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Paper:Biochemistry-||

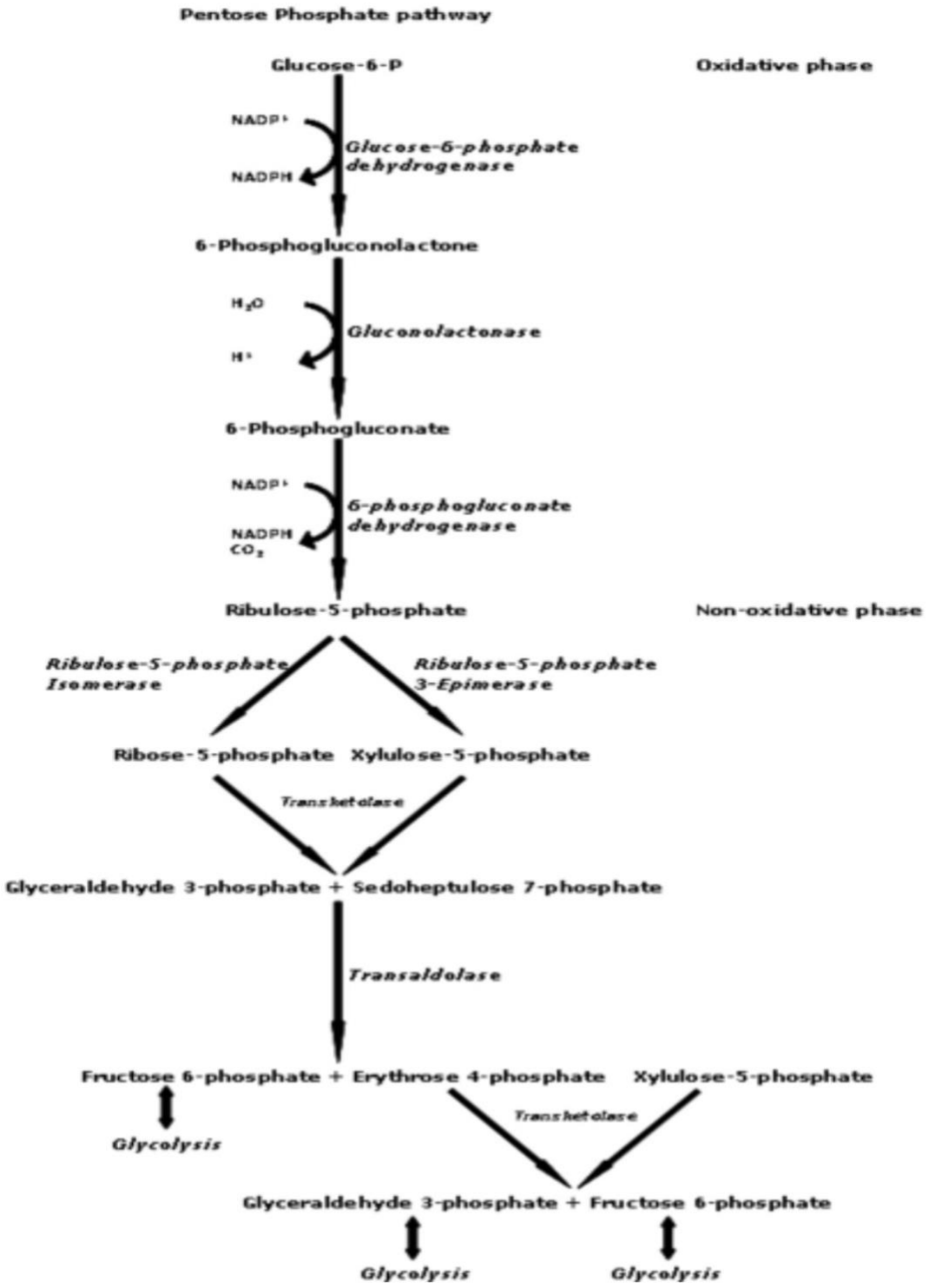
Q1:**Draw and explain pentose phosphate path way?**

Ans: **The pentose phosphate pathway**

The **pentose phosphate pathway** (also called the **phosphogluconate pathway** and the **hexose monophosphate shunt**) is a metabolic pathway parallel to glycolysis. It generates NADPH and pentoses (5-carbon sugars) as well as ribose 5-phosphate, a precursor for the synthesis of Nucleotides. While the pentose phosphate pathway does involve oxidation of glucose, its primary role is anabolic rather than catabolic. The pathway is especially important in red blood cells (erythrocytes).
There are two distinct phases in the pathway. The first is the oxidative phase, in which NADPH is generated, and the second is the non-oxidative synthesis of 5-carbon sugars. For most organisms, the pentose phosphate pathway takes place in the cytosol; in plants, most steps take place in plastids.

Similar to glycolysis, the pentose phosphate pathway appears to have a very ancient evolutionary origin. The reactions of this pathway are mostly enzyme-catalyzed in modern cells, however, they also occur non-enzymatically under conditions that replicate those of the Archean ocean, and are catalyzed by metal ions, particularly ferrous ions (Fe(II)). This suggests that the origins of the pathway could date back to the prebiotic world.

Diagram:



The pentose phosphate pathway

The **pentose phosphate pathway** (also called the

Q2:what is balance food and what are major food groups and explain the health benefit of balance diet?

Ans:

- **Balance food:** A **balanced meal** is a snapshot

of a diet that covers the three core **food** groups. As seen on this portion plate, the **balance** is a quarter proteins, a quarter carbohydrates and half vegetables.

- **Major food groups:**

- breads, cereals, rice, pasta, noodles and other grains
- vegetables and legumes
- fruit
- milk, yoghurt, cheese and/or alternatives
- lean meat, fish, poultry, eggs, nuts and legumes.

A balanced diet includes a variety of foods from each of the five food groups, and offers a range of different tastes and textures. It is important to choose most of the foods we eat each day from these food groups.

- **Benefits of a balanced diet**

- Opting for a balanced, adequate and varied diet is an important step towards a happy and healthy lifestyle.
- Vitamins and minerals in the diet are vital to boost immunity and healthy development,
- A healthy diet can protect the human body against certain types of diseases, in particular noncommunicable diseases such as obesity, diabetes, cardiovascular diseases, some types of cancer and skeletal conditions.
- Healthy diets can also contribute to an adequate body weight.
- Healthy eating is a good opportunity to enrich life by experimenting with different foods from different cultures, origins and with different ways to prepare food.
- The benefits of eating a wide variety of foods are also emotional, as variety and colour are important ingredients of a balance diet.

Q3:Explain krebs cycle?

The Krebs cycle starts with pyruvic acid from glycolysis. Each small circle in the diagram represents one carbon atom. For example, citric acid is a six carbon molecule, and OAA (oxaloacetate) is a four carbon molecule. Follow what happens to the carbon atoms as the cycle proceeds. In one turn through the cycle, how many molecules are produced of ATP? How many molecules of NADH and $FADH_2$ are produced?

Before the Krebs cycle begins, pyruvic acid, which has three carbon atoms, is split apart and combined with an enzyme known as CoA, which stands for coenzyme A. The product of this reaction is a two-carbon molecule called acetyl-CoA. The third carbon from pyruvic acid combines with oxygen to form carbon dioxide, which is released as a waste product. High-energy electrons are also released and captured in NADH.

Steps of the Krebs Cycle

The Krebs cycle itself actually begins when acetyl-CoA combines with a four-carbon molecule called OAA (oxaloacetate) (see **Figure** above). This produces

citric acid, which has six carbonatoms. This is why the Krebs cycle is also called the **citric acid cycle**.

After citric acid forms, it goes through a series of reactions that release energy. The energy is captured in molecules of NADH, ATP, and $FADH_2$, another energy-carrying compound. Carbon dioxide is also released as a waste product of these reactions.

The final step of the Krebs cycle regenerates OAA, the molecule that began the Krebs cycle. This molecule is needed for the next turn through the cycle. Two turns are needed because glycolysis produces two pyruvic acid molecules when it splits glucose. Watch the OSU band present the Krebs cycle: .

Results of the Krebs Cycle

After the second turn through the Krebs cycle, the original glucose molecule has been broken down completely. All six of its carbon atoms have combined with oxygen to form carbon dioxide. The energy from its chemical bonds has been stored in a total of 16 energy-carrier molecules. These molecules are:

- 4 ATP (including 2 from glycolysis)
- 10 NADH (including 2 from glycolysis)
- 2 $FADH_2$

Krebs Cycle
(Citric Acid Cycle)