

Name: Nwifama Stephanie Baridoo

Course code: Mch 202

Department: MIs

Matric no: 18/mhs06/035

Assignment:

Describe the mechanism of aerobic respiration

1. Aerobic respiration is an enzymatically controlled release of energy in a stepwise catabolic process of complete oxidation of organic food into carbon dioxide and water with oxygen acting as terminal oxidant. The common mechanism of aerobic respiration is also called common pathway because its first step, called glycolysis, is common to both aerobic and anaerobic modes of respiration. The common aerobic respiration consists of three steps—glycolysis, Krebs cycle and terminal oxidation.

Glycolysis:

It is also called EMP pathway because it was discovered by three German scientists Embden, Meyerhof and Parnas. Glycolysis is the process of breakdown of glucose or similar hexose sugar to molecules of pyruvic acid through a series of enzyme mediated reactions releasing some energy (as ATP) and reducing power (as NADH₂). It occurs in the cytoplasm.

Krebs Cycle:

The cycle was discovered by Hans Krebs (1937, 1940, Nobel Prize 1953). It occurs inside mitochondria. The cycle is also named as citric acid cycle or tricarboxylic acid (TCA) cycle after the initial product. Krebs cycle is stepwise oxidative and cyclic degradation of activated acetate derived from pyruvate.

Oxidation of Pyruvate to Acetyl-CoA:

Pyruvate enters mitochondria. It is decarboxylated oxidatively to produce CO₂ and NADH. The product combines with sulphur containing coenzyme A to form acetyl CoA or activated acetate. The reaction occurs in the presence of an enzyme complex pyruvate dehydrogenase (made up of a decarboxylase, lipoic acid, TPP, transacetylase and Mg²⁺).