TENDER HEART HIGH SCHOOL, SEC-33B, CHD

CLASS - 8 DATE - 12.08.2024

SUBJECT - BIOLOGY TEACHER - Ms. Nidhi Rana

CHAPTER-9 Economic importance of Bacteria & Fungi

This lesson is for Class 8 for the subject of Biology Topic - Bacteria and its characteristics which is covered in chapter 9 titled 'Economic importance of bacteria and fungi' starting on Page No 83 of your text book titled Concise Biology Selina Publications and is being submitted to you on 12.08.2024. Let us begin with discussion of -

Bacteria - are unicellular (single celled) organisms and prokaryotes [lack true nucleus; nucleus without a nuclear membrane] Each bacteria contains a single chromosome (genetic material) suspended in cytoplasm (not enclosed in nuclear membrane.

Bacteria are found practically everywhere. Some bacteria are useful some are harmful and cause us diseases. These are smallest living organisms on Earth. Types of bacteria based on their sizes -

1) Cocci - Spherical bacteria
2) Bacilli - Rod shaped bacteria
3) Spirilla - Spiral or twisted bacteria
4) Vibrio - Comma shaped bacteria

Diplococci - Bacteria occuring in pairs
Streptococci - Bacteria occuring in long chains
Staphylococci - Bacteria occuring in clusters

Structure of Bacteria -

Bacterial Cell has Cell membrane enclosing protoplasm (cytoplasm and nucleus). Bacterial nucleus is of primitive type without nuclear membrane, but DNA (chromatin material) is present as such in cytoplasm attached to cell membrane at some point.

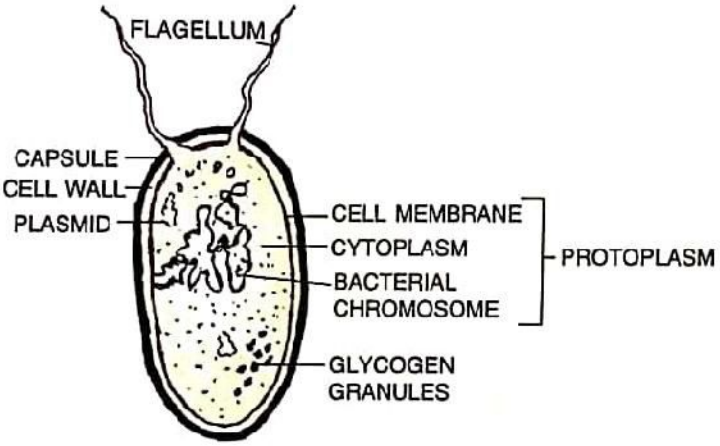

Fig. 9.2 Bacterial cell (diagrammatic)

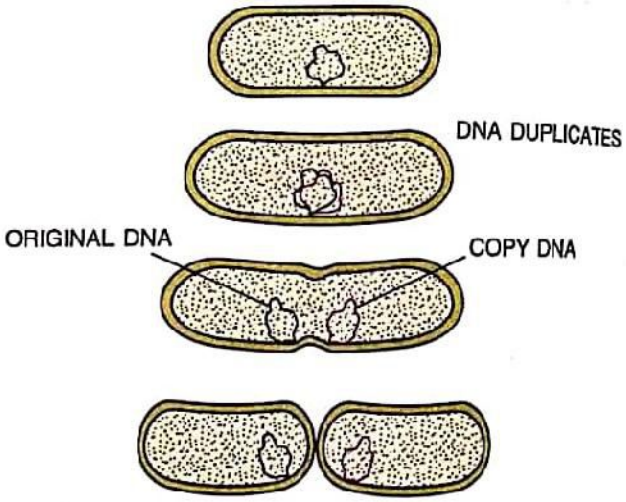

Fig. 9.3 Reproduction in bacteria by fission

Scanned with CamScanner

Cell wall - Cell membrane of bacterial cell is surrounded by a non living stiff cell wall made up of peptidoglycan.

Cytoplasm of bacteria contains vacuoles, granules and in some cases chlorophyll as well.

Capsule - sometimes a protective layer is present outside the cell wall of bacteria called capsule

Movement Some bacteria move passively with water wind or contact Some bacteria have flagella (as locomotory organ) that keeps lashing and provides for active locomotion

Nutrition - is Heterotrophic which may further be-

- Saprophytic (taking nourishment from dead/decaying organisms)
- Parasitic (Living on the body of host and obtaining nourishment from the host's body.)

Respiration

- Aerobic - Bacteria using oxygen for respiration
- Anaerobic - Bacteria respiring without using oxygen

Reproduction by Binary Fission

Asexual reproduction by means of fission/cell division in which DNA duplicates, cell expands. Two DNA are pulled apart. Cell constricts at the middle separating the two cells These two cells separate from each other as independent cells Some bacteria may show primitive sexual reproduction where two bacteria of different

strains (but of same species) come together called conjugation. The plasmid i.e. a small circular DNA molecule different from chromosomal DNA of the donor may be transferred into the recipient (bacteria) through a hollow tube like extension of donor cell

Spore Formation During unfavourable condition bacterial cell draws its content into a spherical mass which becomes surrounded by a thick and hard protective wall This little rounded body is called the spore which is contained within the cell wall of bacterial cell. Later these spores become free when cell wall ruptures.

Spore formation is helping the bacteria to withstand unfavourable conditions [Eg extreme dryness, unfavourable temperature, poisonous chemicals] Within spore the bacterial protoplasm remains dormant and becomes active when the favourable conditions returns.

Now before going further let us recapitulate what we have learnt so far by means of a short test Answer the following questions in your notebooks -

Q1. Name the term given to rod shaped bacteria

Q2 Give the term given to bacteria occuring in clusters

Q3 What is the common method of reproduction in bacteria?

Children you may pause the lesson for 5 mins break to write the answers to these questions in your notebooks.

Break is over children. Listen to the correct answers

A1 Bacilli

A2 staphylococci

A3 Binary fission

Now let us resume the topic and learn about the uses/benefits of bacteria to us.

Useful role of Bacteria in medicine

Antibiotics - are chemicals produced by a living organism (microorganisms) which can stop the growth of some disease producing bacteria and fungi.

Eg - Streptomycin, chloromycetin, penicillin and so on.

Penicillin was the first antibiotic obtained from fungus Penicillium notatum by Alexander Fleming. It was an accidental discovery.

Similarly, streptomycin was discovered by Selman Waksman from bacterium Streptomyces griseus.

Criteria for good antibiotic

1) It should be able to kill a variety of disease producing microorganisms such a antibiotic is called broad spectrum antibiotic

2) It should not produce side effects

3) It should not kill the useful bacteria of the host.

Other uses of antibiotics in addition to being used in medicine

1) It is used as food preservatives, especially for fresh meat and fish.
2) It is used for treating animal feed. (food)
3) It is used for controlling plant pathogens (germs)

2. Serum:

A small dose of bacterial toxin (i.e. poisonous proteins released by pathogenic bacteria) is introduced into the blood of a healthy animal like a horse/cow. Animals body produces antitoxins to neutralise the effect of toxins After several injections of the same toxins the blood of such animal is taken out. On chilling it clears as straw-coloured liquid which separates out from the clot and is called serum.
This serum thus contain numerous chemical substances including antibodies/antivenin/antitoxin.
Serum actually means - blood plasma from which fibrinogen has been removed.

Antivenine used against snake bite is a serum. produced in the blood of horses etc.
Serum is also used against treatment of Haemophilia
Through genetic engineering we may introduce human genes in certain bacteria like E.Coli Bacterial cultures grow very rapidly and the particular gene dependent products are extracted from these bacteria Eg Insulin hormone is produced by E. Coli used to treat Diabetic patients.

CLASS - 8

SUBJECT - BIOLOGY TEACHER - Ms. Nidhi Rana

Vaccination - Introduction of weakened germs or dead germsubstance into the body for developing resistance to a particular disease

On injecting dead germs into the body (produces the disease in mild form) the body gets stimulated to produce antitoxins. These antitoxins provide immunity against any future attack of a particular disease germs.

Vaccine A preparation consisting of weakened germs or dead germsubstance Eg TAB, BCG vaccine.

Toxoids - are inactivated toxins produced by bacteria These toxins (poisons) are made harmless by addition of dilute formalin, yet retaining the capacity to produce antibodies Eg diphtheria, tetanus etc.

Dear Students with this I am ending Todays discussion Kindly go through the given explanation and with reference to the detailed explanation answer the following home assignment questions in your notebooks

Home Assignment

Q1 Answer the following Review questions [Page 89-90 of text book]

C. Short Answer Type Q No 3, 4 and 7

D. Long Answer Type Q No 3 and 5