**Glycolysis or EMP**

* The Embden-Meyerhof or glycolytic pathway is the most common pathway for glucose degradation to pyruvate in stage two of catabolism. It is found in all major groups of microorganisms and functions in the presence or absence of O2.
* Glycolysis [Greek glyco, sweet, and lysis, a loosening] is located in the cytoplasmic matrix of procaryotes and eucaryotes.
* All the living organisms whether aerobes or anaerobes, initiate the mechanism of respiration by breaking down **glucose** (6 carbon compound) into two molecules of **pyruvate** (3 carbon compound).
* This initial process that occurs in 10 steps, the first 5 of which constitute the **preparatory phase**and the last 5 constitute the **payoff phase**is called **glycolysis**.
* The process of glycolysis was first described by **Gustav Embden, Otto Meyerhof**and**Parnas** and therefore also referred to as **EMP pathway**.

The three-carbon stage of glycolysis begins when the enzyme fructose 1,6-bisphosphate aldolase catalyzes the cleavage of fructose 1,6-bisphosphate into two halves, each with a phosphate group. One of the products, glyceraldehyde 3-phosphate, is converted directly to pyruvate in a five-step process. Because the other product, dihydroxyacetone phosphate, can be easily changed to glyceraldehyde 3-phosphate, both halves of fructose 1,6-bisphosphate are used in the three-carbon stage. Glyceraldehyde 3-phosphate is first oxidized with NAD\_ as the electron acceptor, and a phosphate is simultaneously incorporated to give a high-energy molecule called 1,3-bisphosphoglycerate. The high energy phosphate on carbon one is subsequently donated to ADP from a single glucose (one by way of dihydroxyacetone phosphate), the three-carbon stage generates four ATPs and two NADHs per glucose. Subtraction of the ATP used in the six-carbon stage from that produced in the three-carbon stage gives a net yield of two ATPs per glucose. Thus the catabolism of glucose to pyruvate in glycolysis can be represented by the following simple equation.

Glucose + 2ADP + 2Pi + 2NAD+ 2 pyruvate + 2ATP + 2NADH + 2H+

