

BT 102 Mid Current Solved

Medical Microbiology?

Medical Microbiology: Deals with diseases of humans and animals • Identifications of disease causing agents • Control and elimination of microbes • Tracking down new pathogens.

Passive Transport? Types of passive transport?

Passive Movement • Movement of substances with the concentration gradient. This means that substances will move from higher concentration of a substance to lower concentration. Gradient provides the force for movements of molecules and this happens with no energy expenditures. Passive Movement is divided into two groups: 1. Simple Diffusion 2. Facilitated Diffusion.

Pili and Function?

Longer than fimbriae • One or two per cell • Used for attachment: – Host cells – Bacteria. Used for attachment: – DNA transfer: Conjugation (Sex pili) – Twitching Motility – Gliding Motility.

Write the name of Five Kingdom classification system?

Monera: Bacteria and Archea • Protista • Fungi • Plantae • Animalia

Two name of basic stains?

Positive Staining • Crystal violet • Methylene blue • Malachite green • Safranin. **Negative Staining** • Eosin • Acid fuchsin • Nigrosin.

How Bacteria get nitrogen for growth?

Name of Bacteria based on temperature?

1. Psychrophiles: These are further divided into strict psychrophiles and psychrotrophs:
2. Psychrotrophs: Cold loving: 15 0C o
3. Psychrotrophs: Optimum temp is 20-30 0C. Food spoilage bacteria that can spoil food during
4. Mesophiles: 25 – 40 0C: These are the ones that cause diseases in animals and humans.
5. Thermophiles: 50 – 60 0C o Heat loving

Glycocalyx?

A viscous and gelatinous secretion that surrounds the cells – Polysaccharide and polypeptide or both • Capsule: Organized and firmly attached – Virulence – Vaccine • Slime: loosely attached. Bacillus anthracis • Streptococcus pneumoniae • Klebsiella. Glycocalyx as biofilm Bacteria secrete extracellular polymeric substance (EPS) • Protects cells within it. • Facilitates communication amongst cells • Enables the cells to attach to various surfaces for survival.

Characteristic Magnetosomes?

Magnetosomes: • Inclusions of iron oxide • Surrounded by invaginations of plasma membrane • Present in G negative bacteria – Act like magnet – Decompose H₂O₂.

Chemical damage of plasma membrane? Name of Chemical that Cause Disrupt of Plasma membrane? Chemical Which Disrupt Cell Membrane?

Phenol and Phenolics • First widely used antiseptics • Disrupt plasma membranes.

Give Function of Following parts of Microscope? Illuminator, Condenser Object Lens?

Illuminator: a light source • **Condenser:** Directs the light through the specimen • **Objective Lenses:** Close to the specimen

Shape of Bacteria?

Spiral – Vibrio: curved rods – Spirillum: Helical but rigid – Spirochete: Helical but flexible • Move by axial filaments

Define Culture, Culture Medium, Inoculum?

Osmosis?

– Net movement of solvent • From high conc of solvent to low conc – OR low conc of solute to higher conc of solute. Solvent will move b/c of semipermeable membrane.

Characteristic of Algae? Function of algae?

These are eukaryotes. Their cell wall consists of cellulose. These are photosynthetic and produce oxygen. They are usually unicellular, but multicellular algae are also common. Seaweeds and pond scum are some of the examples.

Buffer?

Buffers are used to maintain desired pH – Peptones and amino acids – PBS.

Buffers are used to maintain desired pH o Peptones and amino acids are used as buffers o Phosphates are also used for buffer.

Endospore? Endospore Staining?

Endospore: A resistant dormant structure within a cell • Position of the endospore varies within the cell • Appear as a clear halo in Gram stained smears. Malachite green: Primary stain • Heated to steaming for 5 min. • Washed with water. • Counterstained with safranin.

Industrial Microbiology?

Use of microbes or their enzymes for large scale production of biomolecules.

Advantage of Solid Media culture?

Pure culture is easy to obtain by streaking the organisms • Colony characters can be studied.

Fimbriae?

Hair-like small appendages on Gneg cells • Composed of pilin • Can be at one pole or around the entire cell. Used for attachment to surfaces or epithelial cells • Fimbria: Singular. Attachment to epithelial cells – Neisseria gonorrhoeae – E.coli O157: Diarrhea.

Step of respiration of glucose? Three stage of oxidation of Glucose?

Occurs in three stages: – Glycolysis – The Krebs cycle – Electron transport chain • Most of ATP is generated in the last stage. **Glycolysis:** Glycolysis is the oxidation of glucose to pyruvic acid with the production of some ATP and energy-containing NADH. **The Krebs Cycle:** Oxidation of acetyl CoA to carbon dioxide, with the production of some ATP and energycontaining NADH and FADH₂. **Electron Transport Chain:** NADH and FADH₂ are oxidized through a series of electron carriers to produce ATP. **Fermentation:** Starts with pyruvic acid and has no Krebs cycle or electron transport chain for production of ATP. – ATP yield is low because energy only comes from glycolysis step. • Does not require or use O₂

Short

Glucose: Primary energy source for microbes • Aerobic respiration: – Glycolysis – Krebs cycle – Electron Transport Chain • Fermentation – No O₂ needed.

Function of Cell Membrane of bacteria?

Photosynthesis • Lipid synthesis • Cell wall parts • Receptors

Difference B/W Direct Count and Viable Count?

– **Direct counts** • Counting chamber • Coulter Counter • Flow cytometer • Membrane filter technique for water samples –Fluorescent dye.

Viable counting method – Spread plate – Pour plate. Spread plate with serial dilutions.

Discus stage involve in the germination of spore?

Activation: Prepares spore for germination. – Heating can initiate it. • **Germination:** Spore starts swelling and losing its coats etc. – Metabolically active • **Outgrowth:** New components are made.

Integral protein with example?

Integral proteins – Imbedded in the membrane – Insoluble in water – Amphipathic in nature • Some act as receptors. Integral proteins are not static in position • Can diffuse laterally and change position in the membrane.

Write inclusion and give example?

Inclusions: Reserved deposits of nutrients • Avoid the increase in osmotic pressure – Metachromatic granules – Polysaccharide granules – Lipid inclusions – Sulfur granules etc.

Characteristic Metachromatic granules?

Metachromatic Granules: Also called volutin • Large inclusions • Stained red with methylene blue • Contain inorganic phosphates • Characteristics of Corynebacterium diphtheria.

Difference B/W Oxidation and Reduction?

Oxidation: Removal of electrons from an atom • **Reduction:** Gain of electron • Oxidation and reduction reactions are coupled.

Kind of Spiral shape of bacteria?

- Spiral – Vibrio: curved rods

Define lysosome?

An organelle in the cytoplasm of eukaryotic cells containing degradative enzymes enclosed in a membrane.

Name the counting method for cell?

A counting chamber, (also known as hemocytometer), is a microscope slide that is especially designed to enable cell counting. ... The separating distance between the chamber and the cover is predefined, thus the volume of the counted culture can be calculated and with it the concentration of cells. **(Internet)**

Name Five Bacteria phase?

In autecological studies, the growth of bacteria (or other microorganisms, as protozoa, microalgae or yeasts) in batch culture can be modeled with four different phases: lag phase (A), log phase or exponential phase (B), stationary phase (C), and death phase (D). **(Internet)**

Name Five Bacteria on the bases of oxygen growth? Classification of Bacteria on Oxygen requirement? On the bases of oxygen write name five bacteria group?

Aerobes. 1.1. require oxygen. 1.2. use oxygen as a final electron acceptor. ...

Microaerophiles. 2.1. require limited amount of oxygen. 2.2. ...

Obligate anaerobes. 3.1. require absence of oxygen. 3.2. ...

Aerotolerant anaerobes. 4.1. not use oxygen for growth. 4.2. ...

Facultative anaerobes. 5.1. can grow in present / absence of oxygen. 5.2 **(Internet)**

Sulfur Bacteria Source?

Sulfur-oxidizing bacteria produce effects similar to those of iron bacteria. They convert sulfide into sulfate, producing a dark slime that can clog plumbing. Sulfur-reducing bacteria (SRBs) live in oxygen-deficient environments. ... Of the two types, sulfur-reducing bacteria are the more common. **(Internet)**

Chemotaxis and Phototaxis Sporulation?

Phototaxis is a kind of taxis, or locomotory movement, that occurs when a whole organism moves towards or away from stimulus of light. ... This is analogous to positive **chemotaxis** except that the attractant is light rather than a chemical. **(Internet)**

Sporulation Formation of spores takes place within a vegetative cell and the process is called sporulation or sporogenesis. It is initiated when nutrients become unavailable.

Layer name of endospore? Write the name of five layer on endospore?

Exosporium: A thin delicate outermost covering of the spore • Spore coat: 2nd layer underneath the exosporium. It is thick and composed of several protein layers. ♣ Resistant to chemicals ♣ It contains enzymes for germination. Germination of spores into vegetative form occurs when environment becomes favorable for their growth. • Cortex: It is the 3rd layer from outside in. It has peptidoglycan in it. • Spore cell wall or core wall: Surrounds the protoplast or spore core • Spore core: Contains nucleoid and ribosomes

Prokaryotic and Eukaryotic Difference?

The main difference between prokaryotes and eukaryotes is this: eukaryotic cells contain membrane-bound organelles, such as the nucleus, while prokaryotic cells do not. **(Internet)**

Co-Enzyme? Give Example?

A coenzyme is an organic non-protein compound that binds with an enzyme to catalyze a reaction. ... A coenzyme cannot function alone, but can be reused several times when paired with an enzyme. ... Without coenzymes or cofactors, enzymes cannot catalyze reactions effectively. Example: example is thiamine pyrophosphate (TPP). **(Internet)**

Characteristic Microaerophiles?

Microaerophiles are microorganisms that are not killed outright by the presence of oxygen per se, but are able to tolerate only sub-atmospheric levels of oxygen in their environment. (Internet)

Write the name of Exosporium?

Exosporium: A thin delicate covering (PPTS)

The exosporium is the portion of the spore that interacts with the environment or host organism, and may contain spore antigens. Exosporium proteins, such as Cot protein, are also discovered related to strains of *B. anthracis* and *B.cereus*. (Internet)

Three Name of Flagellum?

The flagellum is composed of three parts: basal body, hook, and filament. Different bacteria can have anywhere from one or two flagella to hundreds of flagella (Internet)

Formula of Compound Microscope?

$m = -\frac{d_i}{d_o} = -\frac{367 \text{ mm}}{44.0 \text{ mm}} = -8.33$
 $m_e = -\frac{d_i'}{d_o'} = -\frac{367 \text{ mm}}{44.0 \text{ mm}} = 8.33$. So the overall magnification is $m = m_o m_e = (-8.33)(8.33) = -69.2$. (Internet)

Name two type of teichoic acid found in bacteria?

Teichoic Acid (glycerol or ribitol + Phosphate)

Name of Microscopy? Type of Microscopy? Five Types of Microscopy?

Light Microscope Uses visible light to observe the specimen.

Darkfield Microscopy: Uses a darkfield condenser having an opaque disk • Used for unstained specimens suspended in liquids.

Phase Contrast Microscopy • Light rays can be in phase or • out of phase. **Fluorescent Microscopy** • Uses fluorochromes and UV light as illumination source. **Transmission Electron Microscopy, Scanning Electron Microscopy,**

Agar and its characteristic? Agar and Its properties?

Agar is typically used in a final concentration of 1-2% for solidifying culture media. Smaller quantities (0.05-0.5%) are used in media for motility studies (0.5% w/v) and for growth of anaerobes (0.1%) and microaerophiles.

Character/Properties: Solubility, Gelling, Viscosity, Stability,

Function of Ribosome, Flagella and Cell Wall?

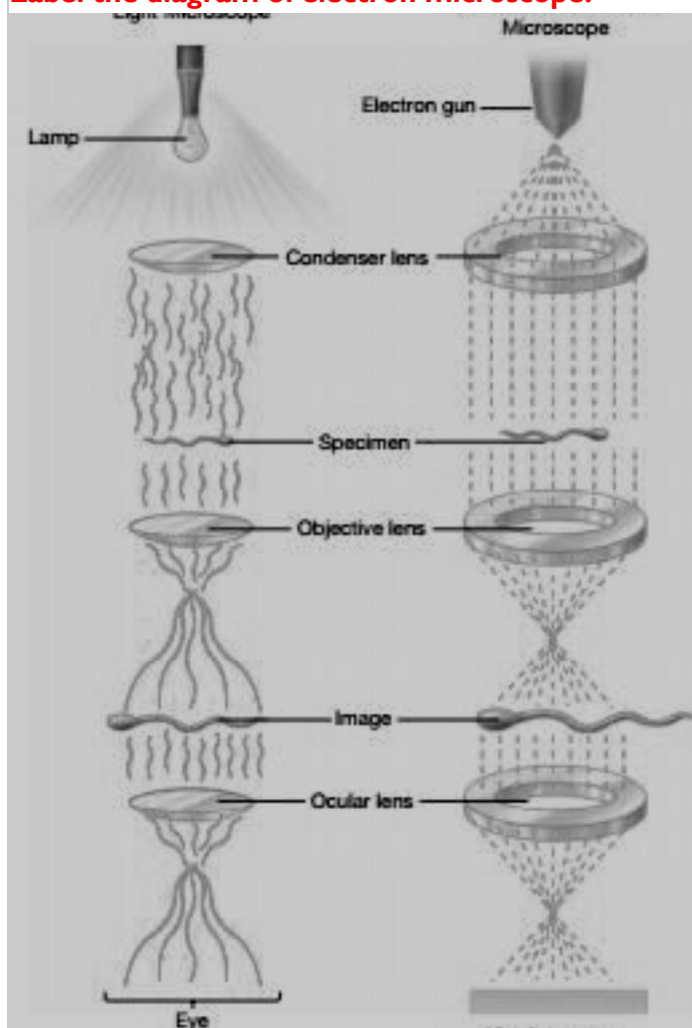
Ribosome: Function of Ribosomes. Ribosomes are a cell structure that makes protein. Protein is needed for many cell functions such as repairing damage or directing chemical processes. Ribosomes can be found floating within the cytoplasm or attached to the endoplasmic reticulum.

Flagella: A **flagellum** is a whip-like structure that allows a cell to move.

Cell Wall: The **cell wall** is the protective, semi-permeable outer layer of a plant **cell**. A major **function** of the **cell wall** is to give the **cell** strength and structure, and to filter molecules that pass in and out of the **cell**.

Cell Membrane and Its Function?

Label the diagram of electron microscope?



GENERAL PROPERTIES

Appearance	Yellowish Powder
Particle Size	100 Mesh
Moisture Content	Max. 18%
Water Absorption	Max. 75 c.c.
Acid Insoluble Ash	Max. 0.5%
Total Ash	Max. 6.5%
Foreign Organic Material	Max. 1.0%
Foreign Insoluble Material	Max. 1.0%
Gelatin	Negative
pH	6.8 to 7.0
Gel Strength 1.5% sol at 20° C	700 to 1000 g/cm ²
Viscosity 1.5% sol at 60° C	10 to 100 cps
Melting Point	85° to 95° C
Setting Point	32° to 45° C
Solubility	Boiling Water
Arsenic	Max. 3 ppm
Heavy Metals	Max. 10 ppm
Starch	Negative
Lead	Max. 10 ppm

MICROBIAL PROPERTIES

Standard Plate Count	< 5000 col/g
E.Coli	Negative
Salmonella	Negative
Total Coliform	< 100 col/g

Figure 1 Agar and its characteristic? Agar and Its properties?

The primary function of the plasma membrane is to protect the cell from its surroundings. Composed of a phospholipid bilayer with embedded proteins, the plasma membrane is selectively permeable to ions and organic molecules and regulates the movement of substances in and out of cells.

Advantage of Cell Wall?

This cell wall exoskeleton provides the bacteria with several benefits. The cell wall protects the bacterium from damage by encircling it with a tough, rigid structure. This structure is also porous. Small molecules are able to freely pass through the cell wall to the membrane, but large molecules are excluded.

Phosphorylation?

Phosphorylation is a commonly seen mechanism in many aspects of cellular biology. In the field of epigenetics, **phosphorylation** refers to the addition of a phosphoryl group (PO_3^-) to histones via a pathway involving a kinase protein. Nucleosome tails can be **phosphorylated** by various kinases

Classification of media on the basis of function?

Media Classification: Function – General purpose – Selective – Enrichment – Differential

Physical and Chemical method of preparing of Smear?

Physical method: Heat • Chemical Methods: Ethanol or formaldehyde

Advantage of Staining?

The most basic reason that cells are stained is to enhance visualization of the cell or certain cellular components under a microscope. Cells may also be stained to highlight metabolic processes or to differentiate between live and dead cells in a sample.

Bacterial Growth Curve Phase?

Log Phase, Lag Phase, Stationary Phase, The Death Phase.

Function of Lipid A in LSP?

Lipid A: endotoxin – Fever, vasodilation and shock.

Stage of involved in germination of spore?

Activation: Prepares spore for germination. – Heating can initiate it, Germination: Spore starts swelling and losing its coats etc. – Metabolically active. Outgrowth: New components are made.

Electron Transmission Microscope parts name?

