
CBSE Class 12 Biology
NCERT Exemplar Solutions
CHAPTER 8
HUMAN HEALTH AND DISEASES

Multiple Choice Questions (MCQs)

1. The term 'Health' is defined in many ways. The most accurate definition of the health would be:

- (a) health is the state of body and mind in a balanced condition**
- (b) health is the reflection of a smiling face**
- (c) health is a state of complete physical, mental and social well-being**
- (d) health is the symbol of economic prosperity.**

Ans. (c) health is a state of complete physical, mental and social well-being

Explanation: Even if a person is physically fit, lack of mental or social wellbeing will not enable him to lead quality life.

2. The organisms which cause diseases in plants and animals are called:

- (a) Pathogens**
- (b) Vectors**
- (c) Insects**
- (d) Worms**

Ans. (a) Pathogens

Explanation: All insects and worms do not cause diseases; only some of them can do so. Vectors are just carriers of disease causing organisms. Hence, option 'a' correct.

3. The chemical test that is used for diagnosis of typhoid is:

- (a) ELISA-Test**
- (b) ESR - Test**
- (c) PCR - Test**
- (d) Widal-Test**

Ans. (d) Widal-Test

Explanation: ELISA is normally use to diagnose AIDS. PCR is used to amplify a gene copy to obtain a particular gene sequence. ESR test is done to find the sedimentation rate of RBCs and is used as a diagnostic tool for inflammation. Widal test is used for diagnosis of typhoid.

4. Diseases are broadly grouped into infectious and non-infectious diseases. In the list given below, identify the infectious diseases.

- (i) Cancer**
 - (ii) Influenza**
 - (iii) Allergy**
 - (iv) Small pox**
- (a) (i) and (ii)**
 - (b) (ii) and (iii)**
 - (c) (iii) and (iv)**
 - (d) (ii) and (iv)**

Ans. (d) (ii) and (iv)

Explanation: Cancer and allergy are non-infectious diseases.

5. The sporozoites that cause infection when a female Anopheles mosquito bites a

person, are formed in:

- (a) Liver of person**
- (b) RBCs of mosquito**
- (c) salivary glands of mosquito**
- (d) intestine of mosquito**

Ans. (d) intestine of mosquito

Explanation: (d) intestine of mosquito

6. The disease chikunguniya is transmitted by:

- (a) house flies**
- (b) Aedes mosquitoes**
- (c) cockroach**
- (d) female Anopheles**

Ans. (b) Aedes mosquitoes

7. Many diseases can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia?

- (a) Difficulty in respiration, fever, chills, cough, headache**
- (b) Constipation, abdominal pain, cramps, blood clots**
- (c) Nasal congestion and discharge, cough, sorethroat, headache**
- (d) High fever, weakness, stomach pain, loss of appetite and constipation**

Ans. (a) Difficulty in respiration, fever, chills, cough, headache

Explanation: Symptoms in 'b' and 'd' are related to digestive system. Symptoms in 'c' are

related to common cold.

8. The genes causing cancer are:

(a) structural genes

(b) expressor genes

(c) oncogenes

(d) regulatory genes

Ans. (c) oncogenes

Explanation: The term 'onco' is related to cancer, e.g. Department of Oncology.

9. In malignant tumors, the cells proliferate, grow rapidly and move to other parts of the body to form new tumors. This stage of disease is called:

(a) metagenesis

(b) metastasis

(c) teratogenesis

(d) mitosis

Ans. (b) metastasis

Explanation: Metagenesis is related to alternation of generation. Teratogenesis is related to congenital deformities. And mitosis is a type of cell division. Hence, option 'b' is correct.

10. When an apparently healthy person is diagnosed as unhealthy by a psychiatrist, the reason could be that:

(a) the patient was not efficient at his work

(b) the patient was not economically prosperous

(c) the patient shows behavioural and social maladjustment

(d) he does not take interest in sports

Ans. (c) the patient shows behavioural and social maladjustment

Explanation: Option a, b and d cannot indicate a disease when taken in isolation.

11. Which of the following are the reason(s) for Rheumatoid arthritis? Choose the correct option.

(i) The ability to differentiate pathogens or foreign molecules from self-cells increase

(ii) Body attacks self-cells

(iii) More antibodies are produced in the body

(iv) The ability to differentiate pathogens or foreign molecules from self-cells is lost

(a) (i) and (ii)

(b) (ii) and (iv)

(c) (iii) and (iv)

(d) (i) and (iii)

Ans. (b) (ii) and (iv)

Explanation: (b) (ii) and (iv)

12. AIDS is caused by HIV. Among the following, which one is not a mode of transmission of HIV?

(a) Transfusion of contaminated blood

(b) Sharing the infected needles

(c) Shaking hands with infected persons

(d) Sexual contact with infected persons

Ans. (c) Shaking hands with infected persons

Explanation: HIV is transmitted through exchange of body fluids. This is not involved during shaking hands.

13. 'Smack' is a drug obtained from the:

(a) latex of Papaver somniferum

(b) leaves of Cannabis sativa

(c) flowers of Datura

(d) fruits of Erythroxyl coca

Ans. (a) latex of Papaver somniferum

Explanation: (a) latex of Papaver somniferum

14. The substance produced by a cell in viral infection that can protect other cells from further infection is:

(a) serotonin

(b) colostrum

(c) interferon

(d) histamine

Ans. (c) interferon

Explanation: Interferon is a protein which prevents a healthy cell from infection by a virus.

15. Transplantation of tissues/organs to save certain patients often fails due to rejection of such tissues/organs by the patient. Which type of immune response is responsible for such rejections?

-
- (a) auto-immune response**
 - (b) humoral immune response**
 - (c) physiological immune response**
 - (d) cell-mediated immune response**

Ans. (d) cell-mediated immune response

Explanation: (d) cell-mediated immune response

16. Antibodies present in colostrum which protect the new born from certain diseases is of

- (a) IgG type**
- (b) IgA type**
- (c) IgD type**
- (d) IgE type**

Ans. (b) IgA type

Explanation: (b) IgA type

17. Tobacco consumption is known to stimulate secretion of adrenaline and nor-adrenaline. The component causing this could be:

- (a) Nicotine**
- (b) Tannic acid**
- (c) Curaimin**
- (d) Catechin**

Ans. (a) Nicotine

Explanation: (a) Nicotine

18. Anti-venom against snake poison contains:

- (a) Antigens**
- (b) Antigen-antibody complexes**
- (c) Antibodies**
- (d) Enzymes**

Ans. (c) Antibodies

Explanation: (c) Antibodies

19. Which of the following is not a lymphoid tissue?

- (a) Spleen**
- (b) Tonsils**
- (c) Pancreas**
- (d) Thymus**

Ans. (c) Pancreas

Explanation: (c) Pancreas

20. Which of the following glands is large sized at birth but reduces in size with aging?

- (a) Pineal**
- (b) Pituitary**
- (c) Thymus**
- (d) Thyroid**

Ans. (c) Thymus

Explanation: (c) Thymus

21. Haemozoin is a

- (a) precursor of hemoglobin**
- (b) toxin released from Streptococcus infected cells**
- (c) toxin released from Plasmodium infected cells**
- (b) toxin released from Haemophilus infected cells**

Ans. (c) toxin released from Plasmodium infected cells

Explanation: Haemozoin a toxin which is responsible for episode of chill and fever in a malaria patient.

22. One of the following is not the causal organism for ringworm

- (a) Microsporum**
- (b) Trichophyton**
- (c) Epidermophyton**
- (d) Macrosporum**

Ans. (d) Macrosporum

Explanation: (d) Macrosporum

23. A person with sickle cell anemia is

- (a) more prone to malaria**
- (b) more prone to typhoid**
- (c) less prone to malaria**

(d) less prone to typhoid

Ans. (c) less prone to malaria

Explanation: People suffering from sickle cell anemia are somewhat resistant to malaria because of different shape of RBCs in them.

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Very Short Answer Type Questions

1. Certain pathogens are tissue/organ specific. Justify the statement with suitable examples.

Ans. Rhino virus infects the nasal passage and respiratory tract only but does not infect the lungs. Fungi responsible for ringworm infect the skin only. These examples show that certain pathogens are tissue/organ specific.

2. The immune system of a person is suppressed. In the ELISA test, he was found positive to a pathogen.

(a) Name the disease the patient is suffering from.

(b) What is the causative organism?

(c) Which cells of body are affected by the pathogen?

Ans. (a) AIDS

(b) Human Immuno Deficiency Virus

(c) T-lymphocytes

3. Where are B-cells and T-cells formed? How do they differ from each other?

Ans. B-cells are formed in bone marrow, while T-cells are formed in thymus. B-cells produce antibodies, while T-cells help B-cells in doing this.

4. Given below are the pairs of pathogens and the diseases caused by them. Which out of these is not a matching pair and why?

(a) Virus **common cold**

(b) Salmonella **typhoid**

(c) Microsporum **filariasis**

(d) Plasmodium **malaria**

Ans. (c) does not show a matching pair, because Microsporum causes ringworm.

5. What would happen to immune system, if thymus gland is removed from the body of a person?

Ans. Thymus is one of the primary lymphoid organs; responsible for maturation of lymphocytes. Removal of thymus has no significant effect on immunity because enough T-cells are generated during foetal stage, i.e. before birth. However, removal of thymus during infancy may affect immunity to some extent.

6. Many microbial pathogens enter the gut of humans along with food. What are the preventive barriers to protect the body from such pathogens? What type of immunity do you observe in this case?

Ans. The mucus secreted by inner lining of alimentary canal kills most of the microbial pathogens. Furthermore, remaining microbes are killed due to acidic pH in stomach. This is an example of active immunity.

7. Why is mother's milk considered the most appropriate food for a new born infant?

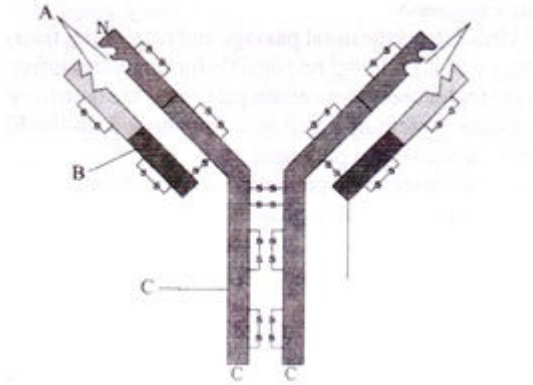
Ans. Mother's milk during initial days after delivery is called colostrum. It contains abundant antibodies (IgA) which protects the neonate against many diseases. So, mother's milk is considered the most appropriate food for a new born infant.

8. What are interferons? How do interferons check infection of new cells?

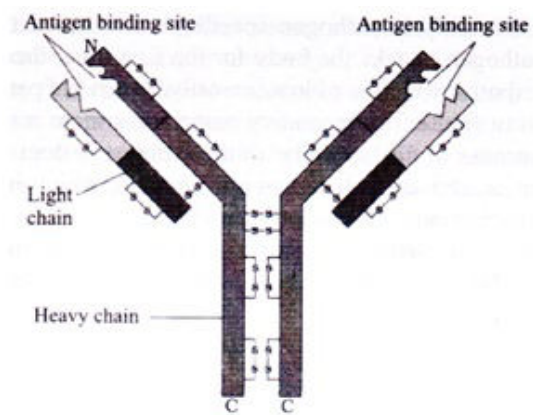
Ans. Virus infected cells secrete proteins called interferons. Interferons protect other cells from infection. They act like cytokinine barriers.

9. In the figure, structure of an antibody molecule is shown. Name the parts A, B and C.

Show A, B and C in the diagram.



Ans. A: Antigen binding site, B: Light chain, C: Heavy chain



10. If a regular dose of drug or alcohol is not provided to an addicted person, he shows some withdrawal symptoms. List any four such withdrawal symptoms.

Ans. Following are four withdrawal symptoms:

- (a) Anxiety
- (b) Shakiness
- (c) Nausea
- (d) Sweating

11. Why is it that during changing weather, one is advised to avoid closed, crowded and

air-conditioned places like cinema halls etc.?

Ans. During changing weather, germs of many viral diseases float in the air. Their prevalence is even more in closed, crowded and air-conditioned places. Due to this, one is advised to avoid such places during changing weather in order to avoid contacting infectious disease; like common cold or flu.

12. The harmful allele of sickle cell anemia has not been eliminated from human population. Such afflicted people derive some other benefit. Discuss.

Ans. A person suffering from sickle cell anemia has one benefit. He is less prone to suffer from malaria. A report from CDC (Center for Disease Control, USA) suggests the prevalence of sickle cell anemia is higher in areas endemic to malaria.

13. Lymph nodes are secondary lymphoid organs. Explain the role of lymph nodes in our immune response.

Ans. Lymph nodes trap microorganisms and antigens which get into lymph and tissue fluid. Antigens trapped in the lymph nodes are responsible for activation of lymphocytes present in lymph nodes. Thus, they trigger the immune response as well.

14. Why is an antibody molecule represented as H_2L_2 ?

Ans. Each antibody molecule has four peptide chains. Two chains are small and are called light chains. Another two chains are long and are called heavy chains. Due to this, an antibody molecule is represented as H_2L_2 .

15. What does the term 'memory' of the Immune system mean?

Ans. Acquired immunity is pathogen specific and is based on 'memory'. When a pathogen attacks the body for the first time, the body gives a primary response which is of low intensity. When the pathogen strikes once again in future, the secondary response is more intensified. This happens because of the 'memory' of the immune system.

16. If a patient is advised Anti-Retroviral Therapy, which infection is he suffering from? Name the causative organism.

Ans. If a patient is advised Anti-Retroviral Therapy, he is likely to suffer from AIDS. The causative organism is Human Deficiency Virus (HIV).

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Short Answer Type Questions

1. Differentiate between active immunity and passive immunity.

Ans.

Active Immunity	Passive Immunity
(i) Body prepares antibodies in response to a pathogen or foreign material.	(i) Antibodies are deliberately put into the body by artificial means.
(ii) It is slow and takes time to show response.	(ii) It is fast and responds quickly.

2. Differentiate between benign tumor and malignant tumor.

Ans.

Benign tumor	Malignant tumor
(i) Usually, they remain confined to their original location and do not spread to other parts of the body.	(i) they spread to other parts of the body as well.
(ii) They cause little damage.	(ii) They cause severe damage.
(iii) They cannot start a new tumor at a new place	(iii) They may start a new tumor when they reach a new place.

3. Do you consider passive smoking is more dangerous than active smoking? Why?

Ans. Passive smoking is definitely more dangerous than active smoking. A smoker is aware about the dangers of smoking and is doing it deliberately. But a non-smoker does not do it deliberately but situations force him/her to inhale the smoke. While epidemiological data show a higher prevalence of smoking-related diseases in smokers but still passive smoking is more dangerous because of non-intention factor involved in it.

4. “Prevention is better than cure”. Comment.

Ans. It is a very old saying and is indeed true. When a person starts suffering from a disease; it entails various costs, viz. physical, emotional and monetary costs. Physical debilitation results in loss of economics productivity which further adds to the financial burden of the individual and family. In many diseases, the cost of treatment may reach a very high level. Prevention costs just a fraction of what it costs for treatment. But apart from preventing the disease; it also prevents loss of manhour and thus loss of economic productivity.

5. Explain any three preventive measures to control microbial infections.

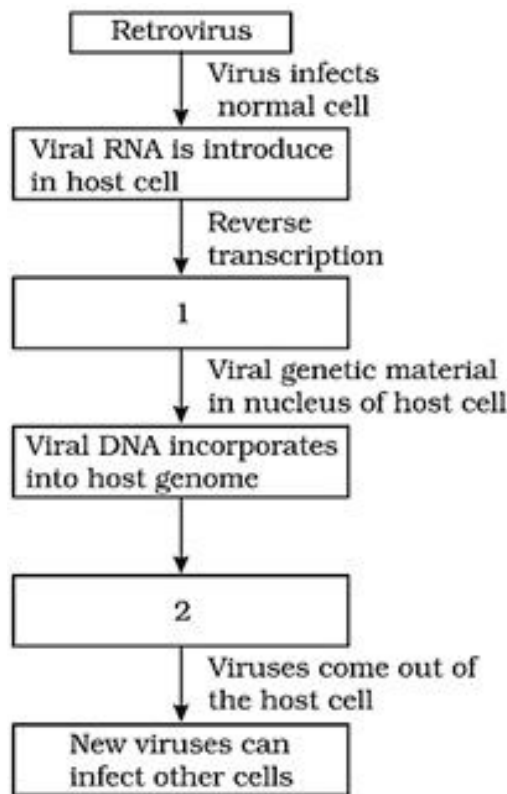
Ans. Three preventive measures to control microbial infections are as follows:

- (a) Avoiding contaminated food and water: Many infections are spread through contaminated food and water, e.g. cholera and jaundice. These infections can be easily prevented by avoiding contaminated food and water. One should use properly filtered and treated water for drinking and cooking. Food from roadside vendors should not be consumed.
- (b) Preventing vectors: Malaria and dengue are examples of vector borne diseases. If we can check the breeding of mosquitoes in our surroundings, we can easily minimize the chances of suffering from these diseases. Mosquito repellants and mosquito nets are also effective in preventing mosquito bite.
- (c) Maintaining hygiene: Maintaining personal hygiene can help us in avoiding various types of skin infections. Maintaining cleanliness in surroundings can help in avoiding many communicable diseases.

6. In the given flow diagram, the replication of retrovirus in a host is shown. Observe and answer the following questions.

(a) Fill in (1) and (2)

(b) Why is the virus called retrovirus?



(c) Can the infected cell survive while viruses are being replicated and released?

Ans. (a) 1: viral DNA is produced; 2: Viral RNA is produced by host cell

(b) A virus which has envelope enclosing RNA genome is called a retrovirus.

(c) Yes.

7. “Maintenance of personal and public hygiene is necessary for prevention and control of many infectious diseases”. Justify the statement giving suitable examples.

Ans. Personal and public hygiene plays important role in prevention and control of many infectious disease. Many fungal infections can spread because of poor personal hygiene. This problem is especially enhanced during adolescent period. A person who maintains good

hygiene is least likely to suffer from common skin infections; like ringworm and eczema. Lack of public hygiene is often the biggest cause for spread of various communicable diseases; like cholera, malaria, typhoid, etc. No matter how clean your house is, if your neighbourhood is not clean; you stand at a higher risk of getting infected with malaria, dengue or cholera. But a clean neighbourhood helps in preventing various communicable diseases to a great extent.

8. The following table shows certain diseases, their causative organisms and symptoms. Fill the gaps.

Name of the disease	Causative organism	Symptoms
(i) Ascariasis	Ascaris	—
(ii) —	Trichophyton	Appearance of dry, scaly lesions on various parts of the body
(iii) Typhoid	—	High fever, weakness, headache, stomach pain, constipation.
(iv) Pneumonia	Streptococcus pneumoniae	—
(v) —	Rhino viruses	Nasal congestion and discharge, sore throat, cough, headache
(vi) Filariasis	—	Inflammation in lower limbs

Ans. (i) Internal bleeding, muscular pain, anemia, fever, blockage of intestinal passage.

(ii) Ringworm

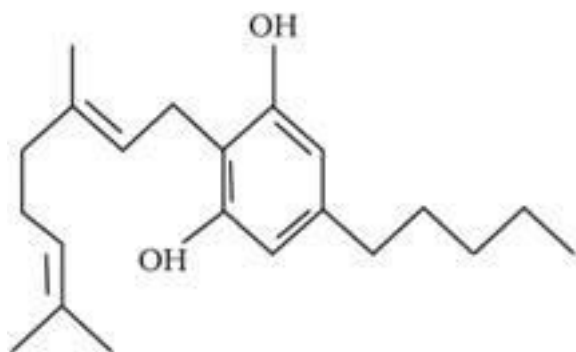
(iii) Salmonella typhi

(vi) Fluid in lungs, fever, difficulty in breathing

(v) Common cold

(vi) Wuchereria

9. The outline structure of a drug is given below.



(a) Which group of drugs does this represent?

(b) What are the modes of consumption of these drugs?

(c) Name the organ of the body which is affected by consumption of these drugs.

Ans. (a) Cannabinoids

(b) Inhalation and oral ingestion

(c) Cardiovascular system

10. Give the full form of CT and MRI. How are they different from each other? Where are they used?

Ans.

CT	MRI
(i) Computed tomography	(i) Magnetic resonance imaging

(ii) Uses X-ray for imaging.	(ii) Uses magnetic field and non-ionising radiations.
(iii) It generates three- dimensional image of the internals of an object.	(iii) It accurately detects pathological and physiological changes in living tissues.

11. Many secondary metabolites of plants have medicinal properties. It is their misuse that creates problems. Justify the statement with an example.

Ans. Morphine is a good example of plant metabolite which is a very strong painkiller. But morphine is abused by many people for getting intoxicated. Similarly, codeine comes from opium plants. Codeine is used in cough syrups and is highly effective in suppressing coughing. But many people gulp down the whole bottle of cough syrup to get intoxicated. Drug abuse makes a person hallucinogenic and the person becomes useless not only for the society but also for himself. In extreme cases, drug addicts resort to petty crimes to get money to buy their daily fix. So, drug abuse is not only a behavioural problem but also a social problem.

12. Why cannabinoids are banned in sports and games?

Ans. Cannabinoids can be used as performance enhancer in sports. Cannabinoids reduce the sensation of pain and thus helps in increasing the endurance of the athlete. Hence, cannabinoids are in the list of banned drugs by International Olympic Association. The list of banned drugs is determined by World Anti-Doping Agency.

13. What is secondary metabolism?

Ans. Secondary metabolism (also called specialized metabolism) is a term for pathways and small molecule products of metabolism that are not absolutely required for the survival of the organism.

14. Drugs and alcohol give short-term 'high' and long-term 'damages', Discuss.

Ans. Drugs and alcohol are used for getting a feeling of intoxication. People often feel on a high after taking a drug or alcohol. But these substances have serious long term repercussions. For example; long term alcohol abuse can result in liver cirrhosis which is a life-threatening condition. Drugs make a person physical and psychologically weak. A drug addict becomes a burden on the society. Hence, it can be said that drugs and alcohol give short-term 'high' and long term 'damages'.

15. Diseases like dysentery, cholera, typhoid etc., are more common in overcrowded human settlements. Why?

Ans. Overcrowded human settlements are usually unhygienic because of overload on the infrastructure and on hygiene workers. Let us compare two situations to understand this. A person has a bathroom for his exclusive use. He can easily maintain a high level of cleanliness in his bathroom. Another person has to share a bathroom with fifty other people. Maintaining a good hygiene level in such a bathroom would be almost impossible. This will lead to higher risk of getting communicable diseases. Even a simple disease like common cold has more chances of spreading to many people in overcrowded places because the germs would be able to infect more number of people in shorter time span.

16. From which plant cannabinoids are obtained? Name any two cannabinoids. Which part of the body is effected by consuming these substances?

Ans. Cannabinoids are obtained from Cannabis sativa. Marijuana and hashish are examples of cannabinoids. They affect the cardiovascular system.

17. In the metropolitan cities of India, many children are suffering from allergy/asthma. What are the main causes of this problem. Give some symptoms of allergic reactions.

Ans. In modern time, many children are kept under protective environment at the early age. They are not exposed to the external environment. This lowers the immunity against hazards of the environment and is the main cause of allergic reactions in those children. Due to this, many children in the metropolitan cities of India suffer from allergy/asthma.

Some symptoms of allergic reaction are; coughing, sneezing, breathlessness, etc.

18. What is the basic principle of vaccination? How do vaccines prevent microbial infections? Name the organism from which hepatitis B Vaccine is produced.

Ans. The basic principle of vaccination is 'memory' of the immune system. Vaccines let the immune system to learn how to fight the future onslaught of that pathogen for which vaccine is being given. The body prepares antibodies in response to vaccination and remembers this act. When the related pathogen attacks in future, the immune system uses its 'memory' to fight the infection. Hepatitis B vaccine is produced from yeast.

19. What is cancer? How is a cancer cell different from the normal cell? How do normal cells attain cancerous nature?

Ans. Uncontrolled cell division which leads to formation of a tumor is called cancer. A normal cell loses its ability to divide after certain rounds of cell division. But a cancer cell continues to divide even after endless rounds of cell division. A normal cell has the ability of contact inhibition which inhibits its division after contact with other cells. When this ability is lost in a cell, it becomes cancerous.

20. A person shows strong unusual hypersensitive reactions when exposed to certain substances present in the air. Identify the condition. Name the cells responsible for such reactions. What precaution should be taken to avoid such reactions.

Ans. This condition is called allergy, Certain white blood cells; called mast cells; and basophils are responsible for such reactions. Usually a person is aware about substances to which he/she is allergic. This person should avoid direct exposure to those substances to avoid allergic reactions. For example; some people are allergic to pollens from certain flowers. They should avoid going near such flowers.

21. For an organ transplant, it is an advantage to have an identical twin. Why?

Ans. Organ transplant involves a critical issue of tissue rejection. This happens because the immune system always tries to reject any foreign substance. In case of identical twins; most

of the tissues would be identical in both the individuals. Hence, chances of tissue rejection would be minimal if donor-acceptor pair is from identical twins. Hence, an identical twin is considered to be an advantage for an organ transplant.

22. What are lifestyle diseases? How are they caused? Name any two such diseases.

Ans. Diseases which happen because of faulty lifestyle are called lifestyle diseases. These diseases are caused because of overeating and a sedentary lifestyle. Diabetes and hypercholesterolemia are examples of lifestyle diseases.

23. If there are two pathogenic viruses, one with DNA and other with RNA, which would mutate faster? And Why?

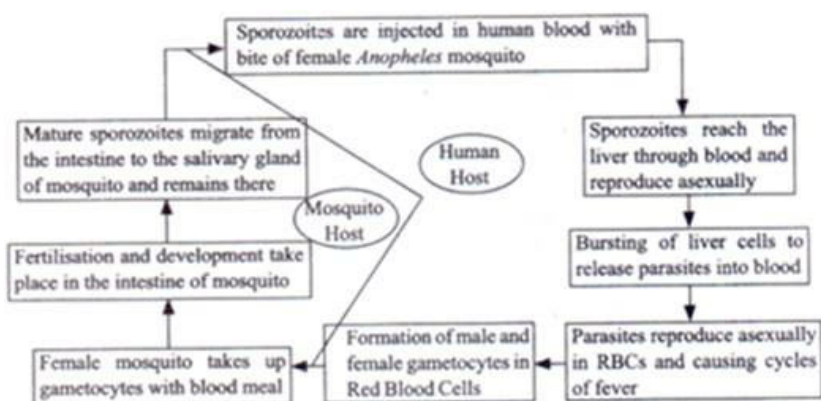
Ans. The pathogenic virus with RNA will mutate faster. RNA replication is more prone to errors than DNA replication. Hence, RNA offers more chances of mutation than DNA. In other words, DNA is more stable than RNA. Hence, a virus with RNA would mutate faster than a virus with DNA.

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Long Answer Type Questions

1. Represent schematically the life cycle of a malarial parasite.

Ans.



2. Compare the life style of people living in the urban areas with those of rural areas and briefly describe how the life style affects their health.

Ans.

People in urban areas	People in rural areas
(i) Most of the people do jobs which involve Sitting for long hours.	(i) Most of the jobs involve manual labour.
(ii) Have sedentary lifestyle.	(ii) Have active lifestyle.
(iii) Have many options to splurge on processed food.	(iii) Mostly depends on unprocessed and home-made food.

(iv) High level of environmental pollution.	(iv) Low level of environment pollution.
(v) Incidence of diabetes and cardiovascular disease is very high.	(v) Incidence of diabetes and cardiovascular disease is low.
(vi) Can get quality medical facilities.	(vi) May not get quality medical facilities.

3. Why do some adolescents start taking drugs. How can this be avoided?

Ans. Curiosity, need for adventure and experimentation are the common causes of initiation of drug abuse among adolescents. This is an age when people are highly curious. They also need to get a high by adventure and experimentation. Moreover, peer pressure often forces them to try out something new. So, what starts as a harmless experimentation ends up in dependence on addictive substances. Following steps can be taken to avoid this situation:

4. In your locality, if a person is addicted to alcohol, what kind of behavioural changes do you observe in that person? Suggest measures to overcome the problem.

Ans. An alcoholic person may show following behavioural changes:

- He may withdraw from the people and may avoid socializing.
- He may get easily irritated and may suffer from bouts of anger and depression.
- He may resort to petty crimes; like stealing and snatching to get the money to get the money to buy alcohol.

Following steps can be taken to solve the problem:

- A qualified counselor should be pressed into service.
- His near and dear ones should try to spend quality time with him.
- The person should be encouraged and help to gradually reduce alcohol intake and if possible totally withdraw consumption of alcohol.

5. What are the methods of cancer detection? Describe the common approaches for treatment of cancer.

Ans. Following are the methods of cancer detection:

Biopsy: In this process, small fragment of the suspicious tissue is extracted and is subjected to histopathological study. This helps in determining any abnormality in the cells.

Blood Test and Bone Marrow Test: These tests show increased levels of cell count. This helps the doctor to diagnose the problem.

Imagery Technique: X-ray, CT scan and MRI help in diagnosing the cancer of internal organs.

Apart from above mentioned techniques; antibodies against cancer-specific antigens and molecular biotechnology are also used in certain cases.

Common approaches of treatment involve surgery, radiotherapy and immunotherapy:

(a) **Surgery:** This involves removal of tumor through surgery.

(b) **Radiotherapy:** Cancerous cells are destroyed by using radioactive rays. Care is taken not to destroy the healthy cells.

(c) **Immunotherapy:** This involves use of alpha-interferon so that some stubborn cancer cells can be destroyed by chemotherapeutic drugs.

6. Drugs like LSD, barbiturates, amphetamines, etc., are used as medicines to help patients with mental illness. However, excessive doses and abusive usage are harmful. Enumerate the major adverse effects of such drugs in humans.

Ans. Adverse Effects of LSD: Mental depression is a very common side effect. The person may also suffer from schizophrenia. The person may suffer from long bouts of hallucination which is a condition of trance. Females may suffer from severe uterine contraction.

Adverse Effects of Barbiturates: Tolerance and dependence are the major side effects of barbiturates. Tolerance means the person would need higher and higher dose as the time elapses. Dependence means the person cannot live without this drug.

Adverse Effects of Amphetamines: Mental depression is a common side effect. Bouts of hallucination may also happen.

7. What is Pulse Polio Programme of Government of India? What is OPV? Why is it that India is yet to eradicate Polio?

Ans. Pulse Polio: This is a mass immunization programme to eradicate polio myelitis from India. This programme was launched in 1995-96. This programme has been undertaken with active cooperation from government agencies, NGOs, UNICEF and CDC.

Key Objectives of Pulse Polio:

- Not a single child should be missed.
- High level of surveillance.
- Reporting of any new case within 14 days.

Polio booths are settled throughout the country to cover all the children below 5 years of age. Volunteers are hired to administer polio vaccine.

OPV (Oral Polio Vaccine): OPV is an attenuated vaccine. It is produced by passage of virus through non-human cells at a sub-physiological temperature. This produces spontaneous mutation in the viral genome.

A single vial of OPV usually contains 10-20 doses.

On 27th March 2014, WHO declared India a polio free nation as no new case was reported in the last 3 years.

8. What are recombinant DNA vaccines? Give two examples of such vaccines. Discuss their advantages.

Ans. A vaccine which is made through recombinant DNA technology is called recombinant DNA vaccine. In such a vaccine; instead of a whole strain of causative pathogen only one or two antigen is inserted into the DNA of a suitable host to prepare the vaccine. Recombinant DNA technology enables to make vaccines on a larger scale with least chances of contamination. This technology also helps in bringing down the cost of the vaccine.

Hepatitis B Vaccine and HPV (Human Papilloma Virus) Vaccine are two examples of recombinant DNA vaccine.

Large scale production of vaccines was earlier done by using cell culture. In this method, strains of pathogen were injected to a suitable animal; like horses and antigens were allowed to proliferate inside the horse's cells. Subsequently, serum of horse is collected to extract the antigens to prepare vaccine. This technique had severe shortcomings. Contamination and chances of some other diseases because of horse's serum was quite high. It also involved cruelty against animals. These problems could be overcome because of recombinant DNA technology. Using this technology, yeast is normally used to produce antigens. Large scale production at lower cost has become possible with this technology.