

BIOLOGY

Board – ICSE

Class – 9

Topic – Aids to Health

1. Name the following:

- (i) The antibiotic which was first discovered.

Ans: Penicillin

- (ii) The scientist who discovered vaccination

Ans: Edward Jenner

- (iii) An immunological preparation of blood containing antibodies and antitoxins against specific diseases.

Ans: Serum

- (iv) Wild animals as reservoir of rabies virus.

Ans: Wolf, Jackal, Fox, Bat

2. Fill in the blanks.

- (i) _____ is the hypersensitivity of the body to certain substances. [Ans: Allergy]

- (ii) _____ Cells release antibodies in the blood cells. [Ans: Plasma]

- (iii) _____ is a blood serum protein produced in response to the injected antigens.

[Ans: Antibody]

3. Mention whether the following statements are true or false. If false, rewrite the sentence.

- (i) Phenol is an antiseptic.

- (ii) AIDS stands for Acquired Immune Destruction syndrome.

Ans:

- (i) False. Phenol is a disinfectant.

- (ii) False. AIDS stands for Acquired Immunodeficiency Syndrome.

4. Define the following

- (i) Vaccine:

Ans. A germ culture which when introduced into animal body, stimulate an immune reaction and thus develop resistance to a particular disease (or disease-causing micro-organism) is called as vaccine.

- (ii) Immunity:

Ans. Ability of animal or plant to resist infection by parasites and effects of other harmful agents

(iii) Antiserum:

Ans. a blood serum containing antibodies against specific antigens, injected to treat or protect against specific diseases.

(iv) Antibodies:

Ans. These are a group of glycoproteins produced in the blood in response to antigens produced by the pathogen.

(v) Phagocytes:

Ans. Cells which can ingest particles from their surroundings. For example, WBC act as phagocytes as they engulf disease-causing pathogens which gain entry into the bloodstream.

5. Differentiate between the following:

(i) Antibody and Antigen.

Ans.

Antibody	Antigen
These are substances produced by organisms in response to infection.	These are foreign molecules which when introduced into the body stimulate the production of antibodies.
These are plasma proteins.	These may be proteins or polysaccharides.

(ii) Vaccine and Serum.

Ans.

Vaccine	Serum
It consists of dead or weakened bacteria or virus that stimulate the production of antibodies by the blood.	It consists of antibodies that have been produced in the body of another person or animal who has gained immunity against the disease and then injecting it into the patient.

(iii) Inherited immunity and Acquired immunity.

Ans.

Inherited Immunity	Acquired Immunity
It is due to antibodies which the organisms inherit from their parents	It is acquired during the life-time of the organism.

6. “Fever is a natural defense mechanism”. Elaborate the statement.

Ans: Fever is a natural defense mechanism because it stimulates the phagocytes and inhibits the growth of micro-organisms.

7. What are antibiotics?

Ans: Antibiotics are chemicals produced by various fungi and bacteria which suppress the growth of other micro-organisms by interfering with some stage of their metabolism. For example, penicillin prevents the synthesis of certain components of the bacterial cell wall.

8. What is allergy? How do allergic reactions take place?

Ans: Allergy is the hypersensitivity of the body to certain substances. Allergy occurs when the antigen and antibody reaction take place inside the tissues. Allergens are the agents which cause allergy. They are weak antigens. First exposure to the allergens does not cause allergy. It only helps in the formation of antibodies. But on second exposure, the allergens combine with the antibody bound mast cells. This complexing causes the cells to burst and release histamines, leading to inflammatory response in form of skin rashes, watering of eyes, frequent sneezing, inflammation of mucous membrane, etc.

9. How does the body fight viral infection?

Ans: In case of viral infection, the body protects itself in the following ways:

- (i) The lymphocytes produce antibodies which cover the protein coat of virus and prevent it from attaching itself to the receptor of a cell.
- (ii) The lymphocytes destroy the cells that have been infected by the virus before they can reproduce.
- (iii) The body produces high fever which limits the ability of the virus to reproduce.
- (iv) In case of cold, large amounts of mucus is formed in the nose and throat which traps

The virus, which is then expelled by sneezing and blowing the nose.

- (v) The body produces a protein called interferon that provides protection against broad spectrum viruses

10. What is disease? Name five types of microbes which cause human diseases.

Ans: A disease is an abnormal condition of an organism or part, especially as a result of infection, inherent weakness or environmental stress, that disturbs the normal physiological functioning of the organism.

The four microbes which cause infection are:

Virus – Chickenpox, influenza, jaundice, etc.

Bacteria – Cholera, tetanus, pneumonia, etc.

Protozoa – Malaria, amoebic dysentery, sleeping sickness.

Worms – Filaria, tapeworm, pinworm.

11. What are vaccines and how do they protect the body?

Ans: A vaccine is a preparation of an antigen for preventive inoculation. When administered, it stimulates specific antibody formation in the body. It protects only against the disease for which it is made.

12. How does the human body protect itself from infections?

Ans: The human body protects itself from infections using various mechanical and chemical barriers which are as follows:

- (i) Human skin is tough which prevents the entry of bacteria and viruses.
- (ii) Perspiration contains enzyme lysozyme that destroys the cell walls of many bacteria.
- (iii) Secretion of gastric juices kills the foreign bodies in the stomach.
- (iv) Saliva contains the enzyme lysozyme which attacks bacteria.
- (v) Respiratory tract is lined with mucous membrane and the nostrils have a mesh of fine hair to capture foreign particles passing through it.
- (vi) Antibodies are produced in the blood to combat toxic effects of parasitic micro-organisms.

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13. Describe the various defense mechanisms which will come into action when you cut yourself with a kitchen knife.

Ans: When we accidentally cut our hand with a knife, the body's second line of defense comes into play:

- (i) The blood capillaries around the injury became permeable due to the release of histamine by the lymphocytes, thus enabling the phagocytes to leak into the interstitial space and engulf the invading microbes.
- (ii) The number of white blood cells count increases. Fever results, which provides defense by stimulating the phagocytes and by inhibiting the growth of micro-organisms.
- (iii) The body produces antibodies against the invading germs at the site of cut.

14. What is serum? How is it prepared?

Ans: Serum: Serum provides immediate, though often temporary immunity.

Its preparation involves the following steps:

- (i) The microbe is grown on culture media in the laboratory.
- (ii) The toxin is separated from it.
- (iii) The toxin is injected into the body of an animal (usually horse) in quantities sufficient to make it ill but not cause its death.
- (iv) After the animal recovers, it is now given a much stronger dose.
- (v) This procedure is repeated until the animal can withstand doses that would otherwise kill a healthy animal.
- (vi) Blood, which is now loaded with antibodies against the toxin, is drawn from the neck of the animal and allowed to coagulate.
- (vii) On coagulation, the serum which separates out from the clot is stored in sterilized bottles.