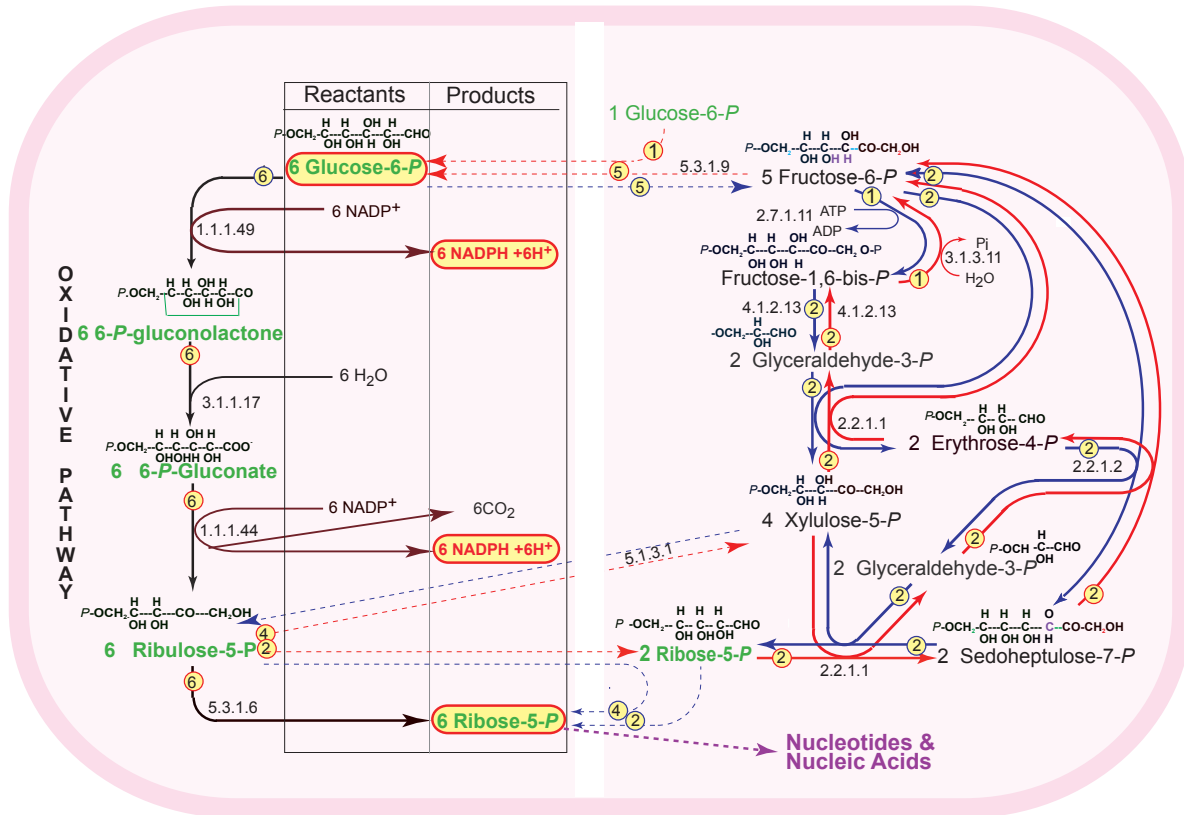


PENTOSE PHOSPHATE PATHWAYS

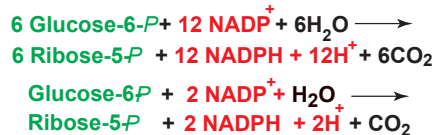
Major functions: To provide reducing power (**NADPH**) for biosynthesis and/or **RIBOSE** for nucleotides

PATHWAY I



PATHWAY I (OXIDATIVE)

Cell requires BOTH **NADH** and **RIBOSE**



NADPH requirements include:

- Fatty acid synthesis and steroid synthesis in liver cytosol
- Regeneration of reduced glutathione to maintain stability of erythrocyte membranes
- Reduction of ribonucleotides to deoxyribonucleotides for DNA

PATHWAYS II and III

Inter- and intra-molecular rearrangements between 3, 4, 5, 6, and 7-carbon sugars, result in the conversion of 5 hexoses into 6 pentoses - and *vice versa* i.e. 5 Glucose-6-P \longleftrightarrow 6 Ribose-5-P

This makes possible the two other Pathways (II and III) in which either **NADPH** or **Ribose** - but not both - are produced.

ENZYMES

- | | |
|---|---|
| 1.1.1.44 Phosphogluconate dehydrogenase (decarboxylating) | 3.1.3.11 Fructose-bisphosphatase |
| 1.1.1.49 Glucose-6-phosphate dehydrogenase | 4.1.2.13 Fructose-bisphosphate aldolase |
| 2.2.1.1 Glycolaldehydetransferase (Transketolase) | 5.1.3.1 Ribulosephosphate epimerase |
| 2.2.1.2 Dihydroxyacetone transferase (Transaldolase) | 5.3.1.1 Triosephosphate isomerase |
| 2.7.1.11 6-Phosphofruktokinase | 5.3.1.6 Ribosephosphate isomerase |
| 3.1.1.17 Gluconolactonase | 5.3.1.9 Glucose-6-phosphate isomerase |

(N.B. 2.2.1.1 Transketolase actually transfers an aldol and 2.2.1.2 Transaldolase transfers a ketol)