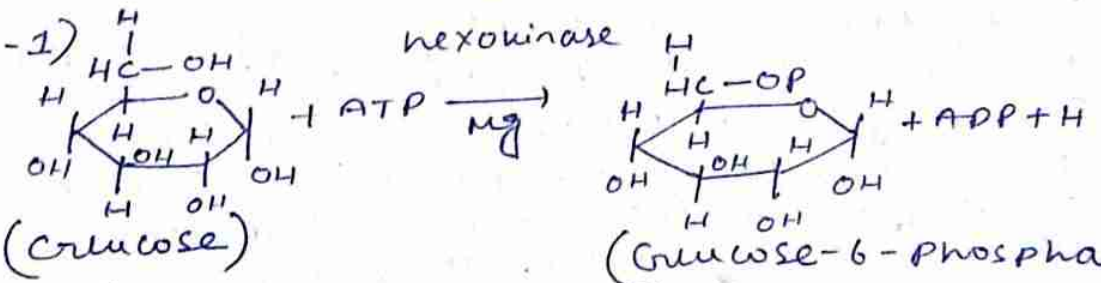
ABHISHEK Roy Roll-53 Dept-CSE (2nd Yr) 5/5/22

1) Why is Glycolysis call Glycolysis?

Ans The word Glycolysis means "glucose-splittings" which is exactly what happens in this stage. Enzymes split a molecule of glucose into two molecules of Pyruvate. (also known as pyruvic acid)

2) How many stages can Glycolysis divided into (broadly)? name them why are they so called?

Ans
(Step-I) Hexokinase
↓
(Step-II) Phospho glucose Isomerase
↓
(Step-III) Phosphofructokinase
↓
(Step-IV) Aldolase
↓
(Step-V) Triosephosphate Isomerase
↓
(Step-VI) Glyceraldehyde-3-phosphate Dehydrogenase
↓
(Step-VII) Phosphoglycerate kinase
↓
(Step-VIII) Phosphoglycerate Mutase
↓
(Step-IX) Enolase
↓
(Step-X) Pyruvate kinase

Step-1) 

Step-2) (glucose 6-phosphate) —phospho-glucose isomerase→ (fructose-6-phosphate)

Step-3) (Fructose 6 phosphate) + ATP —PFK, Mg→ (Fructose-1,6 Bisphosphate) + ADP + H

Step-4) (Fructose-1,6 bisphosphate) → Aldolase

[Dihydroxyacetone phosphate (DHAP)] + [Glyceraldehyde 3-phosphate (GAP)]

Step-5) DHAP ⇌ GAP

(TIM) - Triosophosphate isomerase

Step-6) GAP + NAD + P $\xrightarrow{GAPDH}$ (1,3 bisphoglycerate + NADH + H)

Step-7) (1,3-bisphoglycerate + ADP) $\xrightarrow[Mg]{PGK}$ (3-phosphoglycerate + ATP)

Step-8) (3-phosphoglycerate) $\xrightarrow{\text{phospho-glycerate mutase}}$ (2-phospho-glycerate)

Step-9) (2-phosphoglycerate) $\xrightarrow{\text{Enolase}}$ (phosphoenol pyruvate + H_2O)

Step-10) (phosphoenol pyruvate + ADP + H) $\xrightarrow{\text{pyruvate kinase}}$ (Pyruvate + ATP)

3) Which step of glycolysis called Pace-maker of glycolysis and why called?

Ans → phosphofructokinase (stage III)

Cause, PFK is regulated by energy charge, meaning that unlike HK, PFK changing speed according to the needs of the organism. Pacemaker PFK is essential for cardiac function, much like an electronic pacemaker used by some heart-patient. HK is the 1st step of glycolysis, is not used for glycolysis. The 1st commited step of glycolysis is catalyzed by PFK. It's regulated by energy charge, which means it always runs at high "pace".