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Subject: Micro Biology

Dental 4th Semester

1) Explain Structure of bacteria in detail? also Explain some cell organelle of bacterial cell and its function.

Ans:

Bacteria (singular: bacterium) are classified as prokaryotes, which are single-celled organisms with a simple internal structure that lacks a nucleus, and contains DNA that either floats freely in a twisted, thread-like mass called the nucleoid, or in separate, circular pieces called plasmids. Ribosomes are the spherical units in the bacterial cell where proteins are assembled from individual amino acids using the information encoded in ribosomal RNA.

Bacterial cells are generally surrounded by two protective coverings: an outer cell wall and an inner cell membrane. Certain bacteria, like the mycoplasmas, do not have a cell wall at all. Some bacteria may even have a third, outermost protective layer called the capsule. Whip-like extensions often cover the surfaces of bacteria — long ones called flagella or short ones called pili — that help bacteria to move around and attach to a host.

2) What is Bacterial culture media? write down some types of bacterial culture media in detail.?

Culture media contain nutrients and physical growth parameters necessary for microbial growth. All microorganisms cannot grow in a single culture medium and in fact many can't grow in any known culture medium.

Organisms that cannot grow in artificial culture medium are known as obligate parasites. *Mycobacterium leprae*, *rickettsias*, *Chlamydias*, and *Treponema pallidum* are obligate parasites. Bacterial culture media can be classified on the basis of composition, consistency and purpose.

i. **Solid medium**

Solid medium contains agar at a concentration of 1.5-2.0% or some other, mostly inert solidifying agent. Solid medium has physical structure and allows bacteria to grow in physically informative or useful ways (e.g. as **colonies** or in streaks). Solid medium is useful for **isolating bacteria** or for determining the colony characteristics of the isolate.

ii. **Semisolid media**

Semisolid media are prepared with agar at concentrations of 0.5% or less. They have soft custard like consistency and are useful for the cultivation of microaerophilic bacteria **or for** determination of bacterial motility.

iii. **Liquid (Broth) medium**

These media contains specific amounts of nutrients but don't have trace of gelling agents such as gelatin or agar. Broth medium serves various purposes such as propagation of large number of organisms,

**3) What is the difference between Sterilization and disinfection?
write down some methods used for sterilization?**

Disinfection and sterilization are both decontamination processes. While disinfection is the process of eliminating or reducing *harmful* microorganisms from inanimate objects and surfaces, sterilization is the process of killing *all* microorganisms. That is the main difference between sterilizing and disinfecting. Sterilization also destroys the spores of various organisms present on surfaces, in liquids, in medication, or in compounds such as biological culture media. Such "extreme" forms of decontamination are needed during critical times like surgery, or in environments like industrial, laboratory or hospital. It is more practical to use disinfection in everyday life.

- i. **Filtration** is the quickest way to sterilize solutions without heating. This method involves filtering with a pore size that is too small for microbes to pass through. Generally, filters with a pore diameter of 0.2 μm are used for the removal of bacteria. Membrane filters are more commonly used filters over sintered or seitz or candle filters. It may be noted that viruses and phage are much smaller than bacteria, so the filtration method is not applicable if these are the prime concern.
- ii. **Radiation sterilization:** This method involves exposing the packed materials to radiation (UV, X-rays, gamma rays) for sterilization. The main difference between different radiation types is their penetration and hence their effectiveness. UV rays have low penetration and thus are less effective, but it is relatively safe and can be used for small area sterilization. X-rays and gamma rays have far more penetrating power and thus are more effective for sterilization on a large scale. It is,

however, more dangerous and thus needs special attention. UV irradiation is routinely used to sterilize the interiors of biological safety cabinets between uses. X-rays are used for sterilizing large packages and pallet loads of medical devices. Gamma radiation is commonly used for sterilization of disposable medical equipment, such as syringes, needles, cannulas and IV sets, and food.

- iii. Chemical method of sterilization:** Heating provides a reliable way to get rid of all microbes, but it is not always appropriate as it can damage the material to be sterilized. In that case, chemical methods for sterilization is used which involves the use of harmful liquids and toxic gases without affecting the material. Sterilization is effective using gases because they penetrate quickly into the material like steam. There are a few risks, and the chances of explosion and cost factors are to be considered.

The commonly used gases for sterilization are a combination of ethylene oxide and carbon-dioxide. Here Carbon dioxide is added to minimize the chances of an explosion. Ozone gas is another option which oxidize most organic matter. Hydrogen peroxide, Nitrogen dioxide, Glutaraldehyde and formaldehyde solutions, Phthalaldehyde, and Peracetic acid are other examples of chemicals used for sterilization. Ethanol and IPA are good at killing microbial cells, but they have no effect on spores.

4) Write a note on Structure of fungi in detail?

Ans:

The main body of most fungi is made up of fine, branching, usually colourless threads called hyphae. Each fungus will have vast numbers of these hyphae, all intertwining to make up a tangled web called the mycelium.

The mycelium is generally too fine to be seen by the naked eye, except where the hyphae are very closely packed together. The picture on the left was taken through a microscope. The hyphae are magnified 100 times life size. Some fungi, such as Honey Fungus, which is a parasite of woodland trees, have hyphae collected together into long cables, called rhizomorphs. Because there are so many hyphae packed together, they are easily seen, forming black '**bootlaces**'. These can spread through a woodland infecting neighboring trees.

5) What is few Hospital based infections that can be transfer to others due to un hygienic condition? Explain with an example?

Ans: management of health care waste is an integral part of hospital hygiene and infection control health waste should be considered as a research of the pathogenic microorganism which can causes contamination and give rise to infections if waste is in-adequate managed these microorganism can be transmitted by direct contact

in the air or by a variety of vectors. Infections waste contributes in this way to the risk of nosocomial infections putting the health of hospital personal and patients at risk.

i. Nosocomial infections.

Known also as hospital acquired infections, hospital associated infections, and hospital infections- are infections that are not present in the patient at the time of admission to hospital but develop during the course of the stay in hospital. There are two forms.

a. Endogenous infections, self-infection, or auto-infection.

The causative agent of the infection is present in the patient at the time of admission to hospital but there are no signs infection. The infection develops during the stay in the hospital as a result of the patient's altered resistance.

b. Cross-contamination followed by cross-infection. During the stay in hospital the patient comes into contact with new infective agents, becomes contaminated, and subsequently develops an infection.

While there is no clinically significant difference between the endogenous self-infection and the exogenous cross infection, the distinction is important from the stand point of epidemiology and prevention.