

UNIT – 16 MICROORGANISMS

CLASS: VIII

SUBJECT: SCIENCE

I. Choose the best answer.

1. Microorganisms are measured in _____.
a) cm b) mm **c) micron** d) meter.
2. _____ shows both living and nonliving characteristics.
a) Protozoa **b) Virus** c) Bacteria d) Fungi
3. _____ is a prokaryotic microorganisms.
a) Virus b) Algae c) Fungi **d) Bacteria**
4. Based on shape, the bacteria are classified into _____ types.
a) two b) three **c) four** d) five
5. Common cold in human is caused by _____.
a) plasmodium **b) influenza**
c) vibrio cholera d) aphthovirus

II. Fill in the blanks.

1. Penicillin is prepared from a mould called penicillium.
2. Prions are the infectious protein particles.
3. The infecting virus particle found outside the host cell is virion.
4. Microorganism can be seen with the help of a Microscope.
5. Bacteria, which has a flagellum at one end is classified as Monotrichous.

III. State true or false. If false, correct the statement.

1. Disease causing microorganisms are called pathogens. **True**
2. Female anopheles mosquito is a carrier of **Malaria**. **False**
3. Chicken pox is a communicable disease. **True**
4. Citrus canker is transmitted by **air and water**. **False**
5. Yeast is used in the large scale production of alcohol. **True**

IV. Match the following.

- | | | |
|-----------------------------|-----------------------------|----------|
| 1. Nitrogen fixing bacteria | - Vaccine | 5 |
| 2. Tuberculosis | - Prion | 3 |
| 3. Kuru | - Lactobacillus acidophilus | 4 |
| 4. Probiotics | - Bacteria | 2 |
| 5. Edward Jenner | - Rhizobium | 1 |

V. Answer the following questions.

1. Mark the correct one as:

- a. If both assertion and reason are true and reason is the correct explanation of assertion.
- b. If both assertion and reason are true and reason is not the correct explanation of assertion.
- c. If assertion is true but reason is false.
- d. If both assertion and reason are false.

1. Assertion: Malaria is caused by Protozoa.

Reason: The disease is transmitted by mosquito. **Ans :a**

2. Assertion: Algae are heterotrophic.

Reason: They do not have chlorophyll. **Ans :d**

VI. Answer very briefly.

1. Write the name of any nitrogen fixing bacteria.

Ans : Rhizobium.

2. Name the bacteria used in the production of vinegar.

Ans : Acetobacter aceti.

3. Write the names of any three protozoans.

Ans : Amoeba, Plasmodium, Paramecium.

4. Who discovered penicillin?

Ans : Alexander Flemming.

5. Which diseases can be prevented by vaccination?

Ans : Small pox , polio, measles, mumps, rubella, tuberculosis.

VII. Answer briefly.

1. Write the four types of bacteria, based on their shape.

Bacteria are classified according to the shape of their cells. They are:

- Bacilli : Rod shaped bacteria. Eg. *Bacillus anthracis*
- Spirilla : Spiral shaped bacteria. Eg. *Helicobacter pylori*

- Cocci: Spherical or ball shaped bacteria. They can stick together in pairs (diplococcus) or form a chain (streptococcus) or occur in bunches (staphylococcus).

- Vibrio - Comma shaped bacteria. Eg. *Vibrio cholera*.

2. What are antibiotics?

Antibiotic is a substance produced by living organisms which is toxic for other organisms. E.g Penicillin.

3. What are pathogens?

- A few microorganisms are harmful to plants, animals and humans. They cause diseases and hence they are called as pathogens.
- Pathogens enter into the body through cuts and wounds in the skin, mouth or nose and cause diseases.

4. How disease causing microorganisms enter into human beings?

- A few microorganisms are harmful to plants, animals and humans. They cause diseases and hence they are called as pathogens.
- Pathogens enter into the body through cuts and wounds in the skin, mouth or nose and cause diseases.

- Viruses causing 'flu' are spread in through air. When the patient sneezes droplets containing viruses spread in air and it gets entered to another person when he breathes.

5. Why microorganisms are essential for agriculture?

Natural fertilizer

- Microorganisms are called as decomposers because they act upon degradable wastes.
- During the process, nitrates and other inorganic nutrients are released into the soil, making the soil fertile. This compost is called as natural fertilizer

Nitrogen fixation

- Rhizobium bacteria living in the root nodules of leguminous plants enrich the soil by fixing the atmospheric nitrogen as nitrates which are essential for the growth of plants.
- Some free living bacteria in soil, like Cyanobacteria Nostoc can also fix nitrogen biologically.

Bio-control agents

Microbes are used to protect the crops from pests. Some of them are given below.

- Bacillus thuringiensis (Bt cotton) helps to control insects.
- Trichoderma (Fungi) helps to protect roots and controls plant pathogens.
- Baculoviruses (Virus) attack insects and other arthropods.

VIII. Answer in detail.

1. Write a short note on bacteria and its structure.

- Bacteria are single-celled prokaryotes (cells without nuclei). They are considered to be the first living organisms on earth.
- Bacteria are grouped under the kingdom Monera. The study of bacteria is called bacteriology. The size of bacteria ranges from 1µm to 5µm (micrometer).
- Bacteria are of two types based on respiration They are:
 - Aerobic bacteria (requires oxygen).
 - Anaerobic bacteria (does not require oxygen).

Cell structure of Bacteria:

- A bacterium has an outer covering known as the cell wall. Nuclear material is represented by a nucleoid without nuclear membrane.
- An extra chromosomal DNA called plasmid is present in the cytoplasm. Protein synthesis is carried out by 70S ribosomes. Other cell organelles (mitochondria, golgi body, endoplasmic reticulum etc.,) are absent. Flagella aids in locomotion.
- Bacteria are classified according to the shape of their cells. They are:
 - Bacilli: Rod shaped bacteria. Eg. *Bacillus anthracis*
 - Spirilla: Spiral shaped bacteria. Eg. *Helicobacter pylori*
 - Cocci: Spherical or ball shaped bacteria. They can stick together in pairs (diplococcus) or form a chain (streptococcus) or occur in bunches (staphylococcus).
 - Vibrio - Comma shaped bacteria. Eg. *Vibrio cholera*.

Bacteria are also classified according to the number and arrangement of flagella. They are as follows.

- Monotrichous: Single flagella at one end. Eg. *Vibrio cholera*
- Lophotrichous: Tuft of flagella at one end. Eg. *Pseudomonas*.
- Amphitrichous: Tuft of flagella at both ends. Eg. *Rhodospirillum rubrum*.
- Peritrichous: Flagella all around. Eg. *E.coli*.
- Atrichous: Without any flagella.

Eg. *Corynebacterium diphtherae*.

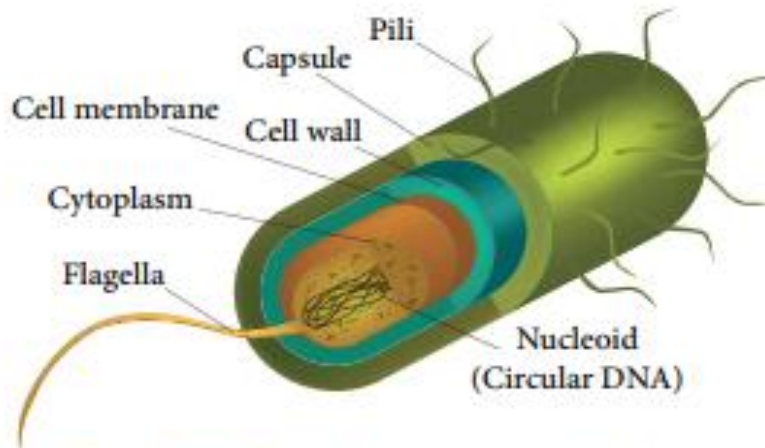


Figure 16.2 Cell structure of Bacteria

2. How microorganisms are useful in the field of medicine?

Microorganisms are useful in different fields such as medicine, agriculture and industry. Some of them are given below.

Medicine

We obtain antibiotics and vaccines from microbes.

Antibiotics

- The word 'anti' means 'against'. Antibiotic is a substance produced by living organisms which is toxic for other organisms.
- Sir Alexander Fleming was the first person to discover the antibiotic penicillin in the year 1928.
- The antibiotic penicillin was obtained from the fungi *Penicillium chrysogenum*. It is used to treat diseases such as tetanus and diphtheria.
- The antibiotic, streptomycin is obtained from *Streptomyces* bacteria to cure various bacterial infections. Eg. Plague.

Vaccines

- Vaccines are prepared from dead or weakened microbes. Edward Jenner was the first person to discover small pox vaccine.
- He coined the term vaccination. When the vaccine is injected to the body of a patient, the body produces antibodies to fight against the germs.
- These antibodies remain inside the body and protect from future invasion of the germs. Therefore, vaccination is otherwise called as immunization.
Eg: MMR vaccine is given for preventing Measles, Mumps and Rubella.
BCG (Bacille Calmette Guerin) vaccine is given for preventing Tuberculosis.

3. Write a short note on common human diseases caused by microorganisms.

Ans:

Human diseases	Causative microorganisms	Mode of transmission	Symptoms	Preventive measures/ Treatment
Tuberculosis	<i>Mycobacterium tuberculosis</i> (Bacteria)	Through air and sputum of infected person	Persistent cough, blood mucus, loss of weight, breathlessness	BCG Vaccine
Cholera	<i>Vibrio cholera</i> (Bacteria)	By flies and contaminated food and water	Watery diarrhoea, vomiting, rapid dehydration.	Anticholera vaccine, maintaining personal hygiene.
Common cold	<i>Influenza</i> (virus)	Through air	Running nose, sneezing	Isolation of patient
Rabies	<i>Rhabdo viridae</i> (Virus)	Animal bite	Fever, hallucination, paralysis, inability to swallow	Anti-rabies vaccine
Amoebic dysentery	<i>Entamoeba histolytica</i> (Protozoa)	Food water and flies	Severe diarrhea and blood in stool	Proper sanitation to be followed and metronidazole antibiotic to be administered
Malaria	<i>Plasmodium</i> (Protozoa)	Female anopheles mosquito	Nausea, vomiting, high fever	Antimalarial drugs like quinine and chloroquine to be taken and usage of mosquito repellents and nets.

4. How can we improve the beneficial bacterial count in human beings?

We can improve the beneficial bacterial count in human beings by adopting the following methods:

1. Intake of fiber rich foods.
2. Intake of seasonal fruits and vegetables.
3. Intake of plenty fermentated foods with live microbes. Eat more of prebiotic foods.
4. Intake of whole grains.
5. Prepare plant based diet.
6. Avoid artificial sweeteners.

5. Write a short note on probiotics.

- ❖ Probiotics are live food supplements used in yoghurt and other fermented milk products.
- ❖ Eg. *Lactobacillus acidophilus* and ***Bifidobacterium bifidum***. These bacteria improve the microbial spectrum in the gut and thus contribute to the following effects.
 - Decrease the risk of colon cancer
 - Decrease cholesterol absorption
 - Prevent diarrheal diseases by increasing immunity.