone marrow and the thymus.
(b) Secondary lymphoid organs are the spleen, lymph nodes, tonsils, Peyer's patches of small intestine, and appendix.

Q7. 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

Answer:

- (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

Q8. Differentiate the following and give examples of each

- (a) Innate and acquired immunity
(b) Active and passive immunity

Answer:

(a) Innate and acquired immunity

Innate immunity	Acquired immunity
1. It is a non-pathogen specific type of defense mechanism.	1. It is a pathogen specific type of defense mechanism.
2. It is inherited from parents and protects the individual from birth.	2. It is acquired after the birth of an individual.

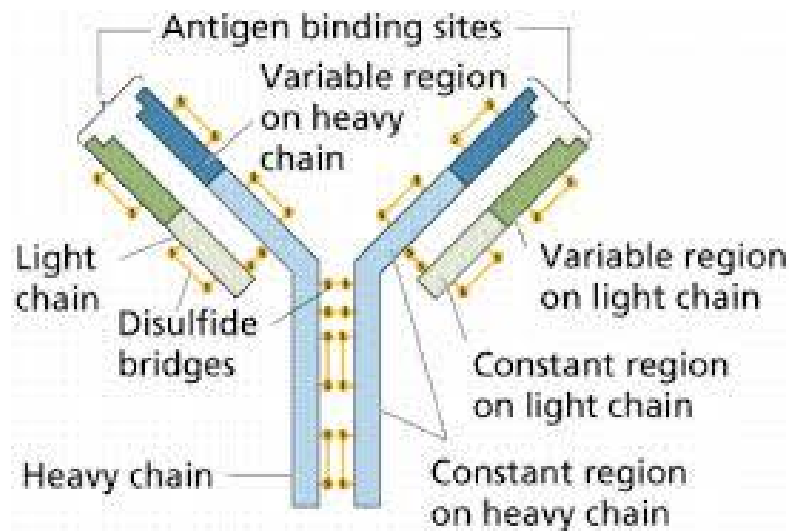
3. It operates by providing barriers against the entry of foreign infectious agents.	3. It operates by producing primary and secondary responses, which are mediated by B-lymphocytes and T-lymphocytes.
4. It does not have a specific memory.	4. It is characterized by an immunological memory.

(b) Active and passive immunity

Active immunity	Passive immunity
It is a type of acquired immunity in which the body produces its own 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. It takes time in producing antibodies and giving responses.	It is fast. It provides immediate relief.
Injecting microbes through vaccination inside the body is an example of active immunity.	Transfer of antibodies present in the mother's milk to the infant is an example of passive immunity.

Q9. Draw a well-labelled diagram of an antibody.

Answer:



Q10. What are the various routes by which trans-mission of human immunodeficiency virus takes place?

Answer: Various routes by which transmission of human immunodeficiency virus takes place are

- Unprotected sexual contact with an infected person.
- Transfusion of blood from a healthy to an infected person.
- Sharing infected needles and syringes.
- From an infected mother to a child through the placenta.

Q11. What is the mechanism by which the AIDS virus causes deficiency of the immune system of the infected person?

Answer: AIDS (Acquired ImmunoDeficiency Syndrome) is caused by the Human immunodeficiency virus (HIV) via sexual or blood-blood contact. After entering the human body, the HIV virus attacks and enters the macrophages. Inside the macrophages, the RNA of the virus replicates with the help of enzyme reverse transcriptase and gives rise to viral DNA. Then, this viral DNA is incorporated into the host DNA and directs the synthesis of virus particles. At the same time, HIV enters helper T- lymphocytes. It replicates and produces viral progeny there. 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, thereby decreasing the immunity of a person.

Q12. How is a cancerous cell different from a normal cell?

Answer: Cancer is a disease characterized by the excessive and abnormal growth of certain cells. In a healthy individual, the growth of cells is balanced by the rate of cell loss. Thus, when one attains adult age, the size and cellular contents of various body organs remain constant. The balance between the growth of the cells and the rate of cell class may be dislocated by certain chemicals, physical stresses and viral agents. As a result, the normal growth of the cells may be transformed into cancerous one. Cancerous cells acquire the ability to invade new sites, a phenomenon called metastasis. They exhibit a number of alterations on cell surface, in the cytoplasm, and in their genes. These features are used for the identification of cancers.

Q13. Explain what is meant by metastasis.

Answer: Metastasis is the phenomenon in which cancer cells due to unregulated proliferation spread to distant sites through body fluids to develop secondary tumors. Only malignant tumors show the property of metastasis.

Q14. List the harmful effects caused by alcohol/drug abuse.

Answer:

Harmful effects caused by alcohol abuse are –

- Alcohol generates more energy mostly in the form of heat, but at the same time, it dilates the blood vessels. Consequently the heat generated is rapidly lost. Due to constant dilation, the arterial walls soon become brittle & rigid. Such a change in the property of blood vessels & deposition of alcoholic fat affects the working of the heart.
- Alcoholism leads to gastric ulcers & gastritis.
- In chronic alcoholism, the axon of the nerve in flames, thus causing neuritis.
- Permanent damage to liver cells occurs due to deposition of fats. The liver dries up & hardens (cirrhosis).

Harmful effects caused by drug abuse are –

- Excessive doses of drugs may lead to coma & death due to respiratory failure, heart failure & cerebral haemorrhage.
- Lack of interest in personal hygiene, withdrawal, isolation, depression, fatigue, aggressive & rebellious behaviour etc.
- Acquire serious infections like AIDS & hepatitis B, who take drugs intravenously.
- The adverse effects of drugs are manifested in the form of reckless behaviour, vandalism & violence.

Q15. Do you think that friends can influence one to take alcohol/drugs? If yes, how may one protect himself/herself from such an influence?

Answer: Yes, friends can influence one to take drugs. Following measures can be taken:

- Increase your willpower to stay away from alcohol and drugs. One should not experiment with alcohol for curiosity and fun.
- Avoid the company of friends who take drugs.
- Seek help from parents and peers.
- Take proper knowledge and counseling about drug abuse. Devote your energy in other extra-curricular activities.
- Seek immediate professional and medical help from psychologists and psychiatrists if symptoms of depression and frustration become apparent.

Q16. Why is it that once a person starts taking alcohol or drugs, it is difficult to get rid of this habit? Discuss it with your teacher.

Answer: Psychological & physiological dependence of an individual to the intake of certain kinds of drugs and alcohol is called addiction. Once a person starts taking alcohol & drugs, it is very difficult to get rid of this habit because addiction drives people to take them even when they are not needed or even when their use becomes self destructive. With repeated use of drugs, the tolerance level of the receptors present in the body increases, consequently, the receptors respond only to higher doses of drugs or alcohol leading to greater intake & addiction. Thus, the addiction potential of drugs & alcohol, pulls the user into a vicious circle leading to their regular use (abuse) from which he/she may not be able to get out.

Q17. In your view what motivates youngsters to take to alcohol or drugs and how can this be avoided?

Answer: Humans have probably been using mind – affecting drugs since time immemorial. The root cause of addiction of man to drugs, smoking and drinking has been due to his inability to make mental adjustments with stresses and strains, drudgery and extreme misery in daily life. As a temporary measure, to combat these adverse situations and to have a certain degree of mental relaxation, humans have been making an extensive use of stimulants, depressants and hallucinogens. Stimulants generally speed up body processes, and depressants slow them. Hallucinogens can alter a person's thoughts, feelings, and perception.

Preventive measures against addiction of alcohol and drugs:

- Communicate openly with the children, listen to their problems patiently and teach them how to handle the problems.
- Take interest in children's activities and their circle of friends.
- Set an example for children by not taking drugs or alcohol.
- Keep track of prescribed drugs in home.
- Learn as much as possible about drugs.

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