Department of Anesthesia Techniques

Title of the lecture:- culture Media

M.S.C Zainab ali mohsen

culture Media

Microorganisms, like all other living organisms, require basic nutrients for sustaining their life. All microorganisms have the same basic requirements but they are diverging in inorganic and organic compounds needs. By providing environmental and nutritional factors it is often possible to provide the appropriate conditions for their cultivation.

Culture media as a fellow: An artificial environment simulating natural conditions that necessary for bacteria to grow in laboratory.

Components of the Typical Culture Medium:

1. Energy source
2. Carbon source
3. Nitrogen source
4. Salts like phosphate, chlorides, sodium carbonates, potassium, magnesium, ferric, calcium and trace element like copper.
5. Source of different minerals e.g. iron, magnesium, sodium, potassium and traces of zinc and manganese.

Culture Media Importance:

1. Isolation and preservation of microorganisms.
2. Reproducing a microorganism and studying its characteristics.
3. Encouragement and induction of the microorganisms to produce materials that have industrial importance like antibiotics and some organic acids.

Classification of Culture Media:

A) Depending on its consistency:

1. Liquid media or broth: these are media that do not contain any solidifying agent like agar. Liquid media are suitable to grow bacteria when the numbers in the inoculum is suspected to be low, also they are usually used in the extraction of active compounds produced by microorganisms (e.g. toxins).

2. Solid media: these are media that contain (1.5 –2 %) agar. Solid medium they are important for isolation of microorganisms in pure form especially when there is more than one species in one sample.

3. Semisolid media: it contains less than 1% (about 0.7 -0.8) % of agar. Such media are soft and are useful in demonstrating bacterial motility and separating motile from non motile strains, also their requirements for O_2 to know if these microorganisms are aerobic, anaerobic, micro aerobic, or facultative anaerobic.

B) Depending on its nature or components or contents:

1. Natural media: these are media that contain natural materials e.g. plant or animal tissues, milk, blood, fruit and vegetables juice and meat extract.
2. Artificial media: these are divided into:
   a) **Synthetic or defined media:** these are media which contain chemical substances that we know their composition and their concentration accurately. These media are used for a wide variety of physiological studies.
   b) **Semi synthetic or complex media:** these are synthetic media supplemented with natural components of unknown chemical composition like the addition of meat extract, yeast extract, peptone or serum. Complex media are usually used for cultivation of bacterial pathogens and other fastidious bacteria.
3. Living media: these are media in which living cells are used as culture media like using chicken embryo and Helacell for cultivation of viruses.

C) Depending on the purpose of uses

1. General purpose media: these are media in which many are grown. They are used for many purposes e.g. nutrient broth.
2. Selective media: these are media that are used for the cultivation and isolation of certain species of microorganisms from a mixture of different species.
3. Differential media: these are media which differentiate between two different groups of microorganisms and allow to diagnosis of microorganisms depending on its biological characters. Differential media contain certain material allows to detection of certain microorganisms depending on their **metabolic activity.**

D)Maintenance media: These media are used for maintenance and storage of microorganisms for long time by adding materials in a certain ratio. These materials maintain the persistence and viability of microorganisms for a longer time

E)Assay media: these media are used for performing assay like the medium that used for performing antibiotic sensitivity test which called Muller-Hinton agar.

F)Stimulatory media: these are media that stimulate the production of certain materials or structures inside the microorganism's cell like: toxins, pigments and endospores.

Some examples of nutrient media

Mannitol salt agar

(selective differential media for gram positive bacteria :Staphylococcus spp)

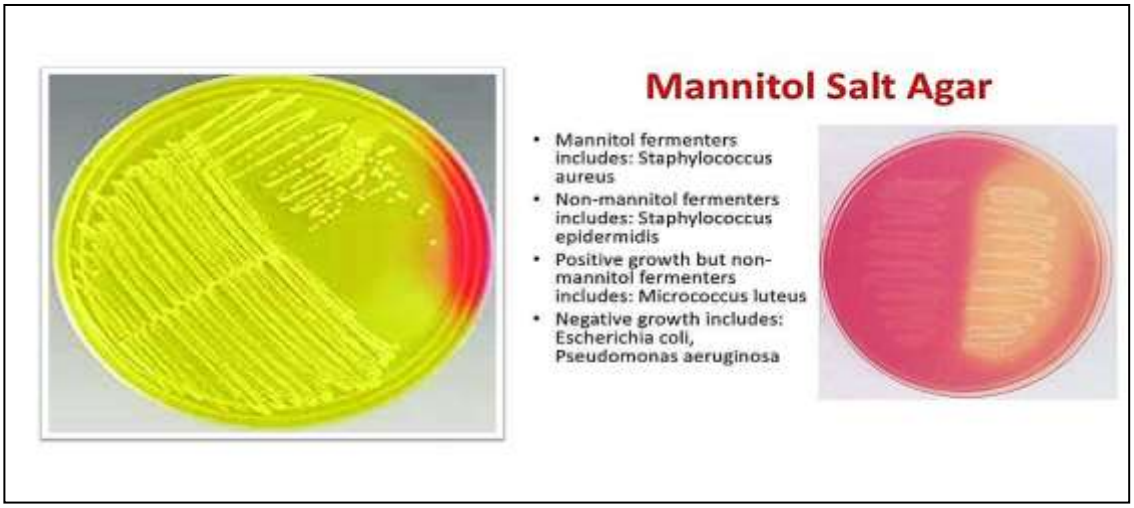
•Sugar: Mannitol

•Nacl7.5%: The inhibitor for gram positive & negative bacteria

•PH-indicator: phenol red

•Mannitol fermenter = yellow colony

•Mannitol non fermenter = red colony



MacConkey agar

(selective differential media for gram negative bacteria)

•Sugar: Lactose

•PH-indicator:Neutral red

•crystal violet: inhibitor for gram positive bacteria

•bile salt: inhibitor for enterococci

•Lactose fermenter= pink colony

•Lactose non fermenter =pale colony