

NCERT Solutions for Class-XII Biology

Chapter -7

NCERT Biology Class 12

1. What are the various public health measures, which you would suggest as safeguard against infectious diseases?
 1. Common preventive public health measures are:
 - (a) Education : People should be educated about the infectious diseases.
 - (b) Vaccination : People should get vaccination to avoid infection.
 - (c) Sanitation : Proper sanitation can prevent spread of diseases.
 - (d) Isolation : The patient should be separated to avoid infection to others.
 - (e) Sterilization : Patient's belongings should be sterilized.
 - (f) Eradication of vectors : The breeding places of the vectors should be destroyed and adult vectors killed by suitable methods.
 2. In which way has the study of biology helped us to control infectious diseases?
 2. The study of biology has helped us to control infectious diseases in the following ways :
 - (a) The use of vaccines & immunization programme is due to advancements in biology.
 - (b) Biotechnology is helping to make new and safe vaccines.
 - (c) Discovery of antibodies and various other drugs have also enabled to treat infectious diseases.
 3. How does the transmission of each of the following diseases take place?
 - (a) Amoebiasis
 - (b) Malaria
 - (c) Ascariasis
 - (d) Pneumonia
 3.
 - (a) Amoebiasis: Amoebiasis is also called Amoebic dysentery. It is caused by *Entamoeba histolytica*. It is transmitted through faecal or oral route or sexual transmission.
 - (b) Malaria: Plasmodium is the malarial parasite. Its sexual phase occurs in the female *Anopheles* mosquito which is its primary host. The asexual phase occurs in humans which is its secondary host. The patient displays symptoms of malarial fever after a period of 14 days from infectious bite. Body temperature may reach 106°F at the height of fever. The patient sweats a lot & the next attack takes place after 48 hours. Quinine is the oldest drug for malaria.
 - (c) Ascariasis: Ascariasis is caused by *Ascaris lumbricoides*. A large number of adult *Ascaris* worms infest a single host, they obstruct the intestinal passage and cause abdominal discomfort like colic pains. The patient may suffer from indigestion, diarrhoea

and vomiting. The disease can be treated by administering antihelminthic drugs like oil of chenopodium, Alcopar, Bendex, Dewormis, Zental etc.

(d) Pneumonia: Pneumonia is caused by *Streptococcus pneumoniae* & *Haemophilus influenzae*. It is a serious disease of the lungs. Lymph and mucus collect in the alveoli and bronchioles of the lungs so lungs do not get sufficient air. No such vaccine is available. However, Penicillin, Streptomycin and Ampicillin is used.

4. What measure would you take to prevent water-borne diseases?
4. The following measures could be taken to prevent waterborne diseases:
 - (a) Fresh and clean water should be taken.
 - (b) If water is contaminated it should be filtered before drinking.
 - (c) Water resources should be disinfected. One should not take pond's water.
5. Discuss with your teacher what does 'a suitable gene' means, in the context of DNA vaccines.
5. 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.
6. Name the primary and secondary lymphoid organs.
 - Primary lymphoid organs include the bone marrow and the thymus.
 - Secondary lymphoid organs are the spleen, lymph nodes, tonsils, Peyer's patches of 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
7.
 - (a) MALT- Mucosa-Associated Lymphoid Tissue
 - (b) CMI- Cell-Mediated Immunity
 - (c) AIDS- Acquired Immuno Deficiency Syndrome
 - (d) NACO- National AIDS Control Organization
 - (e) HIV- Human Immuno Deficiency virus
8. Differentiate the following and give examples of each:

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

8.

(a)

Innate immunity	Acquired immunity
(a) Innate immunity includes all the defence elements with which an individual is born.	(a) The immunity which is acquired after the birth is called acquired immunity.
(b) It consists of various types of barriers that prevent the entry of foreign agents.	(b) It consists of specialized cells(T-cells and B-cells) and antibodies that circulate in the body fluid.
(c) It remains throughout life.	(c) It can be short lived or life long.

(b)

Active immunity	Passive immunity
(a) It is developed when the person's own cells produce antibodies in response to infection or vaccine.	(a) It is developed when antibodies produced in other organisms are injected into a person to counter act antigens such as snake venom.
(b) It provides relief only after long period.	(b) It provides immediate relief.
(c) It has no side effects.	(c) It may cause reaction.
(d) It is long lasting.	(d) It is not long lasting.

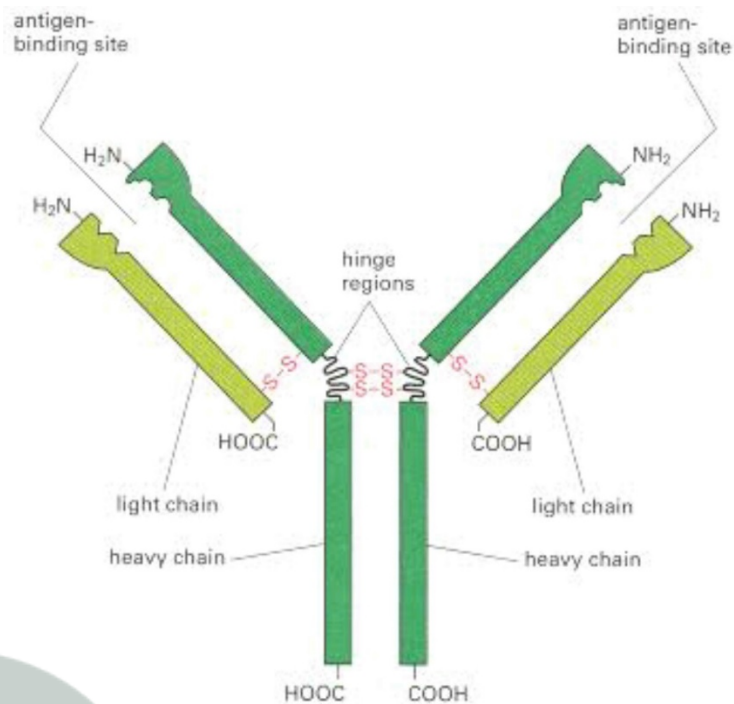
9. Draw a well-labelled diagram of an antibody molecule.

9. Antibodies are immunoglobulins(Igs) which are produced in the body in response to antigen or foreign bodies. Antibodies are produced by B lymphocytes and plasma cells. An antibody molecule consists of the following parts :

(a) Heavy and light chains : An antibody molecule is made up of 4 peptide chains, two small called light chains and two longer called heavy chains. Antibody is thus represented as H₂L₂. The heavy chains have larger number of aminoacids while light chains have less aminoacids.

(b) Constant and Variable regions : There are two different regions the constant and the variable region in each chain of the antibody.

(c) Disulphide Bonds and Hinge region : A disulphide bond joins a light chain with a heavy chain. Two disulphide bond also link the two heavy chains. This part of the antibody displays considerable flexibility and is called hinge region.



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

10. AIDS (Acquired Immuno Deficiency Syndrome) is caused by the Human immunodeficiency virus (HIV).

It has the following modes of transmission:

- 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.

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

11. AIDS (Acquired Immuno Deficiency 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 incorporates 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 Tlymphocytes 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.

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

12.

Cancer cells	Normal cells
(a) These cells divide in an unregulated/uncontrolled manner.	(a) These cells divide in a regulated manner.
(b) Their life span is not definite.	(b) They have a definite life span.
(c) These cells do not respond to control mechanisms and do not show contact inhibition.	(c) They live in a complex interdependent manner and show the phenomenon of contact inhibition.

13. Explain what is meant by metastasis.

13. The property of metastasis is exhibited by malignant tumors. 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 tumor. From the tumor, some cells get sloughed off and enter into the blood stream. From the blood stream, these cells reach distant parts of the body and therefore, initiate the formation of new tumors by dividing actively.

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

14. **The effects of alcohol abuse are :**

- (a) Deficiency of nutrients - Deficiency of nutrients such as minerals, proteins and vitamins are found in alcoholics. Low blood potassium, magnesium, calcium, zinc and phosphorus can occur in alcoholics. Vitamins like thiamine (B1), nicotinic acid(B3), pyridoxine(B6), folic acid, ascorbic acid(vitamin C) and vitamin A may be deficient in alcoholics. Thiamine (B1) deficiency causes Wernicke's and Korsakoff's syndrome.
- (b) Effects on brain - Alcohol is depressant to the brain. Alcohol decreases sleep and depresses rapid eye movement(REM). Cerebrum is affected first followed by cerebellum.
- (c) Mallory Weiss Syndrome - Dilute alcohol stimulates gastric secretion. Acute alcoholic intake can result in inflammation of the oesophagus and stomach.
- (d) Diseases of liver - Absorbed alcohol is carried directly to the liver, where it becomes the preferred fuel. There is destruction of hepatocytes and fibroblasts. The liver shrinks in size.
- (e) Increased cancer risk - Alcoholics have a rate of carcinoma 10 times higher than that expected in the general population.
- (f) Effect on kidneys - Diuresis is noticed after alcohol intake. Alcohol induced inhibition of ADH secretion. Deficiency of ADH cause more urine output.

- (g) Impotency and Infertility - Chronic alcoholic men may show testicular atrophy with shrinkage of the seminiferous tubules and loss of sperm cells. Chronic alcoholism can produce impotence and infertility.
- (h) Foetal Alcohol Syndrome (FAS) - Heavy drinking during pregnancy results in the foetal alcohol syndrome which includes facial changes and mental retardation.

The effects of drug abuse are :

- (a) Nervousness and Psychosis - Prolonged use of drugs leads to nervousness and psychosis. Drug addicts neglect their studies, duty and bring frustration not only for themselves but also for their family and community.
 - (b) AIDS and Hepatitis - Many drug addicts inject these drugs in their blood vessels with previously used needles. AIDS and Hepatitis-B are common in addicts using intravenous drugs.
 - (c) Impotency, Chromosomal Aberration and production of Abnormal babies - Continuous use of narcotics and stimulants cause impotency and chromosomal aberration and production of abnormal babies.
 - (d) Hormonal changes - Hormonal changes include an increase in cortisol levels, inhibition of vasopressin, reversible decrease in serum thyroxine and a more marked decrease in serum triiodothyronine (T₃).
 - (e) Effects on kidneys - Functions of kidney of drug abused persons are impaired or maybe damaged.
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?
15. Yes, friends can influence one to take drugs and alcohol. A person can take the following steps for protecting himself/herself against drug abuse:
- Increase your will power 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 counselling 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.
16. Why is that once a person starts taking alcohol or drugs, it is difficult to get rid of this habit? Discuss it with your teacher.
16. Once a person starts taking alcohol or drugs, he becomes addict to these substances physically and mentally. Whenever he tries to get rid of this habit, he shows unpleasant

withdrawal symptoms and these include vomiting, diarrhoea, shivering, twitching, perspiration, abdominal and muscular cramps.

So, it becomes difficult for a person to get rid of this habit.

17. In your view what motivates youngsters to take to alcohol or drugs and how can this be avoided?
17. Many factors are responsible for motivating youngsters towards alcohol or drugs. Curiosity, need for adventure and excitement, experimentation are the initial causes of motivation. Some youngsters start consuming drugs and alcohol in order to overcome negative emotions (such as stress, pressure, depression, frustration) and to excel in various fields. Several mediums like television, internet, newspaper, movies etc. are also responsible for promoting the idea of alcohol to the younger generation. Amongst these factors, reasons such as unstable and unsupportive family structures and peer pressure can also lead an individual to be dependent on drugs and alcohol.

Preventive measures against addiction of alcohol and drugs:

- Parents should motivate and try to increase the will power of their child.
- Parents should educate their children about the ill-effects of alcohol. They should provide them with proper knowledge and counselling regarding the consequences of addiction to alcohol.
- It is the responsibility of the parent to discourage a child from experimenting with alcohol. Youngsters should be kept away from the company of friends who consume drugs.
- Children should be encouraged to devote their energy in other extracurricular and recreational activities.
- Proper professional and medical help should be provided to a child if sudden symptoms of depression and frustration are observed.



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