**OMOTAYO FAITH**

**18/MHS01/301**

**MEDICAL LABORATORY SCIENCE**

**ASSIGNMENT**

1. Explain (step-by-step) at least ten (10) biochemical reactions of bacteria.

2. Explain the identification/staining techniques of fungi.

1.

* **Respiration**

Respiration is a type of heterotrophic metabolism that uses oxygen and in which 38 moles of ATP are derived from the oxidation of 1 mole of glucose, yielding 380,000 cal

* **Fermentation**

In fermentation, another type of heterotrophic metabolism, an organic compound rather than oxygen is the terminal electron (or hydrogen) acceptor. Less energy is generated from this incomplete form of glucose oxidation, but the process supports anaerobic growth.

* **Krebs Cycle**

The Krebs cycle is the oxidative process in respiration by which pyruvate (via acetyl coenzyme A) is completely decarboxylated to CO2. The pathway yields 15 moles of ATP

* **Glyoxylate Cycle**

The glyoxylate cycle, which occurs in some bacteria, is a modification of the Krebs cycle. Acetyl coenzyme A is generated directly from oxidation of fatty acids or other lipid compounds.

* **Electron Transport and Oxidative Phosphorylation**

In the final stage of respiration, ATP is formed through a series of electron transfer reactions within the cytoplasmic membrane that drive the oxidative phosphorylation of ADP to ATP. Bacteria use various flavins, cytochrome, and non-heme iron components as well as multiple cytochrome oxidases for this process.

* **Mitchell or Proton Extrusion Hypothesis**

The Mitchell hypothesis explains the energy conservation in all cells on the basis of the selective extrusion of H+ ions across a proton-impermeable membrane, which generates a proton motive force. This energy allows for ATP synthesis both in respiration and photosynthesis.

* **Bacterial Photosynthesis**

Bacterial photosynthesis is a light-dependent, anaerobic mode of metabolism. Carbon dioxide is reduced to glucose, which is used for both biosynthesis and energy production. Depending on the hydrogen source used to reduce CO2, both photolithotrophic and photoorganotrophic reactions exist in bacteria.

* **Autotrophy**

Autotrophy is a unique form of metabolism found only in bacteria. Inorganic compounds are oxidized directly (without using sunlight) to yield energy This metabolic mode also requires energy for CO2 reduction, like photosynthesis, but no lipid-mediated processes are involved.

* **Anaerobic Respiration**

Anaerobic respiration is another heterotrophic mode of metabolism in which a specific compound other than O2 serves as a terminal electron acceptor. Such acceptor compounds include NO3–, SO42–, fumarate, and even CO2 for methane-producing bacteria.

* **The Nitrogen Cycle**

The nitrogen cycle consists of a recycling process by which organic and inorganic nitrogen compounds are used metabolically and recycled among bacteria, plants, and animals. Important processes, including ammonification, mineralization, nitrification, denitrification, and nitrogen fixation, are carried out primarily by bacteria.

2)

#### Crystal Violet Stain

Crystal violet staining solution is prepared in the same way as Liquid A used in Gram stain. Take a small quantity of culture and mix with physiological saline to prepare a smear. Stain the smear with crystal violet solution. Observe under oil immersion lens.

* **Lactophenol cotton blue stain**

Place a drop of lactophenol cotton blue staining solution onto a clean slide, and mix the fungal culture or clinical sample with the staining solution. Place a coverslip on top and heat gently. Press the coverslip gently to remove any bubbles. Observe the slide under an oil immersion lens