

13

Hexose Monophosphate pathway

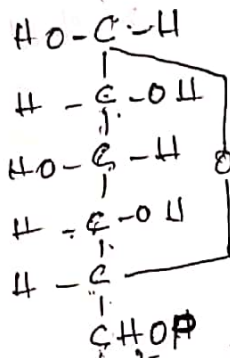
Liver, adipose tissue, erythrocytes, testes, mammary glands

Location: cytosol of

→ It is also called as 'pentose phosphate pathway' or 'phosphogluconate pathway'.

→ This is alternative pathway to glycolysis, and TCA cycle for the oxidation of glucose

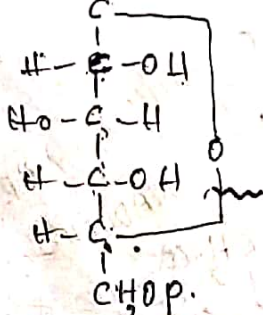
→ 2-phase → Oxidative phase / Non oxidative phase



Glucose-6-phosphate

Dehydrogenation

NADP⁺ / NADPH + H⁺ / H₂ → Glucose-6-phosphate dehydrogenase

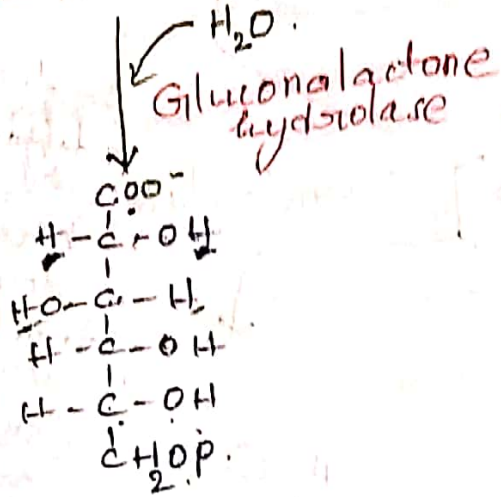


H₂O / H⁺ OH⁻

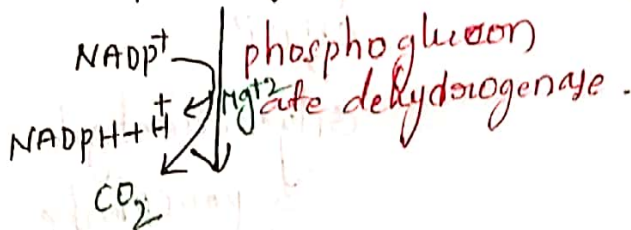
6-phosphogluconolactone

(12) 6-phospho
glucanolate.

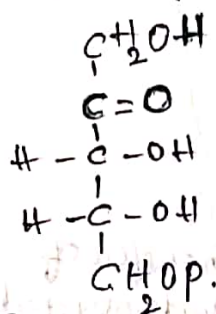
addition of
oxygen



6-phosphoglucuronate:



oxidative decarboxylation
& dehydrogenation
@ 3rd C



phase
oxidative

Ribulose-5-phosphate

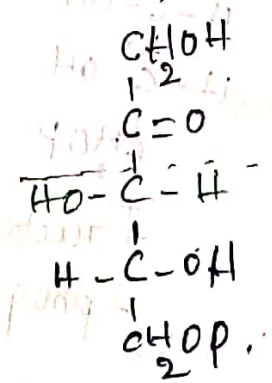
concerned in the
interconversion of
3, 4, 5 & 7 C
monosaccharides.

epimerisation
↓
inter conversion
of configurations

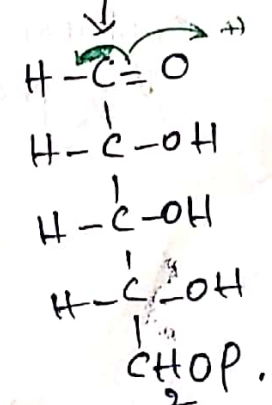
Ribulose-5-P
epimerase

Ribose-5-P-keto
isomerase

Non
oxidative
phase



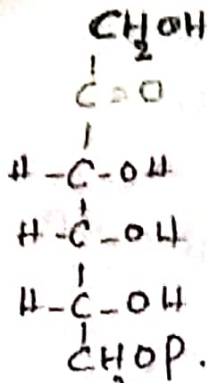
xylulose
-5-phosphate.



Ribose-5-phosphate

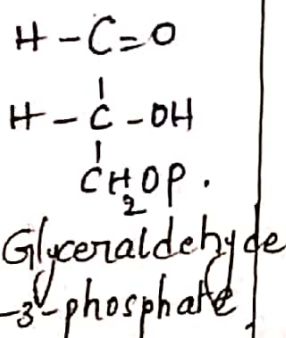
Xylulose 5-P

Ribose-5-phosphate



Fructose-6-phosphate

TPP
Transketolase



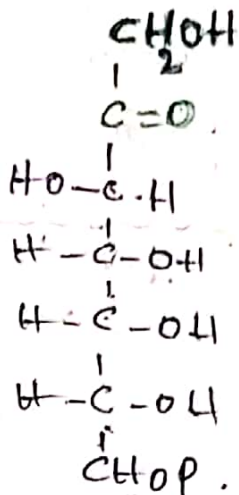
Reversal of glycolysis

Fructose-6-phosphate

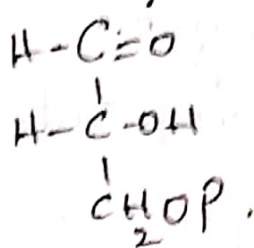
(Pyridoxal phosphate)
TPP

Transketolase

2C glycoldehyde
with 3C ribose
donor
to aldose
acceptor
(CH₂OH)
-C-OH



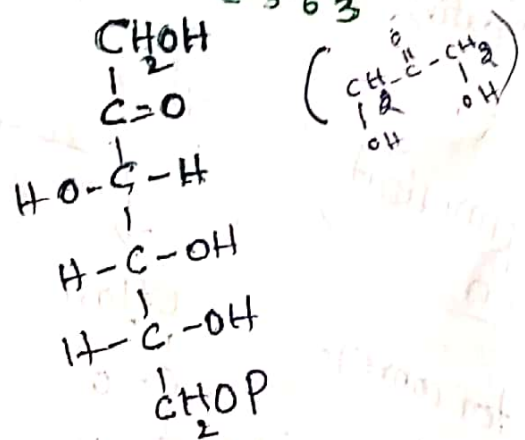
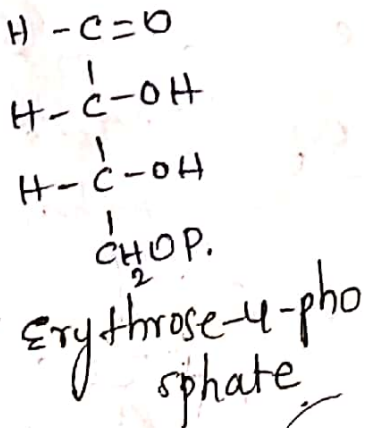
Sedoheptulose 7-phosphate



Glyceraldehyde 3-phosphate

Transaldolase

Transfer of dihydroxyacetone group
(C₃H₆O₃)



Fructose-6-phosphate

(V) Significance of HMP shunt:-

- It is a source of NADPH & Ribose-5-P for Nucleic acid biosynthesis.
- HMP shunt provides Ribose-5-phosphate for the purine biosynthesis.
- In the HMP shunt pathway, few molecules of glycolytic intermediates like G-3-P & F-6-P are produced these are directly involved in glycolysis.