



## **NCERT Class 12 Biology Exercise Solutions**

### **Chapter 7 – Human Health and Disease**

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

**Ans:** Public health measures are the measures taken to prevent and contain the spread of various infectious diseases. They are taken to reduce contact with infectious agents.

Some of these preventative measures include the following:

- Isolation – It prevents the spread of airborne diseases (chicken pox, pneumonia, tuberculosis, etc.). We isolate an infected person to reduce the likelihood of the disease spreading.
- Vaccination – It protects the body from communicable diseases by administering agents that mimic the microbe in the body. This helps in passive immunization of the body. Vaccines are available for some diseases like mumps, polio, measles etc.
- Eradication of vectors - Vector borne diseases like dengue, malaria etc. can be prevented by maintaining a clean environment and containing the mosquito population by regulating water and not allowing it to stagnate near residential areas. Some other measures include regular cleaning of coolers and the use of mosquito nets and insecticides. It can also be controlled by introducing Larvivorous fish such as Gambusia in ponds, as they control mosquito larvae breeding in stagnant water.
- Maintaining public and personal hygiene is one of the most important practices to prevent the spread of infectious diseases. It includes maintaining a clean body, consuming healthy and nutritious food, clean water, etc. Proper disposal of wastes, excreta, and disinfection of water reservoirs are some of the measures that can be adapted as part of public hygiene.

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

**Ans:** Biology is a broad field of science that deals with life forms and their processes. It has helped in the fight against infectious diseases in the following ways:

- The complete eradication of deadly diseases such as smallpox was made possible through the use of immunization programs and vaccines
- Other infectious diseases such as diphtheria, polio, pneumonia, etc. have been successfully combated through the use of vaccines
- The treatment of several infectious diseases was successfully carried out through the use of antibiotics and other drugs

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

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

**Ans:** The transmission of diseases is as given in the table:

Name of the disease	Transmission
Amoebiasis	Ingestion of Quadri nucleated cysts of <i>Entamoeba histolytica</i> can cause the cysts to be passed from the patient's faeces via water and food.
Malaria	Plasmodium, or the malarial parasite, is communicated to a healthy person from a patient when bitten by a female <i>Anopheles</i> mosquito
Ascariasis	It can be passed by ingesting contaminated water and food with the embryonated eggs of <i>Ascaris</i>
Pneumonia	Transmitted by droplets and sputum given out when patient coughs. It is a bacterial disease

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

**Ans:** Measures taken to prevent water-borne diseases are as follows:

- Provision of clean water for drinking
- Industries should be prohibited from discharging wastes into water bodies
- Frequent cleaning and disinfecting of water tanks and reservoirs

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

**Ans:** The term 'suitable gene' is used to refer to a particular section of DNA that can be altered in the host in order to synthesize a particular protein which attacks and kills a specific disease-causing entity.

**6. Name the primary and secondary lymphoid organs.**

**Ans:** Primary lymphoid organs are – Thymus and bone marrow

Secondary lymphoid organs are – Mucosal-associated lymphoid tissues (MALT), Lymph nodes, Spleen, Peyer's patches (small intestine)

**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 expansion is as follows:

- (a) MALT – Mucosal-Associated lymphoid tissues
- (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**

**Ans:** The differences are as follows:

**(a) Innate and acquired immunity**

Innate immunity	Acquired immunity
Non-specific in nature	Specific in nature
Present from birth	It is acquired in response to a particular pathogen
Has different barriers	Has a memory of antibody
For instance, mucus traps bacteria and other particles	For instance, post-vaccination antibodies respond

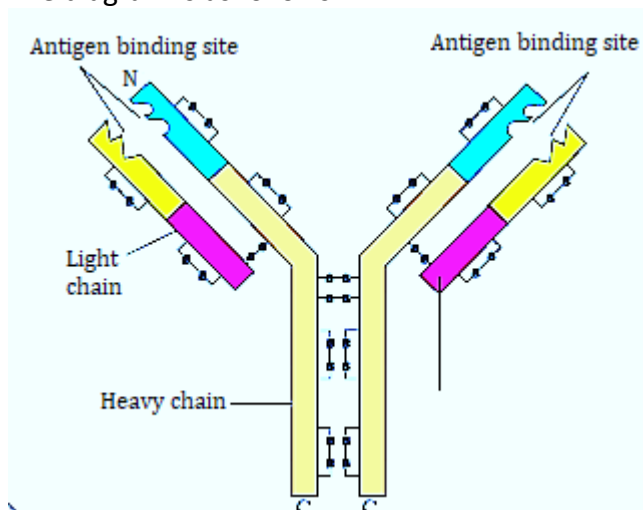
**(b) Active and passive immunity**

Active immunity	Passive immunity
In response to pathogens, the body releases antigens	To initiate immunity, an antigen is injected
Slower response	Faster response
For instance, post-vaccination antibodies respond	For instance, Colostrum is rich in antibodies

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

**Solution:**

The diagram is as follows:



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

**Ans:** The various routes by which transmission of the human immunodeficiency virus (HIV) takes place are as follows:

- Sexual relation with the person infected
- Organ transplantation from an infected person
- Transfusion of contaminated blood products and blood
- Transmitted from mother to the child through the placenta

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

**Ans:** Upon infiltrating the host's system, the virus enters macrophages, where its RNA genome replicates to generate viral DNA through the reverse transcriptase enzyme. Subsequently, this viral DNA integrates into the host cell's DNA, commandeering the host's cellular machinery to produce new virus particles.

Macrophages function as a factory for HIV replication. Concurrently, HIV infects helper T-lymphocytes, undergoing replication and releasing progeny viruses into the bloodstream. These viruses target additional helper T-lymphocytes, culminating in a progressive decline in their numbers within the patient's system. Ultimately, this prolonged depletion of helper T-lymphocytes leads to a compromised immune system.

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

**Ans:** The differences are as follows:

<b>Cancerous cell</b>	<b>Normal cell</b>
As these cells do not possess the property of contact inhibition, they keep dividing, forming a cluster of cells	As these cells possess the property of contact inhibition, they stop dividing once they come in touch with other cells
Do not experience differentiation	Experience differentiation after attaining growth
Cells are not confined; they move to the adjacent tissues and interrupt their functioning	The cells are confined to a specific location

**13. Explain what is meant by metastasis.**

**Ans:** Metastasis is the abnormal progression that occurs in cancerous growths, where malignant cells proliferate and migrate to various organs, perpetually multiplying to develop a mass of cells referred to as a tumour. During this phenomenon, certain cells detach from the primary tumour, infiltrate the bloodstream, travel to distant body regions, and stimulate the growth of additional tumours through continuous division.

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

**Ans:** The harmful effects of alcohol and drug abuse are as follows:

**Harmful effects of alcohol:**

- **On individual** - Excessive alcohol consumption negatively impacts the body by causing harm to the nervous system and the essential organ, the liver. This can result in symptoms like tiredness, melancholy, reduced weight, hostility, and decreased appetite. Severe scenarios may even lead to heart failure, coma, and eventual demise.
- **On family** - The detrimental consequences of excessive alcohol consumption by a family member can manifest in various forms such as domestic violence, verbal abuse, irritability, and feelings of insecurity among other family members.
- **On society** – It leads to impulsive actions, diminishing social interactions, increased aggression, and decreased engagement in communal events are outcomes linked to this phenomenon.

### **Harmful effects of drugs:**

- **On individual** – The effect of drugs on one's body is severe, more so on the central nervous system. It can lead to malfunctioning of different organs of the body such as liver, kidney, etc. in such individuals, HIV spreads rapidly among drug users as they share used needles while they inject drugs into the body. Drug addicts face both short-term and long-term effects, some of which are mood swings, aggressiveness, depression, etc.
- **On family and society** – A drug addict creates issues within the family and society. When a person is dependent on drugs, he/she becomes irritated, frustrated, 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, friends can have an influence on friends to start taking drugs and consuming alcohol. The following actions can be taken as precautionary measures to protect oneself from alcohol/drug abuse, they are:

- One must have a strong control over his/her will. One should refrain from experimenting with alcohol just for the sake of trying/curiosity/fun, etc.
- Stay away from people who are into drugs.
- Seek elderly advise, peer or medical assistance.
- Enlighten yourself with enough knowledge about the consequences of drug abuse.
- Go in for a counselling session.
- Take up some hobby/extracurricular activity.
- If depression or frustration levels persist or heighten, seek immediate medical or professional help.

### **16. 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.**

**Ans:** The consumption of alcohol and drug usage is associated with a strong addictive effect that correlates with feelings of euphoria, providing a temporary sense of happiness. Continued drug use can elevate the body's receptor tolerance levels, resulting in an escalation of drug intake.

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

**Ans:** Various factors attract young individuals to substances like drugs or alcohol. Initially, factors like curiosity, thrill, seeking adventure, and experimentation play a role. Some individuals turn to substance use as a coping mechanism for negative emotions such as stress, depression, pressure, frustration, aiming for improved performance in various areas. Additionally, certain media platforms like the internet, television, newspapers, and movies contribute to promoting alcohol consumption among the youth. Other influencing factors may include unsupportive family dynamics, unstable relationships, and peer pressure, leading individuals to engage in substance abuse.

Some of the preventive measures against the use of drugs and alcohol are as follows:

- Encouragement from parents and older individuals to cultivate a resilient mindset to combat challenges.
- Parents ought to instill an understanding of the detrimental impacts of alcohol in their children, providing thorough guidance and education on the consequences of alcohol dependency.
- It is imperative for parents to meticulously oversee their children's social interactions and guide them away from negative influences.
- Motivate students to channel their efforts into alternative pursuits.
- Adequate medical and expert support must be administered upon noticing signs of depression and distress.

YOUR MENTOR GURU