Human Health and Diseases

CHAPTER 8

NCERT FOCUS

ANSWERS

Topic 1

1. The various public health measures that could provide safeguard against infectious diseases are :

(i) Proper disposal of garbage – There should be regular collection and transport of garbage to disposal sites.

(ii) Proper drainage system – Drains should be covered to reduce chances of multiplication of flies and mosquitoes. Any blockage must be immediately attended.

(iii) Isolation – A person suffering from an infectious disease should be segregated so that others do not catch infection from him.

(iv) Sanitation – Clean surroundings can prevent spread of diseases. This includes: proper disposal of waste and excreta, periodic cleaning and disinfection of water sources and observing standard practices of hygiene in public catering.

(v) Eradication of vectors – It is necessary to eliminate the vectors and their breeding places by avoiding stagnation of water in and around residential areas, regular cleaning of household coolers, use of mosquito nets, doors and windows should be provided with wire mesh, etc.

(vi) Vaccination and immunisation – This has enabled us to completely eradicate a deadly disease like smallpox. A large number of other infectious diseases like polio, diphtheria, pneumonia and tetanus have been controlled to a large extent by the use of vaccines.

(vii) Control of pollution – Anti-pollution laws should be strictly enforced.

(viii) Drinking clean water – Drinking water should be filtered and free from any contamination, suspended and dissolved matter.

(ix) Education – People should be educated about the communicable diseases so that they can protect themselves against infection.

2. Study of biology has helped us to know about causes of diseases, carriers of diseases (vectors), effects of diseases on different body functions and above all, means to control diseases. Our immune system plays a major role in preventing diseases.

3. (a) Amoebiasis is caused by *Entamoeba histolytica.* Infection occurs by ingesting cysts with food and drinks. These cysts are carried by flies from faeces to food and drinks.

(b) Malaria is caused by *Plasmodium* sp. Malarial parasites are carried from the infected to the healthy person by the female *Anopheles* mosquito.

(c) Ascariasis in man is caused by ingesting food and water contaminated with *Ascaris* eggs. Children become infected by ingesting soil.

(d) Pneumonia spreads by sputum (containing *Streptococcus pneumoniae*) of the patient. These microbes are inhaled and get lodged in the bronchioles.

4. Water-borne diseases can be prevented by drinking clean water. Water should be free from contamination, suspended and dissolved substances. If water is contaminated it should be boiled and filtered before drinking. Periodic cleaning and disinfection of water reservoirs, pools and tanks should be done.

Topic 2

1. A DNA vaccine consists of a suitable gene encoding an antigenic protein, inserted into a plasmid, and then incorporated into the cells in a target animal. The plasmid vaccine carrying the DNA (gene) enters the nucleus of target cells and produces RNA and in turn the specific antigenic protein, because these proteins are recognised as foreign. When they are processed by the host cells and displayed on their surface, the immune system is alerted, which then triggers a range of immune responses.

2. Primary lymphoid organs are bone marrow and thymus. Secondary lymphoid organs are spleen, lymph nodes, tonsils, Peyer's patches of small intestine and mucosa associated lymphoid tissues (MALT).

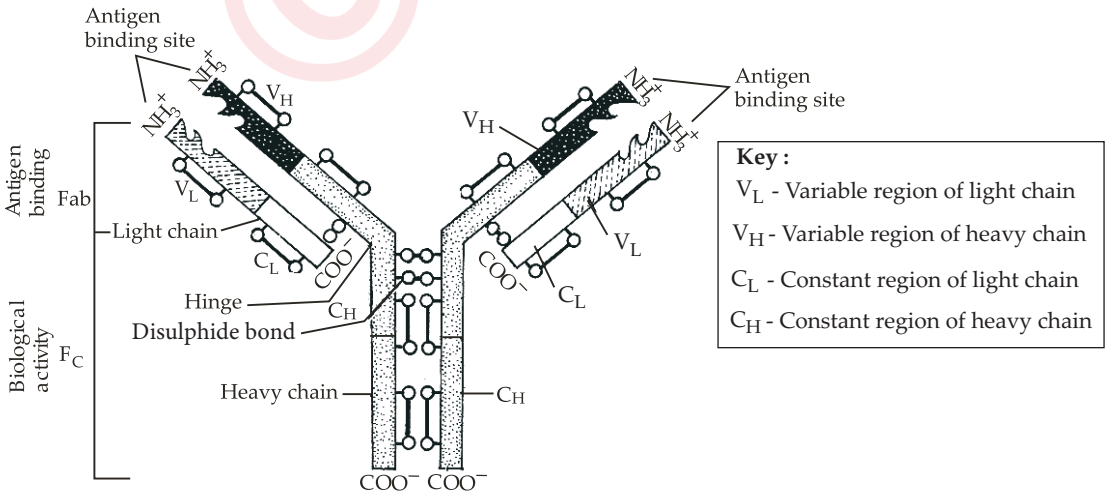
3. (a) Differences between innate and acquired immunity are as follows :

	Innate Immunity	Acquired Immunity
(i)	It is present from birth.	It develops during life time.
(ii)	This immunity remains throughout life.	The acquired immunity can be short-lived or life long.
(iii)	Contact with pathogen or its antigen is not essential for developing innate immunity.	Contact with pathogen or its antigen is essential for developing acquired immunity.
(iv)	Innate immunity is inheritable.	Acquired immunity cannot be passed to the next generation except for a brief period to neonates.
(v)	Examples – Innate immunity in humans against distemper, a fatal disease of dog, acid in the stomach and mucus coating of epithelium preventing microbial growth, interferons protecting non-infected cells from further viral infections, etc.	Examples – IgG antibodies transferred from mother to fetus through placenta, development of natural immunity in a person who has recovered from an attack of mumps, resistance induced by vaccination, etc.

(b) Differences between active and passive immunity are as follows:

	Active Immunity	Passive Immunity
(i)	It is developed when person's own cells produce antibodies in response to infection or vaccine.	It is developed when antibodies produced in other organisms are injected into a person to counteract antigen.
(ii)	Immunity is not immediate. A time lapse occurs for its development.	Immunity develops immediately.
(iii)	It lasts for sufficiently long period, may be life long.	It is not long lasting.
(iv)	It has no side effects.	At times, the body reacts to the introduction of antisera. It is called serum sickness.
(v)	Examples – Bacterial vaccines, viral vaccines, bacterial products such as toxoids for diphtheria and tetanus.	Examples – Human colostrum containing IgG antibodies, antitetanus serum (ATS), antidiphtheric serum (ADS), anti-gas gangrene serum (AGS).

4. A labelled diagram of an antibody molecule is as follows :



Topic 3

1. (a) MALT – Mucosa Associated Lymphoid Tissue
(b) CMI – Cell Mediated Immunity
(c) AIDS – Acquired Immuno Deficiency Syndrome
(d) NACO – National AIDS Control Organisation
(e) HIV – Human Immunodeficiency Virus

2. The various routes by which transmission of human immunodeficiency virus (HIV) takes place are:

(i) Sexual contact with infected person.

(ii) Use of contaminated needles and syringes to inject drugs or vaccines.

(iii) Use of contaminated razors.

(iv) By transfusion of contaminated blood.

(v) From infected mother to her child through placenta.

(vi) Organ transplantation

(vii) Artificial insemination

3. After the entrance of the virus into the body of the person, the virus enters into macrophages where RNA genome of the virus reverse transcribes to form viral DNA with the help of reverse transcriptase enzyme. This viral DNA gets incorporated into the host cell's DNA and directs the infected cells to produce viruses. The infected macrophages produce virus and act like a HIV factory. Simultaneously, HIV virus enters into helper T – lymphocytes where it replicates and produces other viruses. These viruses are then released into the blood and attack other helper T-lymphocytes. In this way, there occurs progressive decrease in number of helper T-lymphocytes in the body of the infected person. Due to decrease in the number of helper T-lymphocytes, the patient becomes so immunodeficient that he/she is unable to protect himself/herself against the infections of bacteria, fungi, viruses, etc.

Topic 4

1. Cancerous cell and normal cell are different in following aspects :

	Normal cell	Cancerous cell
(i)	Normal cells divide in regulated manner.	Cancer cells divide in unregulated, uncontrolled manner.
(ii)	These cells show the property of contact inhibition, *i.e.*, contact with other cells inhibits their uncontrolled growth.	These cells do not respond to control mechanisms and do not show contact inhibition.
(iii)	Dividing cells remain confined to the part of the body where they are formed.	These cells show metastasis, *i.e.*, they have ability to invade new sites.
(iv)	Cells require extracellular growth factors.	These do not require extracellular growth factors.
(v)	Tumors are not formed.	They tend to form tumors.
(vi)	Normal cells have a definite life span.	Cancer cells do not have a definite life span and resist induction of cell death which promotes development of tumors.

2. 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.

Topic 5

1. Harmful effects caused by alcohol/drug abuse are as follows:

(i) Among youth there is drop in academic performance, lack of interest in personal hygiene, isolation, depression, fatigue, aggressive and rebellious behaviour, deteriorating relationships with family and friends, loss of interest in hobbies, change in sleeping and eating habits, fluctuations in weight, appetite, etc.

(ii) Excessive dose of drugs leads to coma and death due to respiratory failure, heart failure or cerebral haemorrhage.

(iii) Abusers become mental and cause financial distress to their entire family and friends.

(iv) They may acquire serious infections like AIDS and hepatitis by taking drugs intravenously.

(v) Intake of alcohol/drugs damages nervous system, liver (cirrhosis) and kidney.

(vi) Drug abuse adversely affects fetus in case of pregnancy, leading to Fetal Alcohol Syndrome (FAS).

(vii) Continuous use of narcotics and stimulants cause impotency and chromosomal aberrations.

(viii) Heavy drinking can cause an acute alcoholic myopathy characterised by painful and swollen muscles and high levels of serum creatine phosphokinase (CK).

2. Yes, friends can influence person to take alcohol/drugs. One may protect himself/herself from such an influence by avoiding experimental use of alcohol/drug for curiosity, pleasure, adventure and excitement, and avoiding the company of such friends.

3. Once a person starts taking alcohol or drugs, it is difficult to get rid of this habit because he becomes addicted to it. Addiction is a psychological attachment to certain effects such as euphoria and a temporary feeling of well-being. These drive people to consume drugs/alcohol even when these are not needed, or even when their use becomes self-destructive. With repeated use, tolerance level of the receptors present in the body increases, which consequently leads to higher dose of drugs/alcohol and addiction.

Thus, the addictive potential of drugs and alcohol pull the user into a vicious circle leading to their regular use from which he/she may not be able to get out.

4. There are many factors that motivate youngsters to take alcohol or drug. These include:

- Curiosity
- Experimentation
- Adventure and excitement
- Peer pressure
- Family history, *i.e.*, unstable or unsupportive family structure
- Frustation and depression
- Relief from pain
- Feeling of independence
- Television, movies, newspapers and internet also help to promote this perception.

This can be avoided by the following measures:

(i) Education and counselling : Educating and counselling people to face problems and stresses, and to accept disappointments and failures as a part of life.

(ii) Seeking help from parents and peers: Help from parents and peers should be taken immediately so that they can guide appropriately. Help may even be taken from close and trusted friends.

(iii) Looking for danger signs : Alert parents and teachers to look for and identify the danger signs. Even friends, if they find someone using drugs or alcohol, should not hesitate to bring this to the notice of parents or teachers in the best interest of the person concerned.

(iv) Cross-checking before prescribing and selling drugs: The physicians should prescribe the habituating drugs only to the genuine persons and only for the essential duration. Pharmacists should not sell these drugs without the physician's prescription.

(v) Appreciation : For even the smallest achievement, good behaviour and other activities, the child should be appreciated.

(vi) Avoid undue pressure : Every child has a specific personality with certain preferences and choices. They should be taken care of and respected. No child should be asked to perform beyond threshold limits whether in studies, sports or extracurricular activities.

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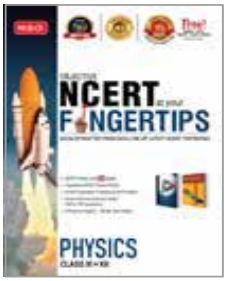

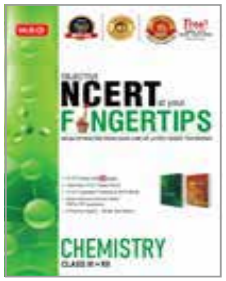

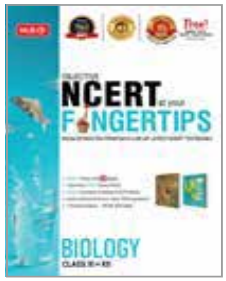

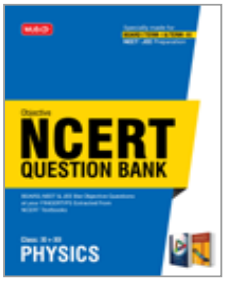

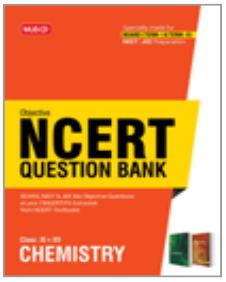

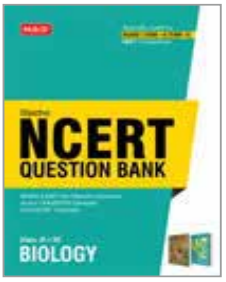

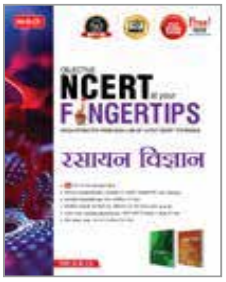

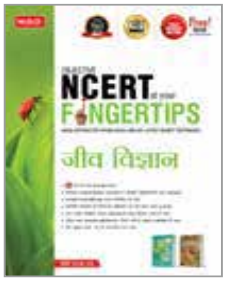

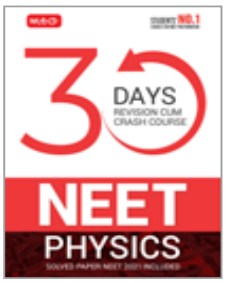

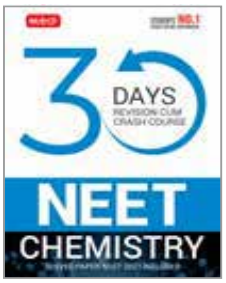

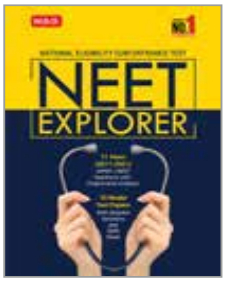

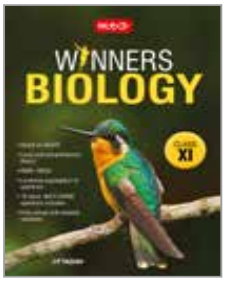

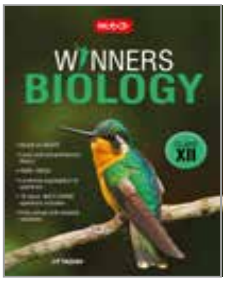

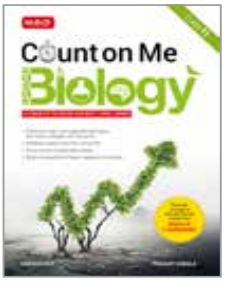

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