

Grade 9: Unit 4

MICRO-ORGANISMS AND DISEASE

Micro-organisms

- They are tiny living organisms that are usually too small to be seen with the naked eye.
 - They are organisms that can only be seen with the aid of a microscope.
- Most micro-organisms are very important.
 - They play a major role in decay and the recycling of nutrients.
 - They are used in making foods, such as injera, yogurt and cheese.
 - They are used in producing alcoholic drinks, such as beer, wine and tej.
- Some micro-organisms cause disease in plants, animals and humans.

Types of Micro-organisms

Bacteria

- They are single-celled prokaryotic organisms.
 - Their genetic material is not contained in a nucleus.
- They are much smaller than the smallest animal and plant cells.
- The bacterial cell wall is made of peptidoglycan.
- Some bacteria have flagella to help them move, or protective slime capsules.
- Bacteria come in a variety of different shapes and sizes.
 - **Bacillus**: A rod-shaped bacterium.
 - **Coccus**: Any spherical or roughly spherical bacterium.
 - **Spirillum**: A bacterium with spiral structure.
- Some bacteria cause disease but many are harmless and some are actively useful to people.

Viruses

- They are made up of a protein coat surrounding genetic material.
- Viruses are smaller than bacteria.
- Viruses are minute with a very simple structure.
- They usually have regular geometric shapes.
- They do not carry out any of the functions of normal living organisms.
- They reproduce by taking over another living cell.
- All naturally occurring viruses cause disease.

Fungi

- They are eukaryotes which obtain their food from other dead or living organisms.
- Fungi like moulds and yeasts are most useful to people.
 - They are important as decomposers.
 - Yeasts are single-celled organisms that reproduce by asexual budding.
 - Moulds are made up of hyphae and they generally reproduce asexually but they do it by producing fruiting bodies containing spores.
 - ✓ Moulds are closely related to yeasts, but they are very different in structure.

The Germ Theory of Disease

- Micro-organisms or 'germs' cause disease.
- Anton van Leeuwenhoek designed the first microscope.
- Robert Koch improved microscopes.
- The work of Louis Pasteur resulted in the widespread acceptance of the germ theory of disease.
 - Fermentation reactions are the result of the action of micro-organisms on sugar.
 - Pasteur showed that the theory of spontaneous generation was wrong.
 - Pasteur identified the pathogens that caused anthrax, rabies and diphtheria.
 - ✓ He made vaccines against the diseases.
 - Pasteur showed that infectious diseases are caused by micro-organisms.

The Immune System

- It is a system of diverse defenses against disease.
 - It is not an organ system in itself.
- It includes WBCs and other immune cells, and defensive chemicals such as antibodies.
 - White blood cells play important roles in immunity.
- Immunity is the ability to ward off a specific infection or disease by means of any of the body's immune mechanisms.

Antigens

- Antigens are complex molecules such as proteins, glycoproteins, and glycolipids.
- They are capable of binding to an antibody or immune cells and triggering an immune response.
- They occur on the surfaces of cells and enable the body to distinguish its own cells from foreign matter.
- When the body detects an antigen of foreign origin, it activates an immune response.
 - This response consists partly of the plasma cells secreting proteins called antibodies.
 - ✓ Certain lymphocytes turn into plasma cells when they detect foreign agents.

Antibodies

- They are proteins that react with an antigen and aid in protecting the body from its harmful effects.
 - Antibodies attack and neutralize organisms that invade the body.

Control of Micro-organisms

- The killing of all micro-organisms in a material or on the surface of an object is called sterilisation.
- There are a number of different ways of sterilizing things:

a. Boiling

- The simplest and best known method of sterilising things.
- The objects are placed in boiling water (at 100 °C) and kept there for about 10 minutes.
 - Some viruses and bacteria take several hours of boiling to kill them.

b. Autoclaving

- Heat- and moisture-tolerant items such as surgical instruments, most microbiological media, and reusable glassware are sterilized using an autoclave.
 - Typical conditions for sterilization are 15 pounds per square inch (psi) and 121°C for 15 minutes.
 - ✓ Longer treatment is necessary for large volumes.
- Water in a chamber in the autoclave is heated to form steam, causing the pressure in the chamber to increase.
 - The higher pressure increases the temperature at which steam forms.
 - Steam at atmospheric pressure never exceeds 100°C but steam at an additional 15 psi is 121°C.
 - 121°C is a temperature that kills even endospores.

c. Ultra high temperature (UHT)

- It is a way of treating food to kill all the micro-organisms on it.
- The temperatures used range from around 135 °C to 150 °C.
 - The food is only heated to these extreme temperatures for 2–6 seconds.
- UHT treatment gets rid of pathogens and destroys the organisms that cause food spoilage.
 - UHT food or milk will last for years if no air is allowed to get to it.

d. Pasteurisation

- It is a technique widely used to treat milk, beer and other foodstuffs.
- Pasteurisation is not a method of sterilisation as it does not kill all the micro-organisms in the food.
 - It destroys pathogens and most micro-organisms that spoil food.
- Pasteurisation is heating food to either 71.6 °C for at least 15 seconds or 62.9 °C for 30 minutes.

e. Dry heat

- It kills all micro-organisms over a long time.
- It involves using temperatures of 171 °C for an hour or 160 °C for two hours, etc.
- Incineration (burning substances at high temperatures in the air) is used to sterilise inoculation loops.

f. Disinfectants

- They are chemicals or physical agents that are applied to an inanimate object to kill micro-organisms.
 - They are used on floors and surfaces, not on people.
- Bleach and calcium hypochlorite are common and widely used disinfectants.
 - Bleach can be used to keep sinks, toilets, milk containers and surfaces germ-free.
 - Hypochlorite can be used to disinfect drinking water.

g. Antiseptics

- They are chemical agents that are applied to living tissues to kill micro-organisms.
 - They are used to decrease bacterial numbers on skin before procedures such as surgery.
 - Alcohol solutions are commonly used as antiseptics.
- They are non-toxic enough to be used on skin or other body tissue.
- Antiseptics damage human tissues slightly.

Culturing microbes

- Many micro-organisms can be grown in the laboratory.
- The cultivation of micro-organisms in an artificial medium containing nutrients is called **culture**.
 - A culture medium contains carbohydrate, various mineral ions and in some cases extra protein and vitamins.
 - ✓ Warmth and oxygen usually need to be provided as well.
 - The nutrients are often contained in an agar medium.
 - ✓ Agar is a substance which dissolves in hot water and sets to form a jelly.
 - The other way to provide nutrients for growing micro-organisms is as a broth in a culture flask.
- Culturing microorganisms makes it possible for us to see what they are like and what they need to grow.
- Strict health and safety procedures are essential when culturing microorganisms.

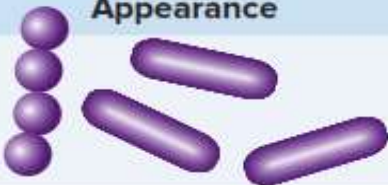
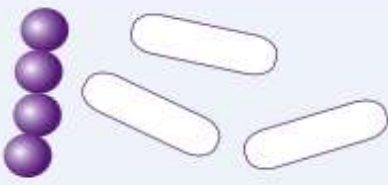
Method

1. Sterilization of Petri dishes and nutrient agar
2. Sterilize the inoculating loop used to transfer microorganisms
3. Dipping the sterilized loop in a suspension of the bacteria you want to grow
4. Make zigzag streaks across the surface of the agar
5. Incubate the Petri dishes to allow the microorganisms to grow
6. After several days, observe the growth of micro-organisms on the Petri dishes.

Identifying Bacteria Using Simple Staining

- Simple staining is a staining technique that uses a basic dye to add color to cells.
 - If only a single dye is used to stain a specimen, the procedure is called **simple staining**.
 - Examples of basic dyes include methylene blue, crystal violet, and safranin.
 - ✓ Acidic dyes do not stain cells.
- A simple stain, e.g. crystal violet, will stain all bacteria purple.
- Differential staining is used to distinguish different groups of bacteria. One of the most frequently used differential staining techniques is the **Gram stain**.

Steps in Gram Stain Procedure

Steps in Staining	State of Bacteria	Appearance
1 Crystal violet (primary stain)	Cells stain purple.	
2 Iodine (mordant)	Cells remain purple.	
3 Alcohol (decolorizer)	Gram-positive cells remain purple; Gram-negative cells become colorless.	
4 Safranin (counterstain)	Gram-positive cells remain purple; Gram-negative cells appear pink.	

Antibiotics

- Antibiotics are chemicals which kill bacteria.
 - Antibiotics only damage bacteria and do not affect human cells.
- Penicillin was the first antibiotic to be discovered, and it is still in use today.
- Antibiotics have no effect on diseases caused by fungi, protozoa and viruses.
 - Fungal infections can often be cured using anti-fungal chemicals.
 - There are no drugs which are really effective against viruses.

Artificial immunity

- When your body has come into contact with a pathogen, some of the WBCs develop antibodies.
- We can protect ourselves against some of the most dangerous diseases artificially.
- Vaccines allow us to be protected from a disease without experiencing the serious effects of that illness.
- Vaccination (immunisation) is the use of dead or weakened strains of pathogens to produce immunity to dangerous diseases.
- Artificial immunity may be passive or active.
 - a. Artificial passive immunity: protection acquired by injection of antibodies. e.g. tetanus, rabies
 - It is short-lived.
 - b. Artificial active immunity: antigens enter the body and the body makes its own antibodies.
 - It is longer lived.

How are vaccines produced?

- Attenuated Vaccine: Vaccine composed of a weakened form of the pathogen that is generally unable to cause disease.
- Inactivated Vaccine: Vaccine composed of killed bacterial cells, inactivated viral particles, fractions of the pathogen, or inactivated toxin.

Diseases

- caused by bacteria, viruses, fungi, protozoa and parasites.

Tapeworm (cestoda)

- Flatworms that can grow up to 5 meters
 - May block the bowel
- Adapted to live in the intestine
 - Head with hooks and suckers
 - Have about 1000 very thin segments which contain reproductive organs
- Absorb nutrients directly
 - Vitamin B12 deficiency
- Their life cycle involves at least 2 hosts
- People get tapeworms by eating undercooked or raw meat and by ingesting eggs in poor sanitation regions
 - Eggs develop into cysticerci
 - Cysts can cause more problems than a live tapeworm

Symptoms

- Anaemia and feelings of weakness
- Weight loss
- Collection of fluid in the abdomen (pot belly)
 - Tapeworm protein generates an immune response
- Cysts can cause severe symptoms including seizures

Control and prevention

- Anti-parasitic, anti-worm and anti-inflammatory drugs
- Large cysts are removed by operation
- By cooking meat properly
- Deworming pets and farm animals
- Maintaining good sanitary conditions

TB

- One of the most deadly and major infectious diseases caused by M. tuberculosis
- Affects the lungs (pulmonary TB), kidneys, lymph nodes, joints or bones
- People with compromised immune system are at risk e,g HIV/AIDS
- Is Spread by droplet infection

Symptoms

- Low-grade fever
- Night sweats
- Fatigue, Weight loss and persistent cough
- Damages the tissues of the lungs

Control and prevention

- Full course of antibiotic
- Cover the mouth and nose when coughing
- Avoid overcrowded conditions
- Effective vaccination

The Role of vectors in disease

- **Vectors** are organisms that transmit disease-causing organisms from one host to another.
 - Mechanical vector and Biological vector

Mosquitoes and malaria

- Malaria is caused by Plasmodium.
- It spends part of its life cycle in mosquito.

- Female anopheles mosquito is the vector for malaria.
 - She needs human blood for reproduction

Symptoms

- The parasites affect the liver and damage the RBCs
- fevers, chills, sweats, feeling exhausted
- small children are affected more

Control and prevention

- no effective vaccine
- controlling the Anopheles mosquitoes
 - avoid contact with mosquitoes
 - ✓ mosquito repellents
 - ✓ screens on doors and windows
 - ✓ wearing clothes with long sleeves
 - ✓ insecticide-treated mosquito nets
 - Destroy breeding ground (standing water)
 - ✓ Remove standing water
 - ✓ Remove your rubbish properly
 - Proper disposal of sewage
 - Biological control (larvae feeding organisms) and spraying pesticides onto the standing water

Diarrhoea

- The production of very loose, runny faeces.
- It is a symptom of a number of different disease

Gastroenteritis/acute watery diarrhea (AWD)

- Can be caused by viruses, bacteria and protozoa
 - Rotaviruses, Salmonella and *E. coli*, Giardia and Amoeba
- The lining of the stomach and intestine become inflamed and painful
- Water cannot be reabsorbed by large intestine
- Transmission is by contaminated food or water
- Common in areas where sanitation is poor

Symptoms

- Violent abdominal cramps and pain
- Feeling nauseous, vomiting or often both
- Watery diarrhea

- Slight fever
- General muscle aches and headache

Control and prevention

- No effective treatment
- Always wash your hands
- Use clean and safe water
- Avoid eating undercooked or raw meat, eggs, shellfish etc
- Keep well away from infected people

Cholera

- caused by *Vibrio cholera*
- transmission is by contaminated water and food

Symptoms

- Many people are asymptomatic
- Mild to severe diarrhea (pale, watery)
- Vomiting and dehydration but no fever
- Severe muscle cramps
- It kills from dehydration within hours
- Incubation period is up to 5 days

Control and prevention

- Replace the fluids and salts
- Antibiotics
- Cholera vaccine with 50% protection
- Supply of clean water
- Effective sewage disposal
- Avoid consuming uncooked foods

Typhoid

- An infection of the intestine and occasionally bloodstream
- Caused by *Salmonella typhi*
- Transmission is by contaminated food and water

Symptoms

- Incubation period is 1-3 weeks
- A very high fever (39-40°C)
- A painful abdomen

- Sore throat and headache
- Constipation (in adults) and diarrhea (in children and adults)
- Rose-coloured spots may appear on the lower chest and abdomen
- Enlarged spleen and liver
- Delusion, weakness and exhaustion
- It kills about 20% of infected people

Control and prevention

- Effective antibiotics
- Manage patients well
- prevent transmission by hand washing, clean food and drinking water, good sewage disposal

Sexually transmitted diseases (STDs)

- Spread through sexual contact
- Often they have no symptoms or very mild symptoms at early stage
- Can cause infertility, brain damage and even death if left untreated
- Can be cured using antibiotics

Gonorrhoea

- caused by *Neisseria gonorrhoeae*
- spread through sexual contact
- can be passed from mother to child during birth
 - can make the baby blind if untreated

Symptoms

- burning sensation while urinating and yellowish-white discharge

Control and prevention

- Using antibiotics at early stage
- Be faithful
- Use condom
- If you suspect yourself avoid sexual contact and visit a doctor
- Notify your sexual contacts if you are infected

Syphilis

- caused by *Treponema pallidum*
- spread is by sexual contact and from mother to her fetus (congenital syphilis)
 - death or deformity of the child

Symptoms

- The symptoms have primary, secondary and tertiary (late) stages
 - Primary: painless sore/sores at the site of initial contact, swollen glands
 - Secondary: tiredness, fever, sore throat, headaches, hoarseness, loss of appetite, patchy hair loss and swollen glands
 - Tertiary: illness in the skin, bones, CNS and heart

Control and prevention

- Antibiotics such as penicillin and tetracycline
- No development of natural immunity
- Similar to gonorrhea

Chancroid

- Caused by *Haemophilus ducreyi*
- Not too serious in itself but increase the likelihood of becoming infected with HIV/AIDS
- Transmission is by sexual contact

Symptoms

- Sore ulcerations on the genitals which bleed easily
- Infection of the lymph glands

Control and prevention

- Antibiotics
- Be faithful, Use condoms, Good genital hygiene, Male circumcision
- Avoid sexual contact if infected

Using medicines correctly

- Take the right dose
- Keep medicines at the right temperature
- Keep them away from children
- Avoid self-medication

Grade 9: Unit 4 (EGSECE)

1. An individual could be prevented from droplet infection by (2003)
 - A. breathing through the nose.
 - B. breathing faster and deeper.
 - C. avoiding over crowding.
 - D. eating cooked food.
2. Which of the following diseases is different from others? (2003)
 - A. Influenza
 - B. Rabies
 - C. Tuberculosis
 - D. Measles
3. How does an individual know that he is infected by tapeworm? By (2003)
 - A. making blood test.
 - B. making sputum test
 - C. observing tapeworm segments in faeces.
 - D. observing tapeworm segments in urine.
4. Mr. X has felt sick and visited his doctor. Which of the following is the right way of using antibiotics? (2004)
 - A. Mr. X should keep the drug at high temperature areas.
 - B. Mr. X should take the drug regularly as prescribed.
 - C. Mr. X should take more doses of drugs than prescribed.
 - D. Mr. X should not be expected to finish the drug if he recovered.
5. Which of the following is a symptom of chancroid? (2004)
 - A. Burning sensation while urinating
 - B. Yellowish-white discharge from the penis
 - C. Sore ulcerations on the genitals filled with pus
 - D. Loss of appetite and patchy hair loss
6. HIV affects the human body by (2004)
 - A. attacking the B-cells of the immune system.
 - B. attacking the T-cells of the immune system.
 - C. infecting the lymphatic system.
 - D. infecting the circulatory system.
7. Which of the following statements is true about vaccines? (2004)
 - A. They stimulate the immune system.
 - B. They help us cure from diseases.
 - C. They are produced from active pathogens.
 - D. They are given only in needles.
8. Living organisms that can be seen only with the aid of a microscope are called (2004)
 - A. yeasts.
 - B. bacteria.
 - C. macro organisms.
 - D. microorganisms.
9. Which of the following statements is true about microorganisms?
 - A. All microorganisms are important sources of food.
 - B. Some microorganisms are important in nutrient decomposition.
 - C. Many microorganisms are disease causing.
 - D. All microorganisms are poisonous.

10. Tapeworm is one of human parasite. It is (2004)
- A. caused by the bacterial infection of intestine.
 - B. prevented by avoiding contact with mosquitoes.
 - C. prevented by anti-inflammatory drugs.
 - D. caused by parasitic plasmodium.
11. Which of the following statements is true about tuberculosis? (2004)
- A. It is caused by viruses and bacteria.
 - B. It affects the heart and lungs.
 - C. It has a symptom of abdominal cramps.
 - D. It has a symptom of night sweat.
12. Which of the following statements is true about the risk of self prescribed medicines? They (2007)
- A. may be taken wrongly.
 - B. may be important to recover soon.
 - C. can prevent the patient from dying.
 - D. can eliminate very serious diseases.
13. Which of the following statements explains the importance of vaccine? It (2007)
- A. can be used to treat all types of diseases.
 - B. protects from a disease without experiencing its serious effect.
 - C. protects from a disease after the individual is infected.
 - D. can be used to prevent all types of diseases.
14. Which of the following methods is used to control gonorrhea? Using (2007)
- A. a cover for mouth and nose.
 - B. chemical treated net.
 - C. a male or female condom.
 - D. anti-worm drugs.
15. Which of the following statements explains the harmful nature of micro-organisms? They (2007)
- A. can cause diseases and infections to organisms.
 - B. can cause decay and recycle substances in the environment.
 - C. are used for making food and alcoholic drinks.
 - D. are used for genetic engineering technologies.
16. Which of the following statements is true about the proper handling of medicines? Medicines should be stored at (2007)
- A. near place for babies
 - B. too cold place.
 - C. too hot place.
 - D. the right temperature.
17. Someone took a traditional medicine (“Yabesha koso”) after he was infected with a tapeworm parasite. After a day, a long chain of proglottids passed out along his faeces. This shows that “Yabesha koso” is a powerful medicine to (2007)
- A. make the parasite cyclical.
 - B. treat the tapeworm infection.
 - C. facilitate the infection.
 - D. spread the parasite.
18. What is the impact of HIV and AIDS on the society? It (2009)
- A. reduces stigma and discrimination.
 - B. makes people loyal to their partners.
 - C. leads to significant social cost.
 - D. increase the immune system through time.

19. A doctor prescribed abdominal medicine to Ato Hailu. Ato Hailu bought the medicine and wanted to check if it is the right medicine. Which of the following information should he read on the leaflet? (2009)
- Illness which the medicine treats
 - Name of the medicine
 - Dosage of the medicine
 - Side effects of the medicine
20. What is the name of the lymph nodes located in the armpit? (2009)
- Mesenteric lymph nodes
 - Cervical lymph nodes
 - Inguinal lymph nodes
 - Axillary lymph nodes
21. What is the importance of a vaccine? It (2009)
- facilitates cell division.
 - triggers the immune system.
 - inhibits movement of viruses.
 - kills disease causing agents.
22. This item is based on the following methods required for growing microorganisms.
- Sterilization of Petri dishes and nutrient agar
 - Dipping the sterilized loop in a suspension of the bacteria you want to grow
 - Sterilize the inoculating loop used to transfer microorganisms
 - Make zigzag streaks across the surface of the agar
 - Incubate the Petri dishes to allow the microorganisms to grow
- Which of the following are correct sequences of methods to grow microorganisms? (2009)
- 5→4→2→3→1
 - 1→3→4→5→2
 - 1→3→2→4→5
 - 1→2→3→4→5
23. What is the risk of self prescribed antibiotics? They (2009)
- have no apparent risk as long as properly used.
 - facilitate the functions of liver and kidneys.
 - effectively destroy disease causing agents.
 - may lead to the use of the wrong medicine.
24. Which of the following chemicals is applied on living tissues to kill micro-organisms? (2009)
- Antibody
 - Hormone
 - Disinfectant
 - Antiseptic
25. Which of the following diseases is correctly matched with its symptom? (2009)
- Diarrhea → running nose
 - Malaria → sweating
 - Tapeworm → fever
 - Tuberculosis → shivering
26. Which of the following is advisable with regard to the use of medicine? (2010)
- Finishing the prescribed dose even if the symptoms are gone.
 - Children can be given medicine prescribed for adults for similar symptoms.
 - Self-prescription of medicine based on previous history.
 - It is bad to take overdose of a medicine but taking under dose is not a problem.
27. Which of the following sexually transmitted diseases is caused by *Haemophilus ducreyi*?
- AIDS
 - Gonorrhea
 - Syphilis
 - Chancroid

28. Which of the following diseases shows the symptom of an enlarged spleen and liver? (2010)
- A. Cholera
B. Tuberculosis
C. Typhoid
D. Chancroid
29. Vaccines that help to protect the body from deadly diseases are produced from (2010)
- A. extracts of tablets.
B. antibiotics.
C. weakened pathogens.
D. medicinal plants.
30. A chemical agent that is applied on a living tissue to kill microorganisms is (2010)
- A. antiseptic.
B. disinfectant.
C. sterilizer.
D. autoclave.
31. Which of the following processes requires the activity of yeast? (2010)
- A. Preparing coffee
B. Producing wine
C. Making orange juice
D. Cooking shero wot
32. In a petri dish used to grow microorganisms, agar is added (2010)
- A. to lower the temperature
B. to maintain pH
C. as a source of food
D. to provide moisture
33. Which of the following is the most appropriate support that can be provided to people living with HIV/AIDS (PLWHA)? (2010)
- A. Building the moral of PLWHA by giving them authority
B. Counseling on how to live longer with HIV/AIDS
C. Washing the clothes of PLWHA
D. Giving money to PLWHA
34. How does antiretroviral medicine help in the treatment of HIV/AIDS? It (2010)
- A. kills the virus by attacking its DNA.
B. controls the reproduction of the virus.
C. makes T-cells more susceptible to the virus.
D. fights against respiratory infection.
35. Which of the following methods of controlling microorganisms is done by raising the boiling point of water to 121°C ? (2011)
- A. Autoclaving
B. Dry heat
C. Pasteurization
D. Disinfection
36. The following question is based on the table below which shows micro-organisms and their natural activities.

No	Organisms	Activity
1.	Yeast	X
2.	Bacteria	Nutrient cycling
3.	Molds	Decomposing

In the table above “X” can be described as

- A. fermentation.
B. cooking.
C. disease causing.
D. immunity developing.

37. Which one of the following activities is a method of growing microorganisms? Inoculation of microorganisms into (2011)
- A. moisturized soil and incubation
 - B. non sterile nutrient agar and incubation
 - C. sterile disinfectants and incubation
 - D. sterile nutrient agar and incubation
38. Which of the following diseases is correctly paired with its preventive method? (2011)
- A. Gonorrhoea – take vaccination
 - B. Malaria – cooking meat
 - C. Tuberculosis – avoid overcrowding
 - D. Cholera – using bed nets
39. A young man had unprotected sex with a lady. As a result, after several days he started feeling burning during urination and a yellowish-white discharge from his penis. What is the disease he contracted? (2011)
- A. Typhoid fever
 - B. Gonorrhoea
 - C. Syphilis
 - D. Chancroid
40. What is the function of the lymphatic system? It (2011)
- A. transports nutrients.
 - B. transports oxygen.
 - C. filters out bacteria.
 - D. filters out blood cells.
41. How does HIV affect the human immune system? By attacking the (2011)
- A. white blood cells
 - B. red blood cells
 - C. blood vessels
 - D. blood plasma
42. Why are vaccines important? Because they help to (2014)
- A. trigger the immune system.
 - B. kill pathogens
 - C. prevent functional diseases.
 - D. heal wounds.
43. Which one of the following diseases increases the likelihood of contracting HIV? (2014)
- A. Syphilis
 - B. Chancroid
 - C. Tuberculosis
 - D. Gonorrhoea
44. Even though pasteurization is a technique used to heat milk, beer and other foods, it cannot preserve food unspoiled for years because it (2014)
- A. cannot kill pathogenic microorganisms.
 - B. reduces the nutritional content of the food.
 - C. is conducted in containers that are not properly sealed.
 - D. uses mild temperature that kills most but not all bacteria.