

Table 26.1 Pathways requiring NADPH

Synthesis

Fatty acid biosynthesis

Cholesterol biosynthesis

Neurotransmitter biosynthesis

Nucleotide biosynthesis

Detoxification

Reduction of oxidized glutathione

Cytochrome P450 monooxygenases

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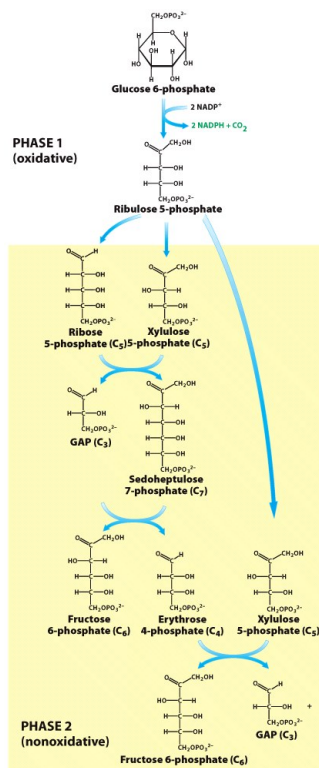


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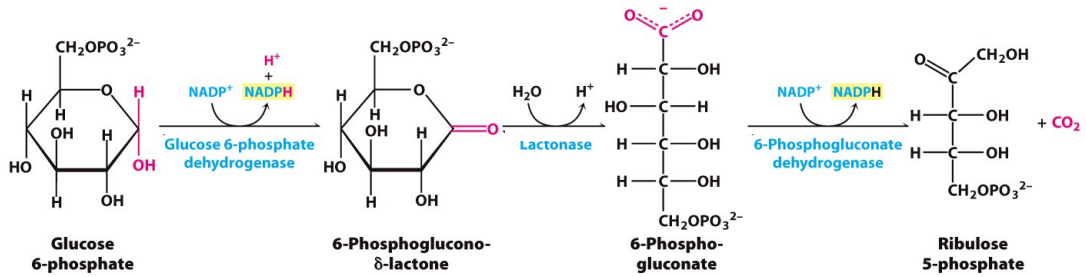
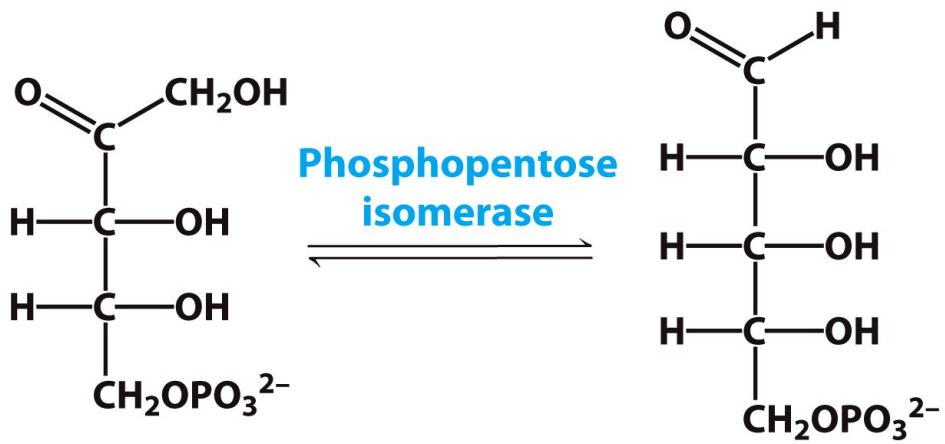


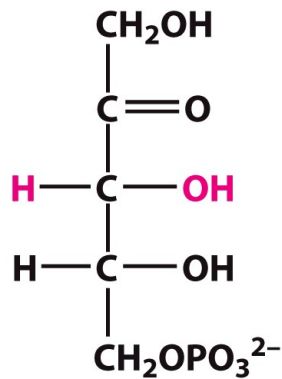
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3



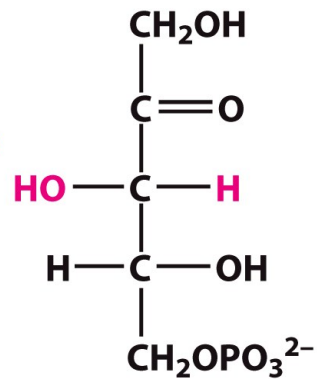
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Ribulose 5-phosphate

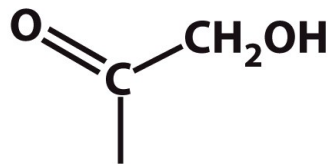
Phosphopentose
epimerase



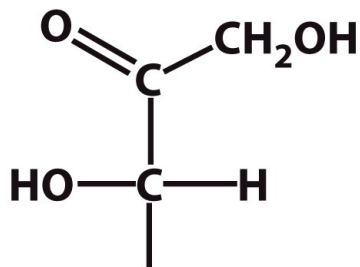
Xylulose 5-phosphate

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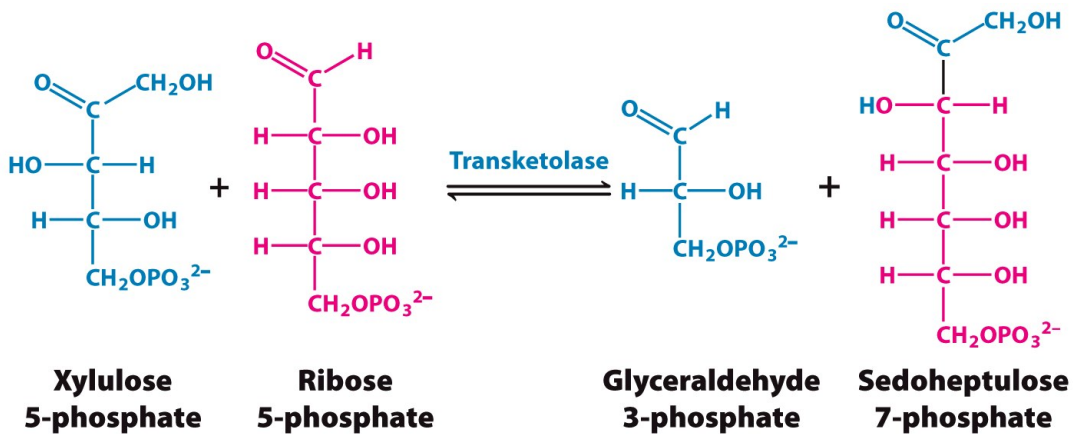
Transferred by transketolase



Transferred by transaldolase

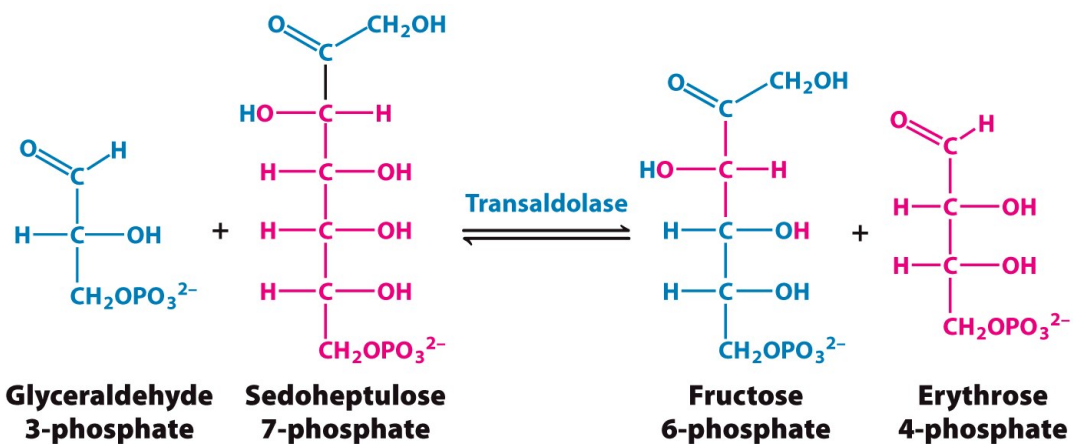
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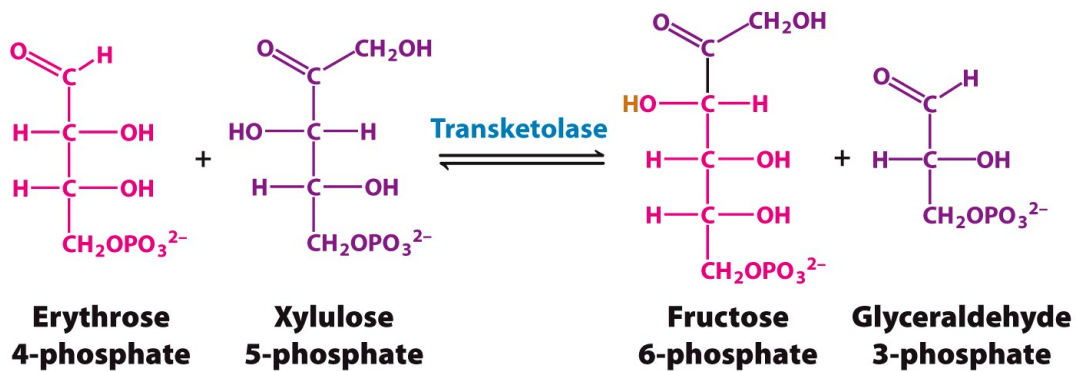
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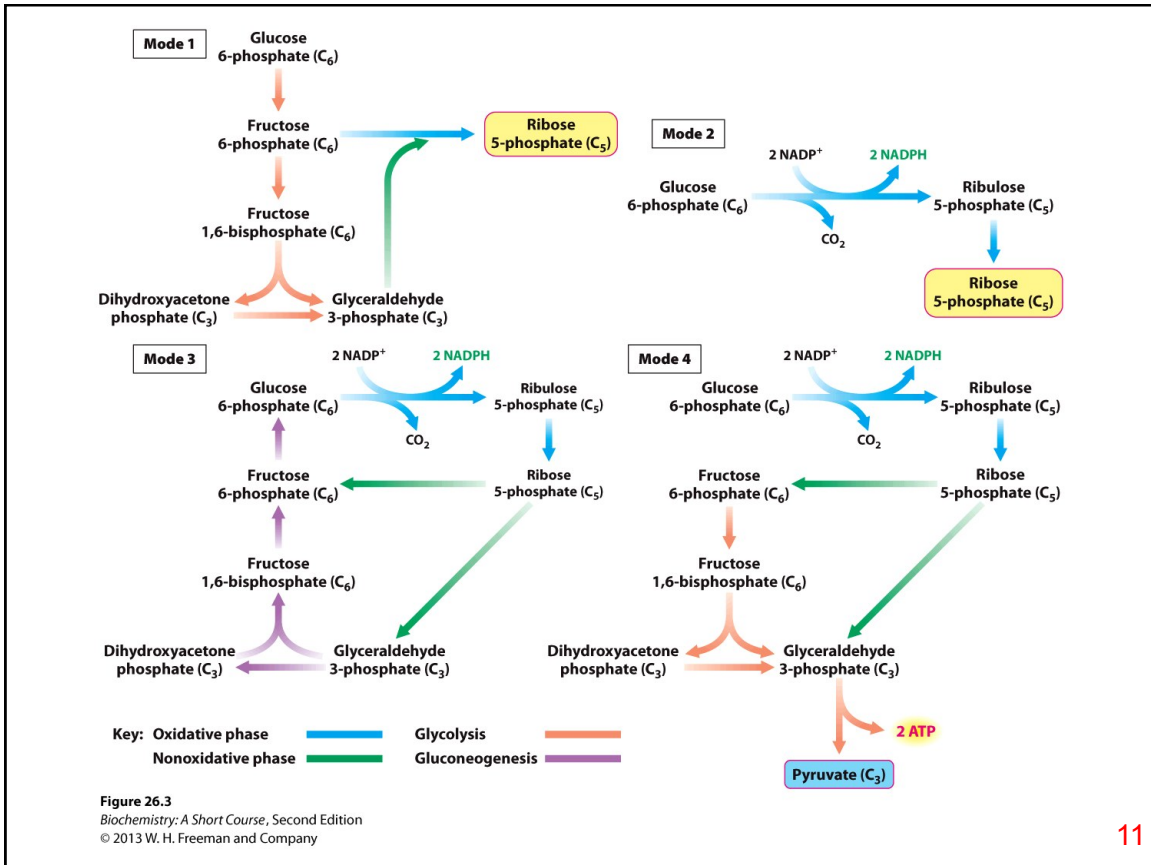
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Table 26.2 The pentose phosphate pathway

Reaction	Enzyme
Oxidative phase	
Glucose 6-phosphate + NADP ⁺ → 6-phosphoglucono-δ-lactone + NADPH + H ⁺	Glucose 6-phosphate dehydrogenase
6-Phosphoglucono-δ-lactone + H ₂ O → 6-phosphogluconate + H ⁺	Lactonase
6-Phosphogluconate + NADP ⁺ → ribulose 5-phosphate + CO ₂ + NADPH	6-Phosphogluconate dehydrogenase
Nonoxidative phase	
Ribulose 5-phosphate ⇌ ribose 5-phosphate	Phosphopentose isomerase
Ribulose 5-phosphate ⇌ xylulose 5-phosphate	Phosphopentose epimerase
Xylulose 5-phosphate + ribose 5-phosphate ⇌ sedoheptulose 7-phosphate + glyceraldehyde 3-phosphate	Transketolase
Sedoheptulose 7-phosphate + glyceraldehyde 3-phosphate ⇌ fructose 6-phosphate + erythrose 4-phosphate	Transaldolase
Xylulose 5-phosphate + erythrose 4-phosphate ⇌ fructose 6-phosphate + glyceraldehyde 3-phosphate	Transketolase

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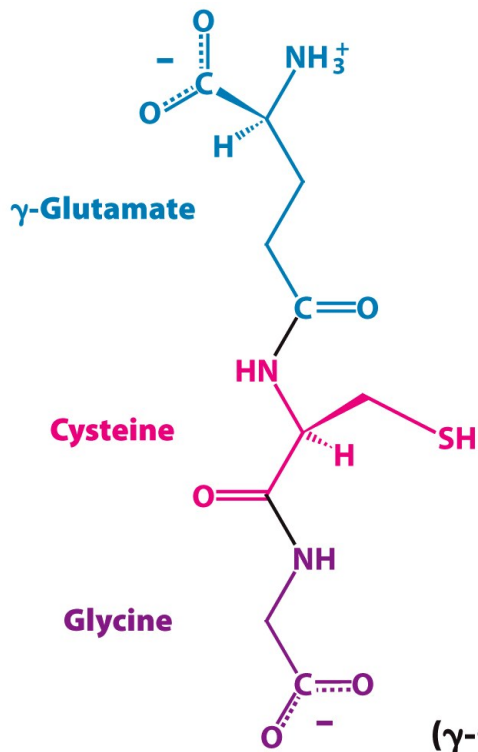
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Table 26.3 Tissues with active pentose phosphate pathways

Tissue	Function
Adrenal glands	Steroid synthesis
Liver	Fatty acid and cholesterol synthesis
Testes	Steroid synthesis
Adipose tissue	Fatty acid synthesis
Ovaries	Steroid synthesis
Mammary glands	Fatty acid synthesis
Red blood cells	Maintenance of reduced glutathione

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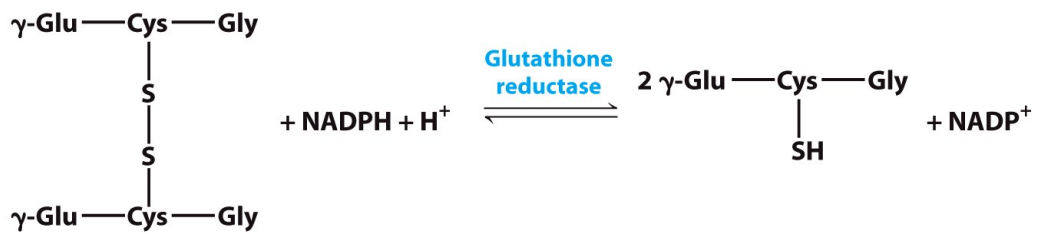
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Glutathione (reduced)
(γ-Glutamylcysteinylglycine)

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