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**Q1: Explain structure of bacteria in detail? Explain some cell organelles of bacterial cell and its function?**

**Structure of Bacterial cell:**

To begin with, bacteria are prokaryotes, and it is quite clear that they lack well defined nuclei as well as membrane –bound organelles, and with chromosomes composed of a single closed DNA circle. So the structure of bacteria is illustrated below:

**Cell wall:**

* External most boundary
* Reasonable Strong and remain just outside of plasma membrane
* Cell wall of bacteria is composed of peptidoglycen (sugur+protien) and Murine.
* Some bacteria possess no cell wall like mycoplasma and some archaea

**Function of cell wall:**

* Cell wall keep safe cell from toxic substance
* Cell wall of numerous pathogen have component that help to these pathogenecity
* Give protection, shape or form to cell.
* Cell wall is total penetrable that allow preceding all material across it.
* Cell is a site where different antibiotic involve or include.

**Plasma membrane:**

The membrane that remains inside cell wall is called plasma membrane.

It is a network of lipids and proteins that forms the boundary between a cell’s content and the outside of the cell.

**Structure of plasma membrane:**

**Peripheral protein:**

* Remained to surface
* not firmly connected to outer membrane and easily remove
* Soluble aqueous solution and composed of almost 20-30% of total membrane protein

**Fluid mosaic model:**

This model is proposed by S J sanger and G Nicholson

The difference between two lyres of protein is integral or peripheral protein

**Integral protein:**

* In soluble in aqueous solution.
* It may be Enzyme i.e. permeates (responsible for active transport, facilities transport
* Entirely are partially imbedded in lipid bailer

Important role in metabolic activity I.e. Respiration or photosynthesis

**Transmembrane protein**

It acts as cellular phone they transport message from external environment to internal environment.

**Haponids:**

The bacterial membrane contains pentacyclic sterile like molecule called haponids.

It acts as receptor site for phages or different type of drugs (chemicals).

Layer which incompreses the cytoplasm and define cell boundaries.

**Function of cell membrane:**

* Provide shape, size to cell
* It is site for action of different antibiotic.
* It is site for different metabolic activities e.g. photosynthesis or respiration.
* Elastic in nature

**Bacterial plasmid:**

* Plasmid is usually found in Bacteria
* Plasmid possess their own replication
* Small double stranded DNA molecule usually circular
* Exist independently of host chromosome

**Replication:**

* Replication is a DNA molecule or sequence that has replication origion and is capable of being replication.)
* Plasmid in bacterial is separate replicon.
* Plasmid have relatively few gene
* Gene range from 8-10 mostly (8 gene less than 30 gene)

**Ribosome:**

* Ribosome are found both in prokaryotic and eukaryotic cell
* the shape or form of each protein is fixed by its amno acid sequence
* In prokaryotic cell here is 70s ribosome and eukaryotic has 80s ribosome
* Ribosome are composed of protein & rRNA
* ribosome are area for protein synthesis
* Important to note that prokaryotic ribosome are smaller than eukaryotic ribosome
* Dimension about 14-15 nm approximately 2.7million
* They are constructed of 50s -30s
* s stand for swedbrg unit

**Nucleoid:**

Its nucleoid don’t have a fix position

No membrane bounded nucleus is present

**Flagella:**

* Thrid like structure
* Its function is to do movement for bacteria
* Movement depend upon chemical structure
* Some move toward light
* It’s nucleoid don’t have a fix position.

**Inclusion bodies:**

* It carries out many function
* It also suspended particle.
* Inclusion bodies usually are used for storage
* Example carbon compound inorganic substance
* Some inclusion body bound by membrane and some are without membrane
* These are lie freely in cytoplasms

**Q2: What is Bacterial culture media? Write down some type of bacterial culture media in detail?**

**Ans:**

**Bacterial culture media**: It is solid, liquid or semi­- designed to help the growth of microorganisms or cell, or small plants like the moss Physcomitrella patents.

**Microbial Growth**:

A media which possesses nutrient as required for the growth of pathogen and microorganisms.

There are two types of media:

1. Solid media
2. Liquid media

Solid media**:**  It is a mixture of liquid media and agar is added as a solidifying agent.

For storage of culture

Agar is made for solid media

Such is nutrient agar or blood agar are used

For pure culture isolate

To observe specific biochemical reaction

**Semi solid media:**

Reducing the amount of agar to (0.2-0.5%)make the media semi solid.

Such media are fairly soft and are usefull in demonstrating bacterial motility and separating motile from non motile strain.

It is not completely liquid but it is a semi solid or gel type.

It helps micro organisms to stay suspended.

Hard to dig out all type of organisms.

Proper for isolation of bacteria from blood culturing in water analysis.

**Liquid Media:**

It is not fully liquid but it is a semi solid or gel type.

It helps micro organisms to stay suspended.

It is hard to identify all type of organisms.

It is proper for the separation of bacteria from blood culturing in water analysis.

**Agar:** it extracted from polysaccharides of sea weeds

They are solid at room temperature (37 C).

Inert against micro organisms.

No influence on micro organisms.

Used for isolation of bacteria

Used for identification of bacteria.

**Classification of media:**

1. **Basal media:**

They are pre made.

No further substances/additive are required to be added to this media.

Nutrient agar media

It possesses both media (liquid media) semi-solid

Nutrients are carbohydrates nutrient and agar

Agar is used as solidifying agent

Also called Brooth media

**Selective Media:**

It is used to find which type of bacteria is present

This media is used for particular bacteria

It is used to isolate specific group of bacteria.

It courage particular bacteria and discourage non particular bacteria.

It is also called as algae media

It detects TB in sputum

**Indicator media:**

Identification of particular bacteria

Streptococci grow and breakdown and do a chemical reaction which indicate the presence of bacteria

Also known as Mekonky agar media.

**Enriched media:** further additive/component are added from outside to this media

Examples:

blood -------- for energy

Egg---------- carbohydrate and protein

Serum ------- antibiotic protein

It is also called as blood agar media.

Streptococci grows on blood and do hemolysis means breakdown of blood cell so it well grow in enriched media because it need nutrient and blood

**Storage media:**

It is used to store bacteria for long time

Also known as egg saline media

**Transport media;**

Applied to transport bacteria from one place to another

First a sample is collected and putted in a pepton water media.

Nutrient are added to this media for bacterial survival

**Q3; what is the difference between disinfection and sterilization? Write down some method used for sterilization.**

**Ans: Disinfection:**

Disinfection is the process of elimination of b pathogenic microorganisms. However, the process is not effective in case of vegetative spores**.**

**Sterilization:**

Serialization is a process of elimination that kills viable microorganisms, bacterial spores and viruses**.**

Disinfection and sterilization are both decontamination method .Based on the purpose of decontamination, either disinfection or sterilization can be chosen or opted.

Method of sterilization

Physical

Chemical

Mechanical

Biological

**Physical sterilization:**

**A:** heat: B: rays

**A: Heat:**

Consist of two layers

One is dry and the other is moist heat

In dry heat, sterilization is over flame and moist heat sterilization on boiling.

B: **Rays:**

Here, Sterilization is on ultraviolet rays and infrared rays.

**Chemical sterilization:**

It is of two types.

1. Gases. B. liquid

**Gases:**

Oxide (H2O2) are used for sterilization which causes the excitation of electron attach with bacteria ruptured it

**Liquid:**

Alcohol is applied/used for sterilization.

**Mechanical sterilization:**

Filtration are applied/used in mechanical sterilization

**Biological sterilization:**

Viron/prion whish are virus and parasites predator used in this type of sterilization.

**Q4: Write Note on structure of fungi in detail?**

**Ans:**

**Structure of fungi:**

Fungi are composedof a number of elongated tubular filaments known as Hyphae.

.Fungus which possesses branch is known as mycelium.

In yeast same cell function in vegetative growth as well as sexual reproduction.

While in other fungi, vegetative and reproductive phases are there.

Vegetative phase also called assimilative phase

**Yeast:** yeast is unicellular fungi

Yeasts are non filaments

To produce to new cell

To produce fission yeast which are divided symmetrically and asymmetrically

One yeast cell can produce up to 24 daughter cell by budding

Single cell buds

Example Cryptococcus performance

**Mycelium is three kinds**

**Vegetative mycelium:** those which penetrate the surface of medium and absorb nutrient

**Aerial mycelium:** those that grow above the agar surface

**Fertile mycelium or Aerial hyphea:** that bear reproductive structure such is media or sporangia

Composed of a number of elongated tubular filaments known as Hyphae.

Fungus having branch is known as mycelium.

In yeast same cell function in vegetative growth as well as sexual reproduction .

In other fungi, vegetative and reproductive phases are there.

Vegetative phase also called assimilative phase

**Hyphae:** third like structure

A fungal thus consists of filament of cell called hyphea.

Type of hyphae

Septate Hyphae:

Some fungi have hyphae divided into cellular compartments by walls called septa.

Septa have tiny perforations which allow molecules, cytoplasm, and sometimes organelles to move between the cells.

Fungi can close their septa if they are injured, preventing fluid loss from the rest of the filament.

## Non-Septate Hyphae

These types of hyphea are also called aseptate or coenocytic.

They represent a more primitive form of fungi and are the ancient ancestors of septate hyphae.

Fungi of the genus Mucor and the division Zygomycetes are non-septate.

Non-Septate hyphae do have some septa, but they are found only at the branching points. If there were no septa at all, the entire fungus would be at risk of compromise if even one hyphae were damaged

**Rhizoids:** these are rote like structure which is visible in portion of vegetative hyphea in some member of zygomycetes.

**Q5:** what are few hospital based infection that can be transfer to others due to un hygienic condition? Explain with example?

**Hospital based infection OR Nosocomial infection:**

**Definition:**

A nosocomial infection also called hospital acquired infection (HAI) can be defined as “a infection acquired by a patient during hospital care which was not present or incubating at the time of admission.

An infection acquired in hospital by a patient who was admitted for a reason other than that infection

A common nosocomial infection

1 UTI

2 LRTI

3 surgical site infection (SSI)

**4** pneumonia Etc

**Corona virus**

Corona virus causes and spreads through **close social contact** with an infected person.

**Close social contact** means greater than 15 minutes face-to-face or the sharing of a closed space for more than two hours with a confirmed case.

**A close social contact could include any person meeting any of the following criteria:**

* living in the same household or household-like setting (for example, school or hostel and shops)
* Direct contact with the body fluids or laboratory sample of a confirmed case.
* A person who spends two hours or longer in the same room.
* Face-to-face contact for more than 15 minutes can also infect with corona virus.
* Don’t shaking hand with corona patient

**Pseudomonas aeruginosa**:

It is most common in children that we bring to the hospital most of them are healthy but they are infected with pneumonia the recent research is conducted on this particular health problem that is caused by pseudomonas aeruginosa.

Let me clear that **Pseudomonas aeruginosa** lives in the environment and can be spread to people in healthcare settings when they are exposed to water or soil that is contaminated with these germs. Resistant strains of the germ can also spread in healthcare settings from one person to another through contaminated hands, equipment, or surfaces.