Chap 6 (Kingdom Monera) F.Sc 1st Year Biology Notes

Chapter 6: Kingdom Monera

(Short Questions Answers)

What temperatures are used to sterilize food and milk?

Food is sterilized by using high temperatures of 120° – 126°C obtained by heating under pressure for 12 to 90 minutes. Milk is pasteurized by heating at 71°C for 15 seconds or at 62°C for 30 minutes.

What are chemical methods used for microbial control?

One can use antiseptics, disinfectants, chemotherapeutic agents and antibiotics for microbial control.

What are disinfectants or what chemical agents are used for disinfection?

The important chemical agents used for disinfection are oxidising and reducing agents, for example, halogens and phenols, hydrogen peroxide, potassium per magnate, alcohol and formaldehyde etc. These chemicals inhibit the growth of vegetative cell. They are used on nonliving materials.

What chemical methods or substances are used for natural defence or in living tissues?

Chemotherapeutic agents and antibiotics work with natural defence and stop the growth of bacteria and other microbes. These are sulfonamides, tetracycline, penicillin, etc. They destroy or inhibit the growth of microorganisms in living tissues.

What methods of prevention and treatment have been introduced to control microbial diseases.

- immunization (e.g., vaccination)
- antisepsis (procedures to eliminate or reduce the possibility of infection)
- chemotherapy treatment of the patient with chemicals)
- public health measures (e.g., water purification, sewage disposal, and food preservation)

What were called vaccine and vaccination by Pasteur?

He called the attenuated cultures of bacteria, vaccine (a term derived from the Latin Vacca, “cow”) and immunization with attenuated cultures of bacteria, vaccination.

How cell walls of archaeobacteria are different from eubacteria?

Cell walls of archaeobacteria do not contain peptidoglycan. Their cell walls are composed of proteins, glycoproteins and polysaccharides.

What are nucleoid? or Define nucloeoid?

The nuclear material or DNA in bacterial cells is a single, circular and double stranded. It aggregates as an irregular shaped dense area called nucleoid or chromatin body.

What do you know about the spores of bacteria?

Certain species of bacteria produce spores, either external to the vegetative cells (exospores – bacteria rarely produce exospores, it is the characteristic of fungi) or within the vegetative cells (endospores). Spores are resistant to adverse physical environment condition such as light, high temperature, desiccation, pH and chemical agents.

Differentiate between parasitic and saprophytic bacteria.

Parasitic bacteria are fully dependent on their host for their nutrition whereas saprophytic bacteria are those which get their food from dead organic matter.

How gram staining technique make difference between gram positive and gram negative bacteria. or What are Gram positive and Gram negative bacteria?

By Gram staining technique gram positive bacteria are stained purple (retain the primary dye due to formation of CV-I complex) and gram negative bacteria are stained pink (retain secondary dye such as safranin) in colour.

How bacterial membranes differ from eukaryotic membranes?

Bacterial membranes differ from eukaryotic membranes in lacking sterols such as cholestrol.

What is mesosome?

The cell membrane invaginates into the cytoplasm forming a structure called mesosome. Mesosomes are in the form of vesicles, tubules or lamellae.

What is the function of mesosomes?

Mesosomes are involved in DNA replication and cell division where as some mesosomes are involved in export of exocellular enzyme. Respiratory enzymes are also present on the mesosome.

What are different categories of autotrophic bacteria?

On the basis of energy source, autotrophic bacteria can be divided into two categories: Photosynthetic autotrophs and chemosynthetic autotrophs.

What type of granules and storage bodies are found in bacteria?

Bacteria tend to store extra nutrients when possible. These may be glycogen, sulphur, fat and phosphate. In addition, cells contain waste materials that are subsequently excreted. For example, common waste materials are alcohol, lactic acid and acetic acid.

Differentiate between photosynthetic and chemosynthetic bacteria.

Photosynthetic bacteria utilize sunlight as a source of energy while chemosynthetic bacteria oxidize inorganic compounds like ammonia, nitrate, nitrite, sulphur or ferrous iron.

How photosynthesis in bacteria is different from green plants?

During photosynthesis bacteria use hydrogen sulphide (H_2S) instead of water as hydrogen source and liberate sulphur instead of oxygen. In most green plants chlorophyll is present within chloroplast while bacterial chlorophyll is dispersed in the cytoplasm.

Differentiate between aerobic and anaerobic bacteria.

Bacteria which can grow in the presence of oxygen are called aerobic bacteria while those which can grow in the absence of oxygen are known as anaerobic bacteria

Differentiate between facultative and microaerophilic bacteria.

Facultative bacteria grow either in the presence or absence of oxygen e.g., E. coli. Some bacteria require a low concentration of oxygen for growth and are known as microaerophilic e.g., Campylobacter.

What is generation time?

The interval of time until the completion of next division is known as generation time.

How bacterial decomposition play significant role?

Bacteria decompose organic matter and play a significant role in the completion of cycle of nitrogen, phosphorus, sulphur and carbon.

What is economic importance of bacteria?

Bacteria are used in number of industries, including food, drugs (production of antibiotics and vaccines) and in biotechnology. Bacteria are also responsible for spoilage of food and vegetables. Many plant pathogens adversely affect agricultural industry.

How binary fission occurs in bacteria?

In binary fission parent cell enlarges, its chromosome duplicates, and plasma membrane pinches inward at the centre of the cell. When nuclear material has been evenly distributed, the cell wall thickens and grows inward to separate cell into two.

What is trichome?

An individual chain of cells in cyanobacteria is called trichome.

Differentiate between stationary and death/decline phases.

In Stationary phase bacterial death rate is equal to bacterial rate of reproduction and multiplication rate. But in Death/Decline phase bacteria start dying. Here the death rate is more than reproduction rate.

How bacteria are ecologically important?

They are highly adaptable as a group. They are found nearly everywhere. They decompose organic matter and play a significant role in the completion of cycle of nitrogen, phosphorus, sulphur and carbon.

What is medical importance of bacteria?

Bacteria are very common pathogens of humans. Approximately 200 species are known to cause diseases in humans e.g., diphtheria, tetanus, tuberculosis, etc. Many bacteria normally inhabit the bodies of man and other animals e.g., E. coli.

How many species of bacteria are known to cause disease in humans?

Approximately 200 species are known to cause disease in humans.

How moist and dry heat control microbes?

Moist heat causes coagulation of proteins and kills the microbes. while dry heat causes oxidation of chemical constituents of microbes and kills them.

Define sterilization.

The process in which physical agents are used to control bacterial microorganisms is known as sterilization. In this process all forms of life are destroyed.

What electromagnetic radiations are effective in killing of microorganisms?

Certain electromagnetic radiations below 300 nm are effective in killi microorganisms. Gamma rays are in general used for sterilization.

How heat sensitive compounds are sterilized?

Heat sensitive compounds like antibiotics, serums, hormones etc., can be sterilized by means of membrane filters.

How photosynthetic system of cyanobacteria closely resembles that of eukaryotes?

Their photosynthetic system closely resembles that of eukaryotes because they have chlorophyll a and photosystem 11. They carry out oxygenic photosynthesis, i.e., they use water as an electron donor and generate oxygen during photosynthesis.

What do you know about accessory and photosynthetic pigments of cyanobacteria?

Cyanobacteria use phycobilins. as accessory pigments. Photosynthetic pigments and electron transport chain components are located in thylakoid membranes linked with particles called phycobilisomes. Phycocyanin pigment is their predominant phycobilin and CO2 in them is assimilated through the Calvin cycle.

What is the difference between cyanobacteria and plants regarding their reserve food?

Reserve food material in cyanobacteria is glycogen but in plants it is starch.

How cyanobacteria reproduce?

Cyanobacteria reproduce by binary fission and fragmentation. In cyanobacteria hormogonia, akinetes and heterocysts are present.

Give economic importance of cyanobacteria.

- Cyanobacteria have heterocysts, which are helpful in the fixation of atmospheric nitrogen
- They help in reclamation of alkaline soils
- They release O2 in the environment due to their photosynthetic activity
- Oscillatoria and few other cyanobacteria can be used as pollution indicator
- They have symbiotic relationship with protozoa, fungi, and nitrogen fixing species of angiosperms
- Super Blue green algae is basically expensive pond scum. In which cyanobacteria is a single celled organism that produce its own food through photosynthesis
- Many species of cyanobacteria form water blooms, where they often give unpleasant smell and make water unfit for consumption
- Some species produce toxins that kill livestock and other animals that drink the water

What is the disadvantage of water blooms formed by cyanobacteria? or What are water blooms? What is their effect on animals?

Many species of cyanobacteria form water blooms, where they often give unpleasant smell and due to a large amount of suspended organic matter water becomes unfit for consumption. Some species produce toxins that kill livestock and other animals that drink the water.

What is the habitat of Nostoc?

Nostoc is common terrestrial and subaerial cyanobacteria. It is widely distributed, in alkaline soils and on moist rocks and cliffs.

When hormogonia are formed?

Hormogonia are formed when filament breaks at different points into smaller pieces. This is due to death and decay of ordinary cell or the heterocyst may serve as a breaking point.

What is unique about the structure of bacterial ribosomes?

Some may also be loosely attached to plasma membranes. There are thousands of ribosomes in each healthy growing cell. They are smaller than eukaryotic ribosome (14-15 nm x 20 nm).

What is a trichome in Nostoc?

Trichome is a chain of cells, which is unbranched and appears beaded. All cells in trichome are mostly similar in structure but at interval are found slightly large, round, light yellowish thick walled cells called as heterocysts.

Differentiate between streptococci and staphylococci.

When cocci are arranged in irregular, often grape-like clusters, arrangement is called staphylococci. Whereas when cocci form long chain of cells then arrangement is called as streptococci.

What are lophotrichous bacteria?

When tuft of flagella' is present only at one pole of bacteria, it is called Tophotrichous.

What are (or differentiate between) amphitrichous and Peritrichous bacteria?

When tuft of flagella at each of two poles is present, bacterium is called Amphitrichous. When flagella surround the whole cell, bacterium is called Peritrichous.

Write down the function of cell wall in bacteria.

It determines the shape of bacterium. Cell wall also protects the cells from osmotic lysis.

Compare nucleoid with nucleus.

Nucleoid is a region in prokaryotes where chromosomes are present without nuclear membrane while nucleus is found in eukaryotes and is membrane bound structure having chromosomes and nucleolus.

Differentiate between spore and cyst.

Spores: They are metabolically dormant bodies. They are produced at a late stage of cell growth. Spores are resistant to adverse physical environment condition such as light, high temperature, desiccation, pH and chemical agents. Under favourable conditions they geminate and form vegetative cells.

Cysts: Cysts are dormant, thick-walled, desiccation resistant forms. They develop during differentiation of vegetative cells which can germinate under suitable condition. They are not heat resistant.

What are photosynthetic bacteria? Give two examples or Name the bacteria which are photosynthetic.

They use sunlight as a source of energy. During photosynthesis they use hydrogen sulphide (H_2S) instead of water as hydrogen source and liberate sulphur instead of oxygen. For example, Chromatium (Purple sulphur bacteria), Chlorobium (green sulphur bacteria) and Rhodospirillium (purple non-sulphur bacteria).

What are antiseptics?

Chemical substances used on living tissues that inhibit the growth of microorganisms are called as antiseptics.

What is Hydrophobia or rabies?

Hydrophobia or rabies is a disease transmitted to people by bites from rabid (mad) dogs, cats, and other animals.

What are antibiotics? Write their sources.

Antibiotics is a Greek word (Anti, against, and Bios life). Antibiotics are. chemotherapeutic chemical substances which are used in treatment of infectious disease. Antibiotics are synthesized and secreted by certain bacteria, actinomycetes and fungi.

What care should be taken in the use of antibiotics? or Write three precautions in the use of antibiotics.

- To determine drug of choice, one must know its mode of action, possible adverse side effects in the human beings
- Use antibiotics as prescribed by the physicians
- Take dose at regular intervals and complete the treatment time as advised by the doctor

Give two disadvantages of misuse of antibiotics.

- Misuse of antibiotics such as penicillin can cause allergic reactions
- Misuse of antibiotics can interact with the human metabolism and in severe cases it can cause death of human beings

How movement occurs in cyanobacteria?

They lack flagella and often use gas vesicles to move in the water. Many filamentous species have gliding motility.

What are different types of respiration in bacteria?

Respiration in bacteria may be aerobic (requiring free oxygen) or anaerobic (not requiring free oxygen.

What is conjugation?

Some bacteria transfer genetic material from a donor bacteria to a recipient during a process called conjugation. Some conjugating bacteria use specialized sex pili to transfer genetic material. Conjugation produces new genetic combinations that may allow the resulting bacteria to survive under great variety of conditions.

Describe asexual reproduction in Nostoc.

It reproduces asexually by formation of hormogonia and akinetes. Hormogonia are formed when filament breaks at different points into smaller pieces. This is due to death and decay of ordinary cell or the heterocyst may serve as a breaking point. Akinetes: Akinetes are thick walled, enlarge vegetative cells which accumulate food and become resting cells. On arrival of favourable conditions they form normal vegetative cell.

What are streptobacilli?

A chain of bacilli is called streptobacilli.

What Antonnie Von Leeuwenhoek famous for?

A Dutch Scientist “Antone Van Leeuwenhoek” was the first to report the microbes such as bacteria and protozoa.