

# **Table 26.1 Pathways requiring NADPH**

## **Synthesis**

**Fatty acid biosynthesis**

**Cholesterol biosynthesis**

**Neurotransmitter biosynthesis**

**Nucleotide biosynthesis**

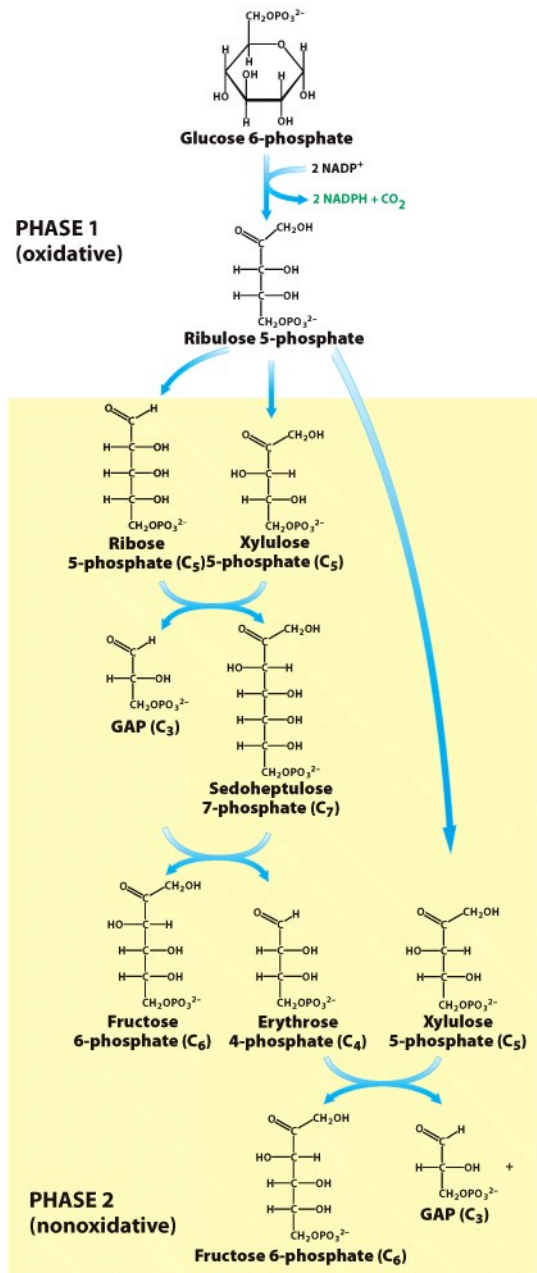
## **Detoxification**

**Reduction of oxidized glutathione**

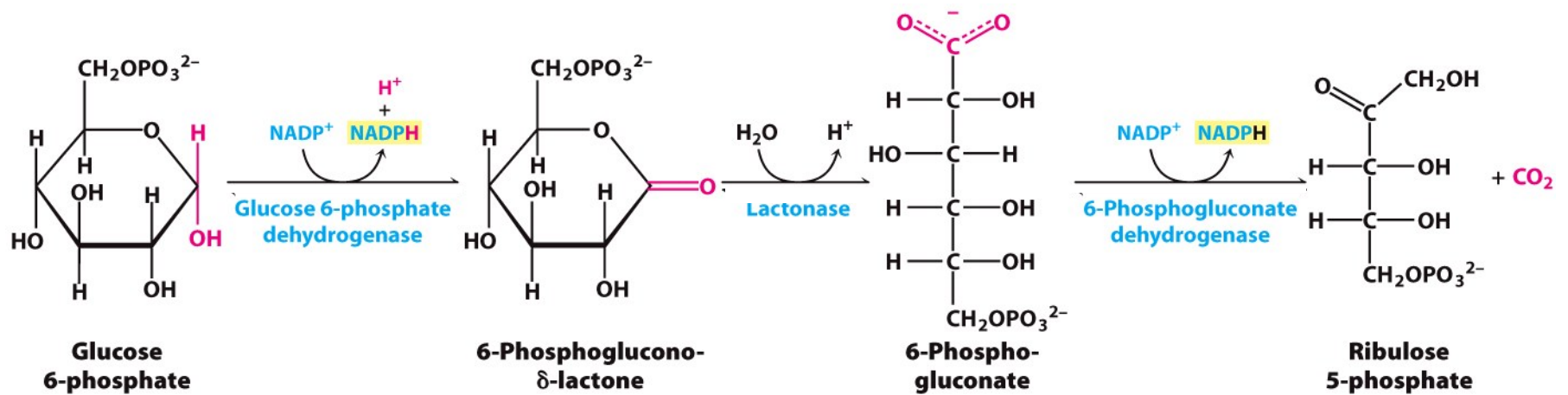
**Cytochrome P450 monooxygenases**

**Table 26.1**

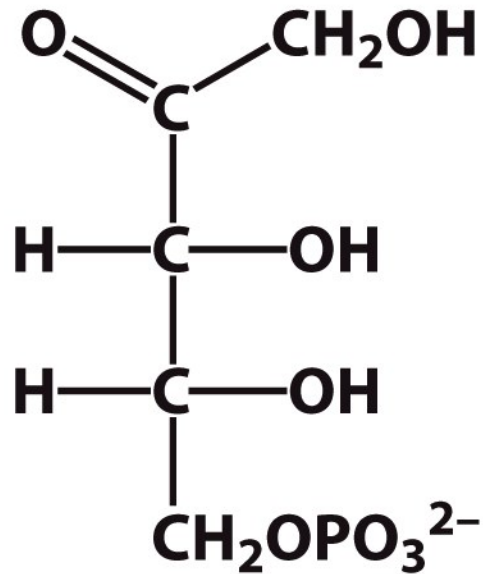
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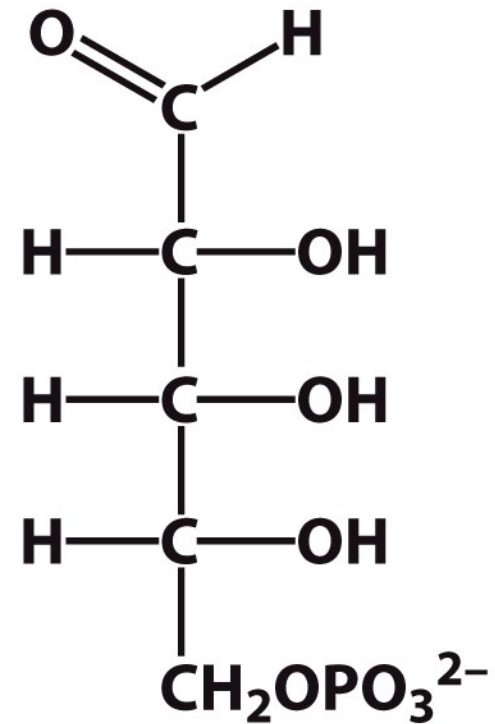
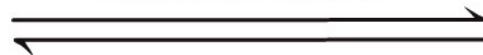
**Figure 26.1**  
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**Figure 26.2**  
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Phosphopentose  
isomerase



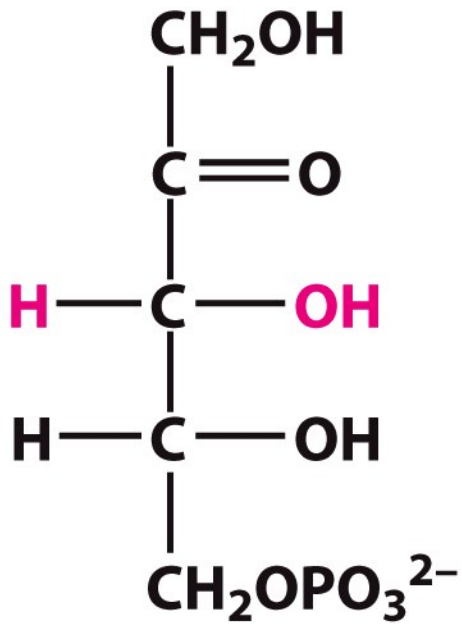
**Ribulose 5-phosphate**

**Ribose 5-phosphate**

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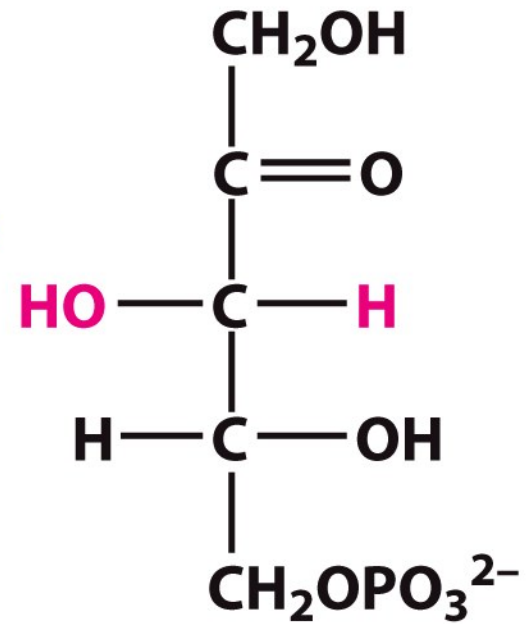
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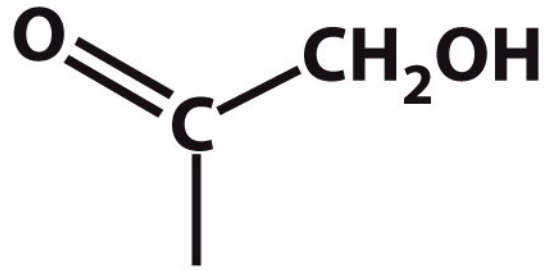


**Ribulose 5-phosphate**

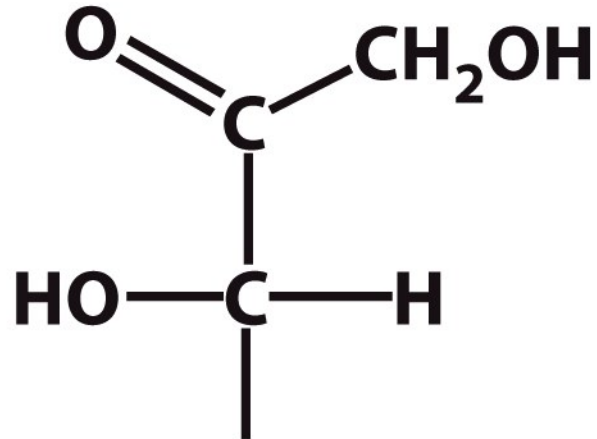
Phosphopentose  
epimerase



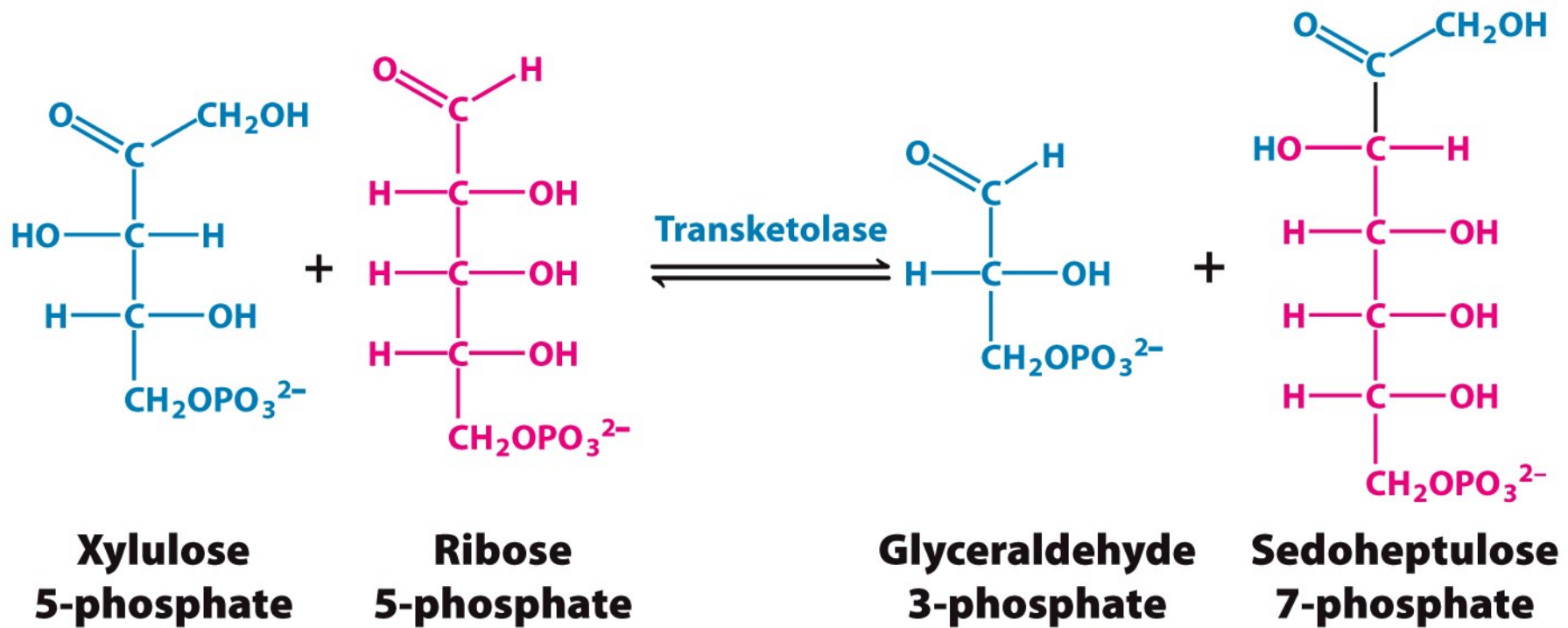
**Xylulose 5-phosphate**



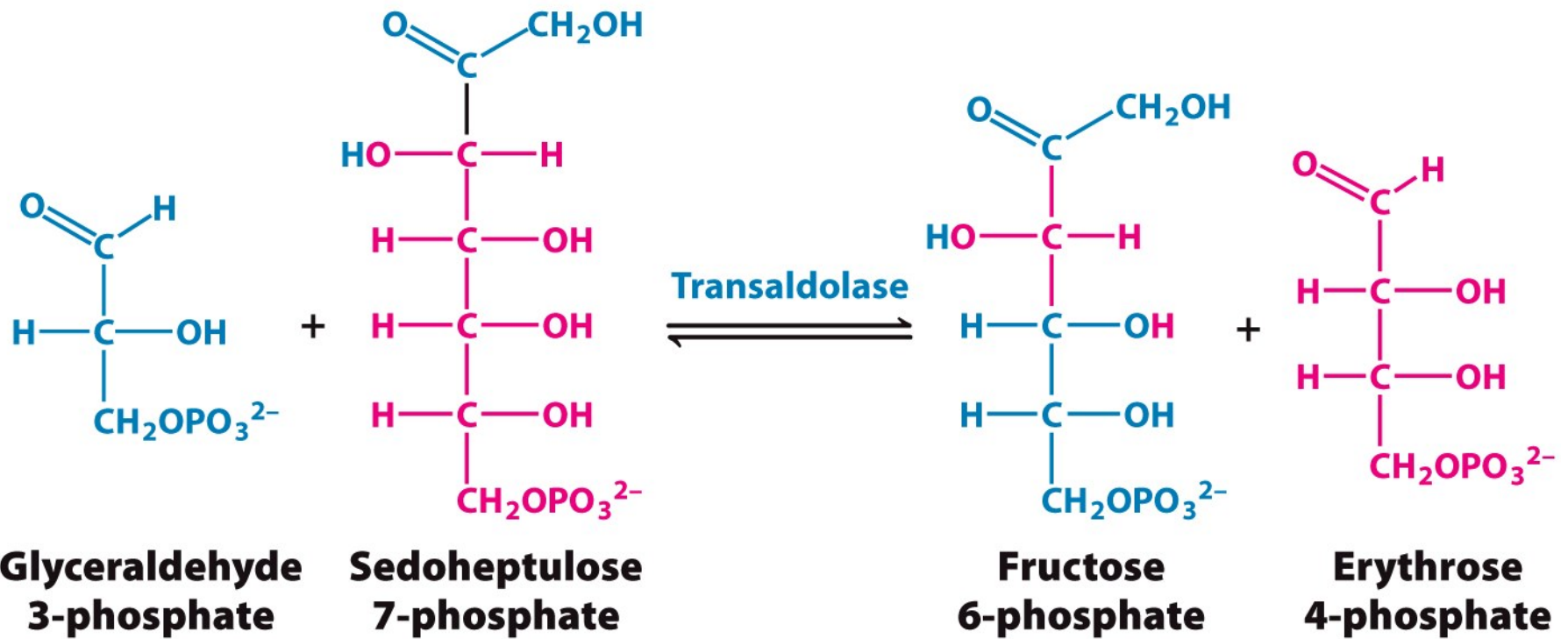
**Transferred by transketolase**



**Transferred by transaldolase**

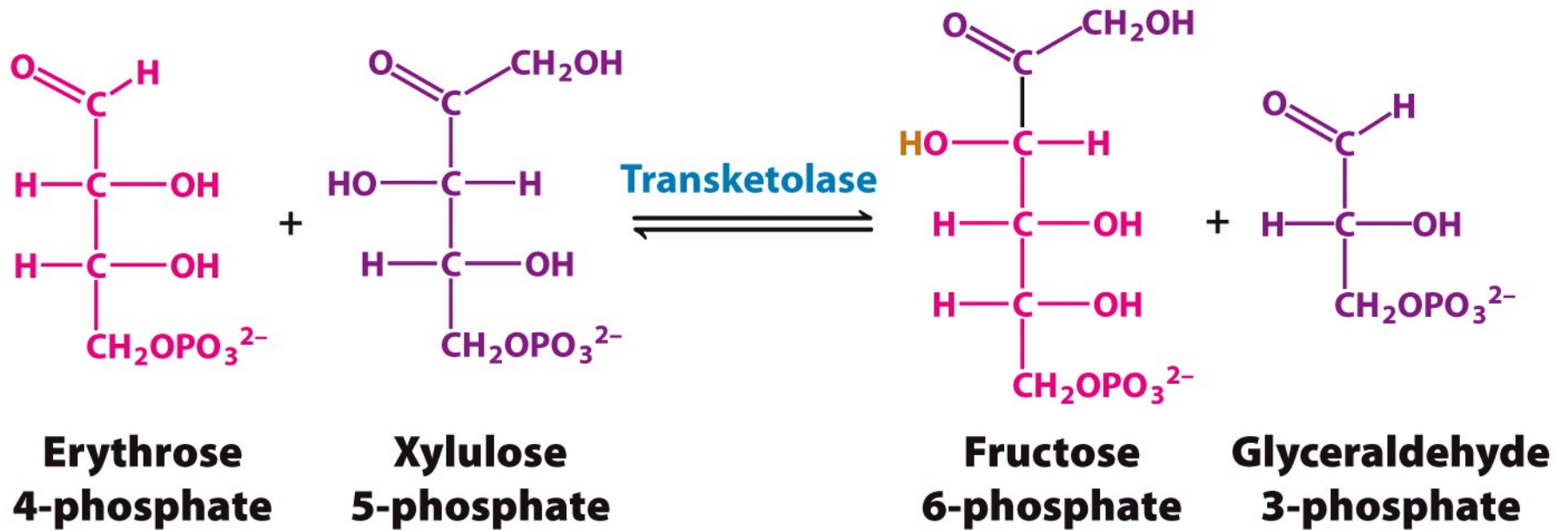


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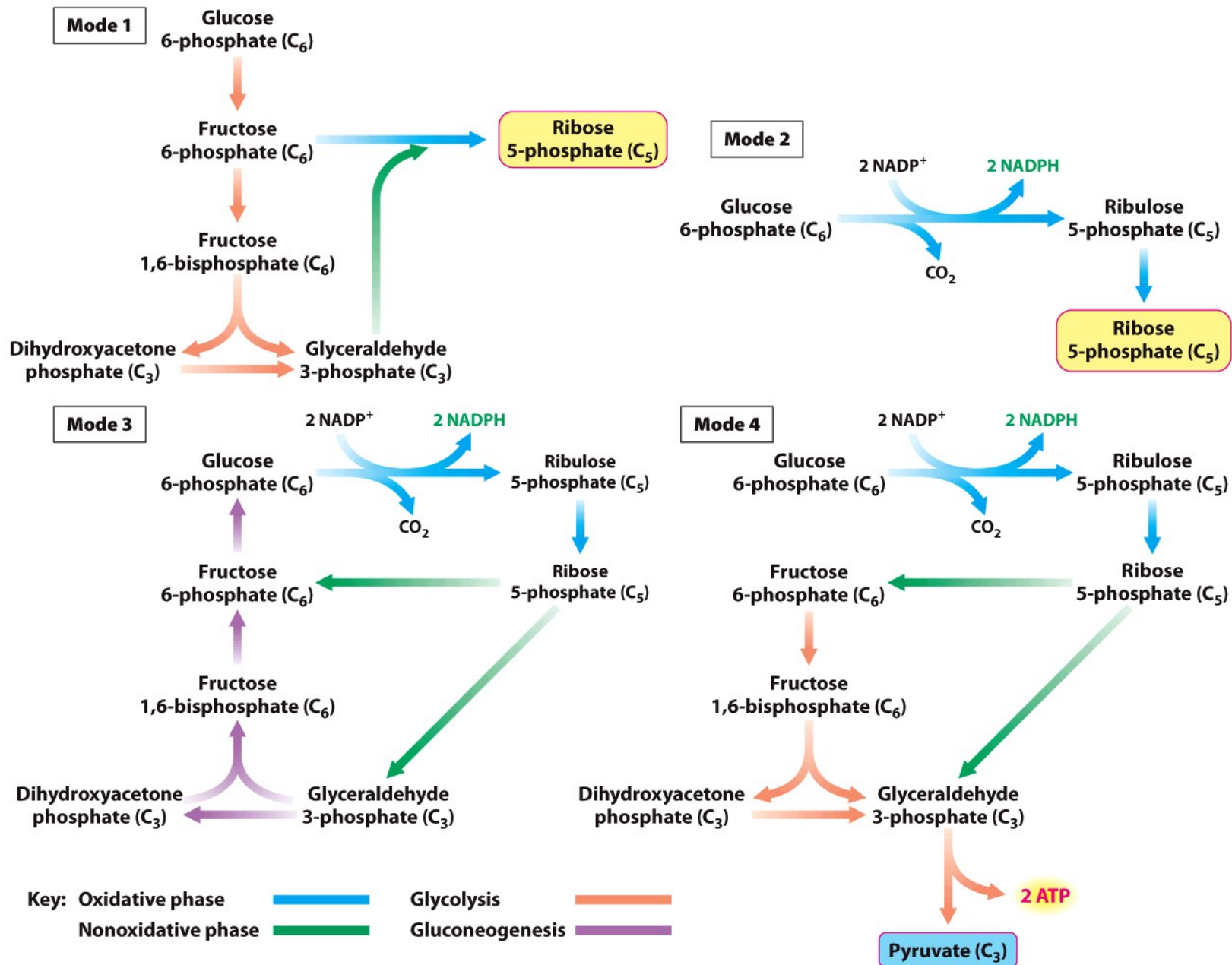
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**Table 26.2** The pentose phosphate pathway

Reaction	Enzyme
<b>Oxidative phase</b>	
Glucose 6-phosphate + NADP <sup>+</sup> → 6-phosphoglucono-δ-lactone + NADPH + H <sup>+</sup>	Glucose 6-phosphate dehydrogenase
6-Phosphoglucono-δ-lactone + H <sub>2</sub> O → 6-phosphogluconate + H <sup>+</sup>	Lactonase
6-Phosphogluconate + NADP <sup>+</sup> → ribulose 5-phosphate + CO <sub>2</sub> + NADPH	6-Phosphogluconate dehydrogenase
<b>Nonoxidative phase</b>	
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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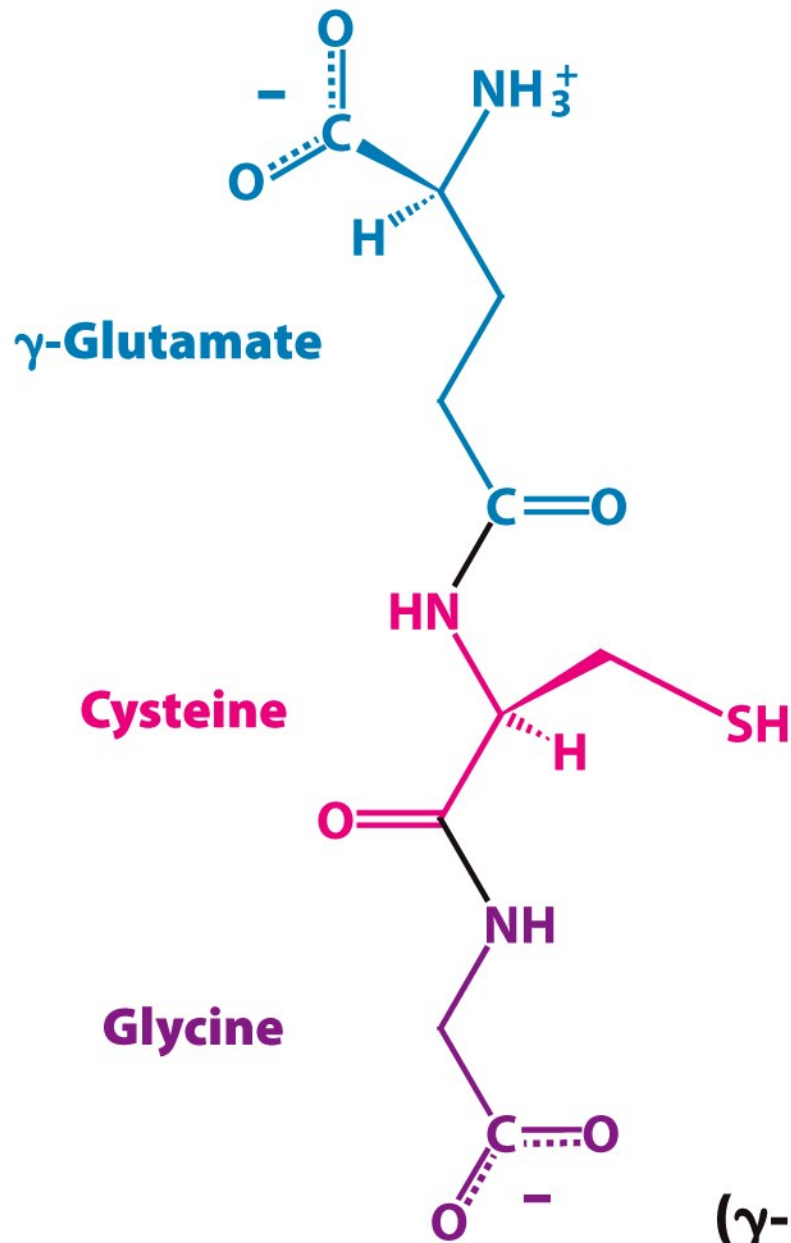


**Figure 26.3**  
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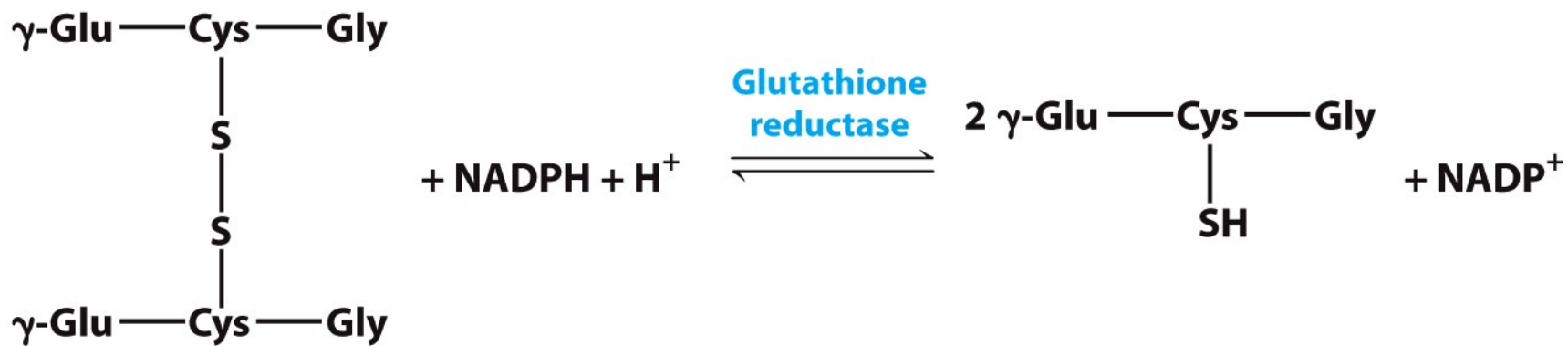
**Table 26.3** Tissues with active pentose phosphate pathways

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

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**Glutathione (reduced)**  
**( $\gamma$ -Glutamylcysteinylglycine)**



**Oxidized glutathione (GSSG)**

**Reduced glutathione (GSH)**

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