

Sem-5

MJC-8

Synthase - Synthesis enzyme

Synthetase - Energy breaking

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Location of Glycolysis Cytoplasm.

⇒ Glycolysis → Most primitive Metabolic Pathway because it takes place in cytoplasm

Glucose is preferred source in case of Animals.

Sucrose " " " Plants.

→ It is also called EMP-Pathway because its details were given by Embelen, Meyerhof and Partridge.

Sucrose
Pyrophosphate

G-6-P
Glucose 6 phosphate

Fructose 6 Phosphate

(Alternative pathway for Glucose)
Sucrose breakdown

(Uridine Diphosphate - UDP)

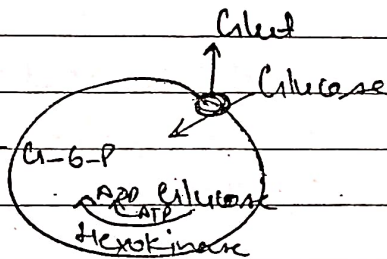
UDP

Sucrose Synthetase

Fructose

UDP glucose

UTP → Glucose



There is no 1-6-P transporter in membrane so they remain inside the cell.

⇒ GLUT - Glucose transporter and of five types 1, 2, 3, 4, 5

⇒ GLUT 1 & GLUT 3 present in all mammalian cells & Rest others GLUT 2, 4 and 5 are tissue specific.

→ No oxygen & No CO_2 produced so it is completely Anaerobic process. So number of C atom remain unchanged. (Glycolysis)

GLUT 1 - Erythrocyte

2 - Liver

3 - Brain

4 - skeletal muscle and adipose tissue → intra cellular

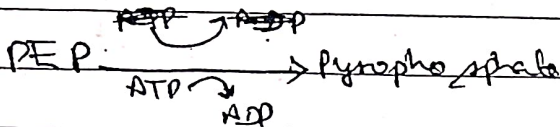
5 - Small intestine → visible

Cell - Surface

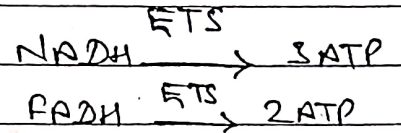
? Energy Currency

↓ ATP is produced in two ways

Substrate level
phosphorylation



↓ Oxidative
phosphorylation



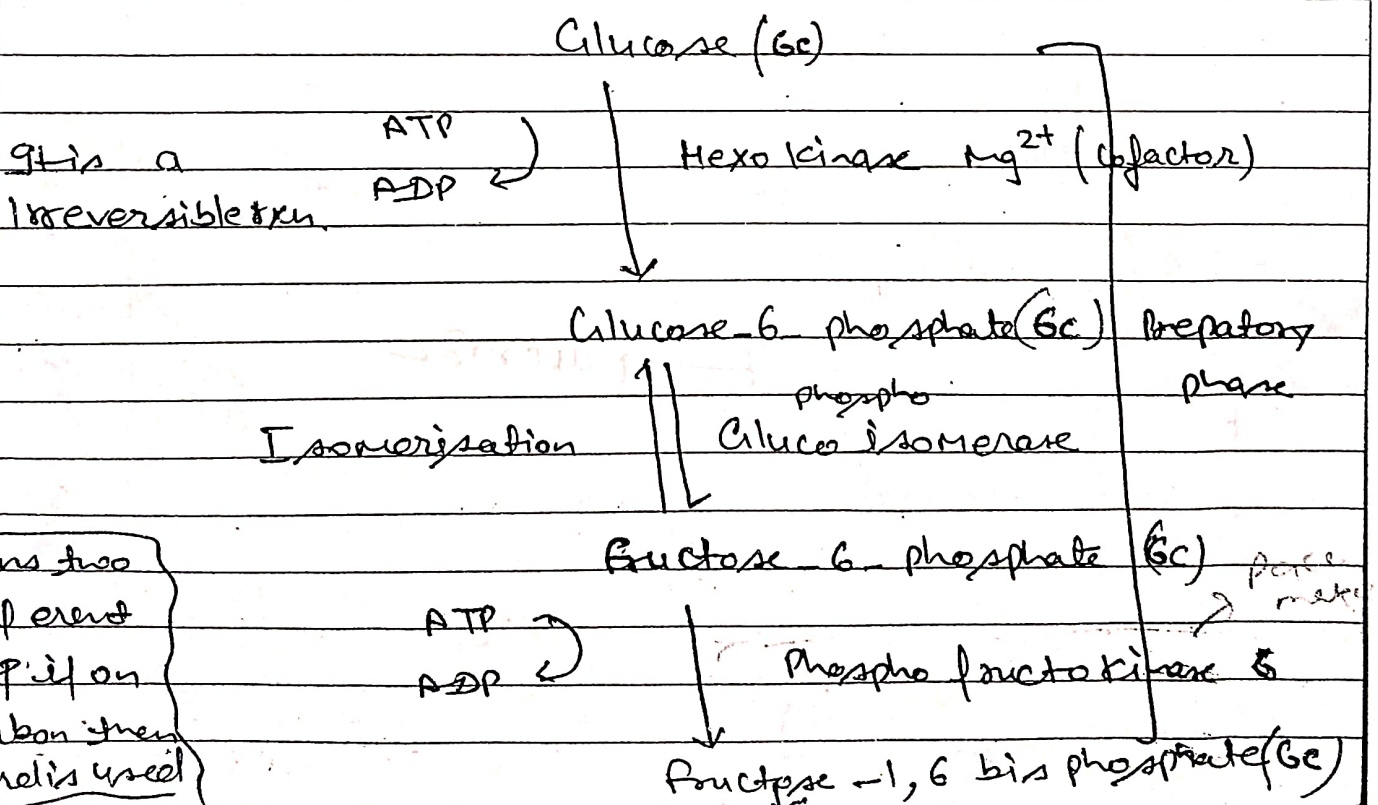
→ phosphate directly transferred
from substrate to ADP or
GDP

P: O

3: 1

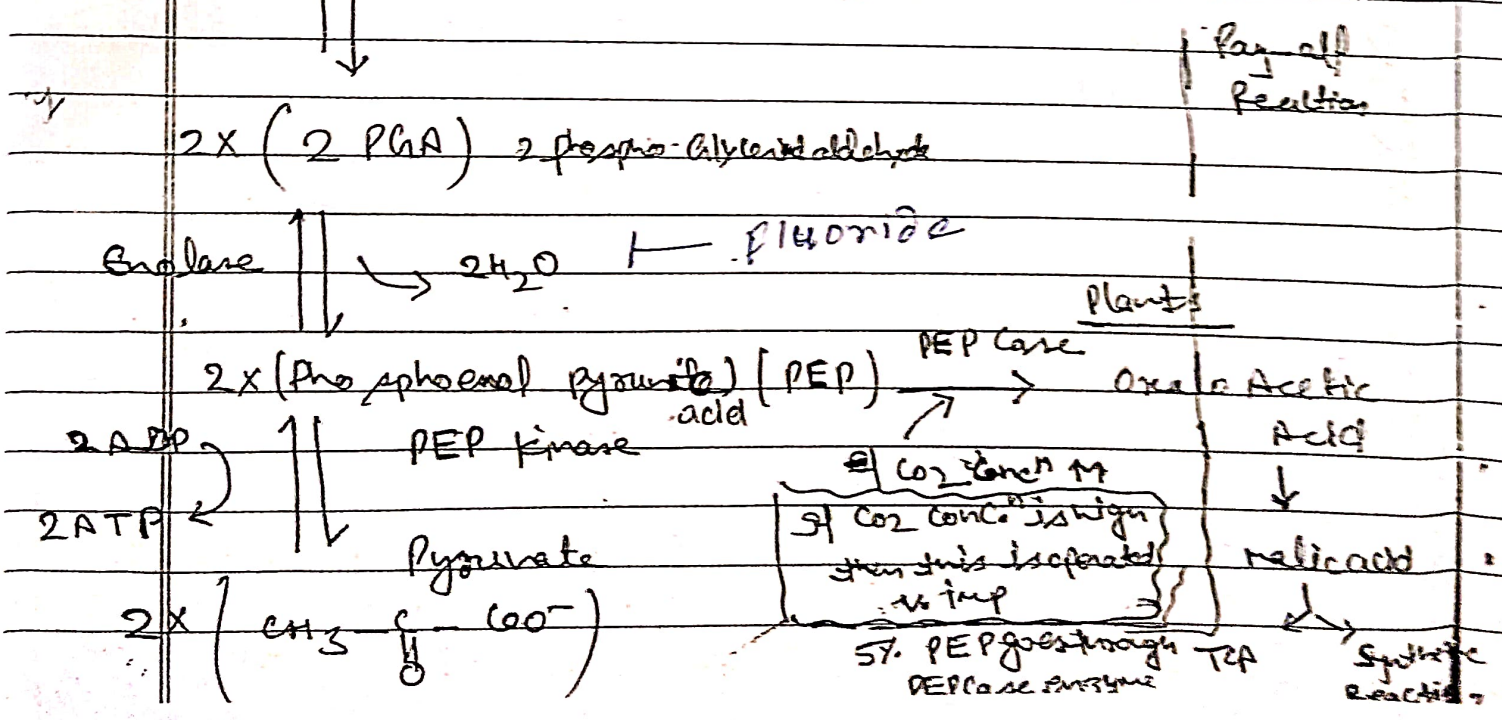
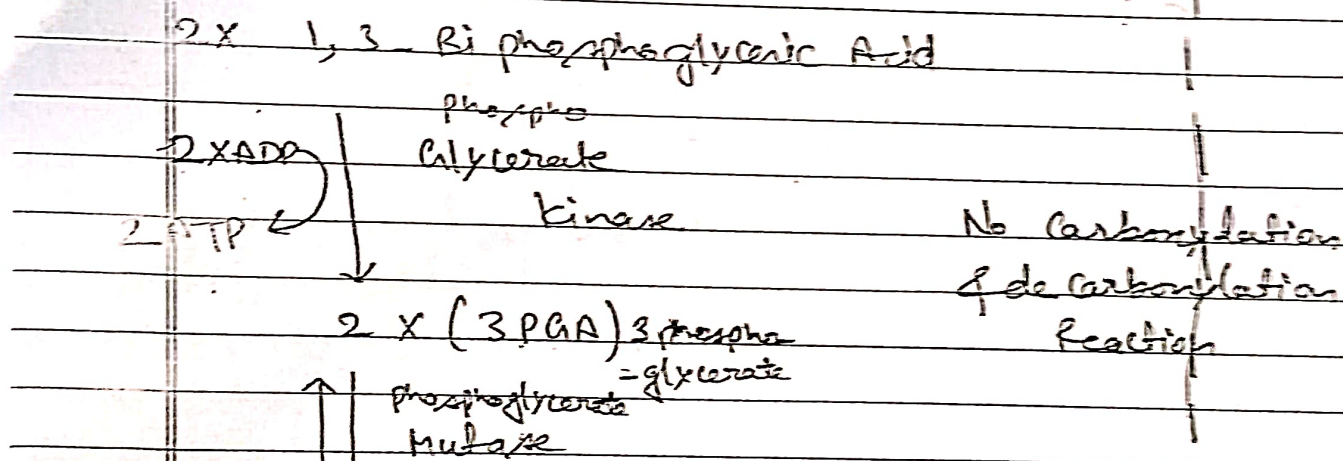
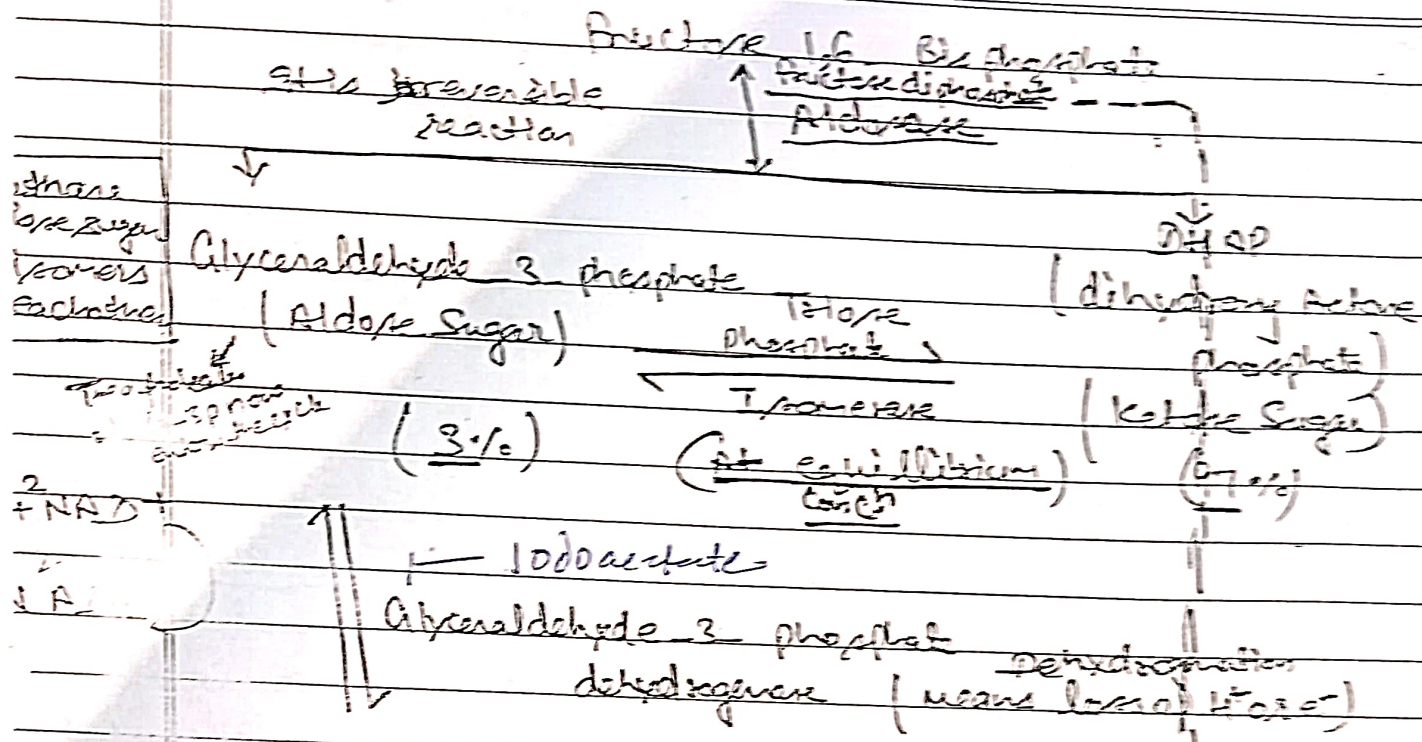
Number of ATP molecule upon oxidation of one reduced co-enzyme.

→ Glycolysis is completed in two phase. First is preparation phase & second is pay-off.



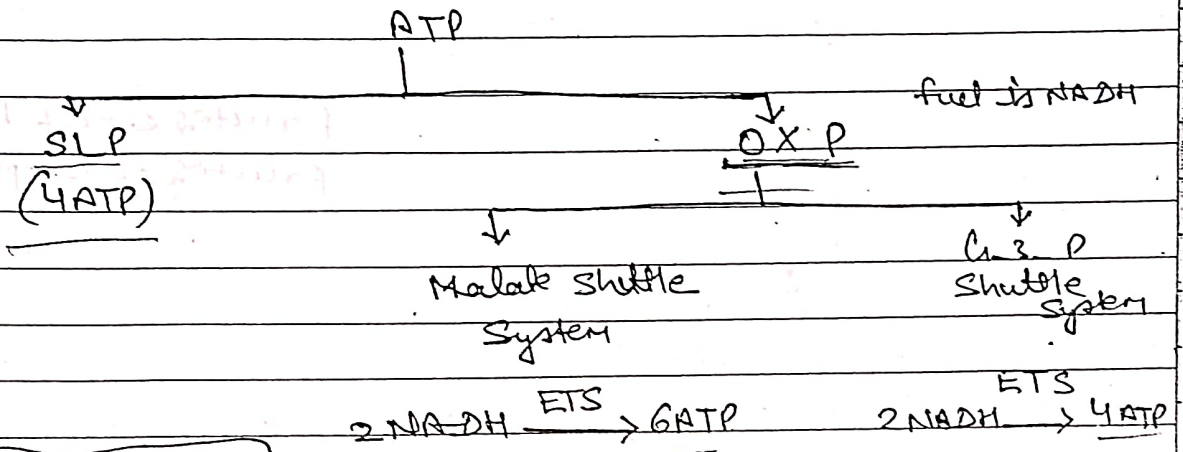
means two different position of carbon where it is used

For every phosphorylation
Energy is required



? Energetics →

Expenditure 2 ATP
Production



4 ATP is produced in Glycolysis
4 2 ATP is lost

Net Yield of Glycolysis →

2 Pyruvate + 2 NADH + 2 ATP

Isoenzyme - Different forms but same function

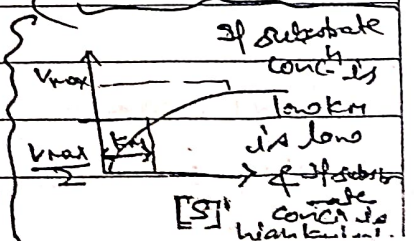
→ Hexokinase, Myokinase & Glucokinase are three isoforms of isoenzymes of Hexokinase

Hexokinase - In plants

Myokinase In Muscles low K_m .

Glucokinase In liver High K_m

K_m is affinity of enzyme for substrate molecule & relationship is inverse ly proportional.



Enzymes which bind other site of enzyme than Active site are called Allosteric enzyme.

Regulation of Glycolysis

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→ Phosphofructokinase - Pacemaker / Rate determining enzyme / Pacesetter

→ Allosteric Enzyme

Inhibitors: ATP, PEP, Citrate
 Promoters: AMP
 All these are Allosteric inhibitors of PFK. Fructose-2,6 biphosphate, Fructose 6-phosphate

ATP → ADP → AMP
 High Conc.ⁿ low Conc.ⁿ ← Conc.ⁿ in cells

→ Slight change in AMP will lead to change in Activity of PFK.

If ATP this is low, AMP is high, PFK is Activated.

→ Upon dehydrogenation of 3-phosphoglycerate the electrical energy of electrons used for phosphorylation

→ PFK, Glucokinase & PEP kinase all three are allosteric enzyme.

→ In plants primary regulation occur at PEP conversion level.

Hexokinase	inhibitor	Activator
PFK	G-6-P	
	Citrate, ATP	

Pyruvate Kinase	Acetyl CoA	ATP	Fructose-1,6 biphosphate
			AMP