

Via das Pentose Fosfatos

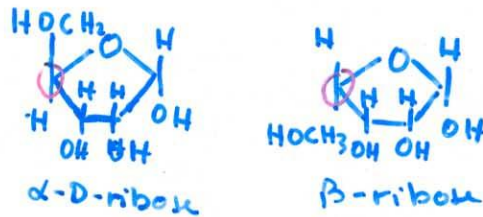
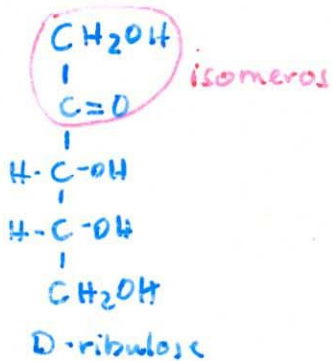
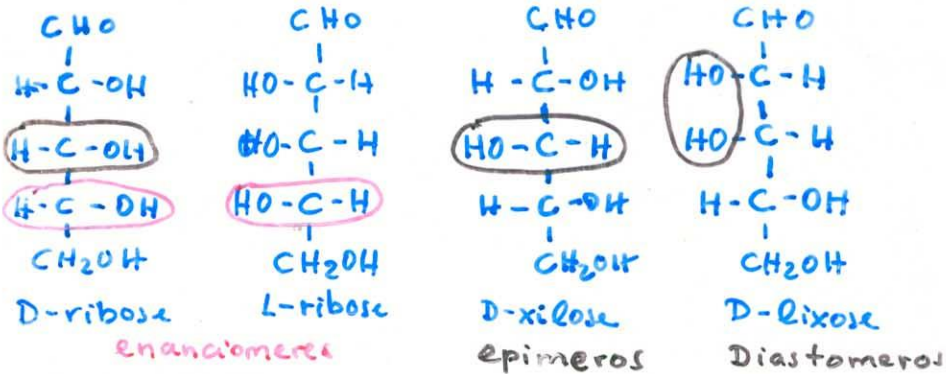
**Geração de NADPH
e riboses**

Prof. Henning Ulrich

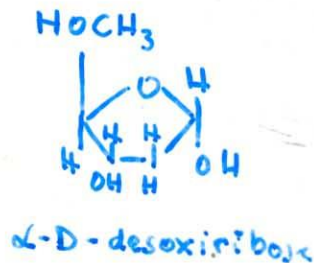
4.

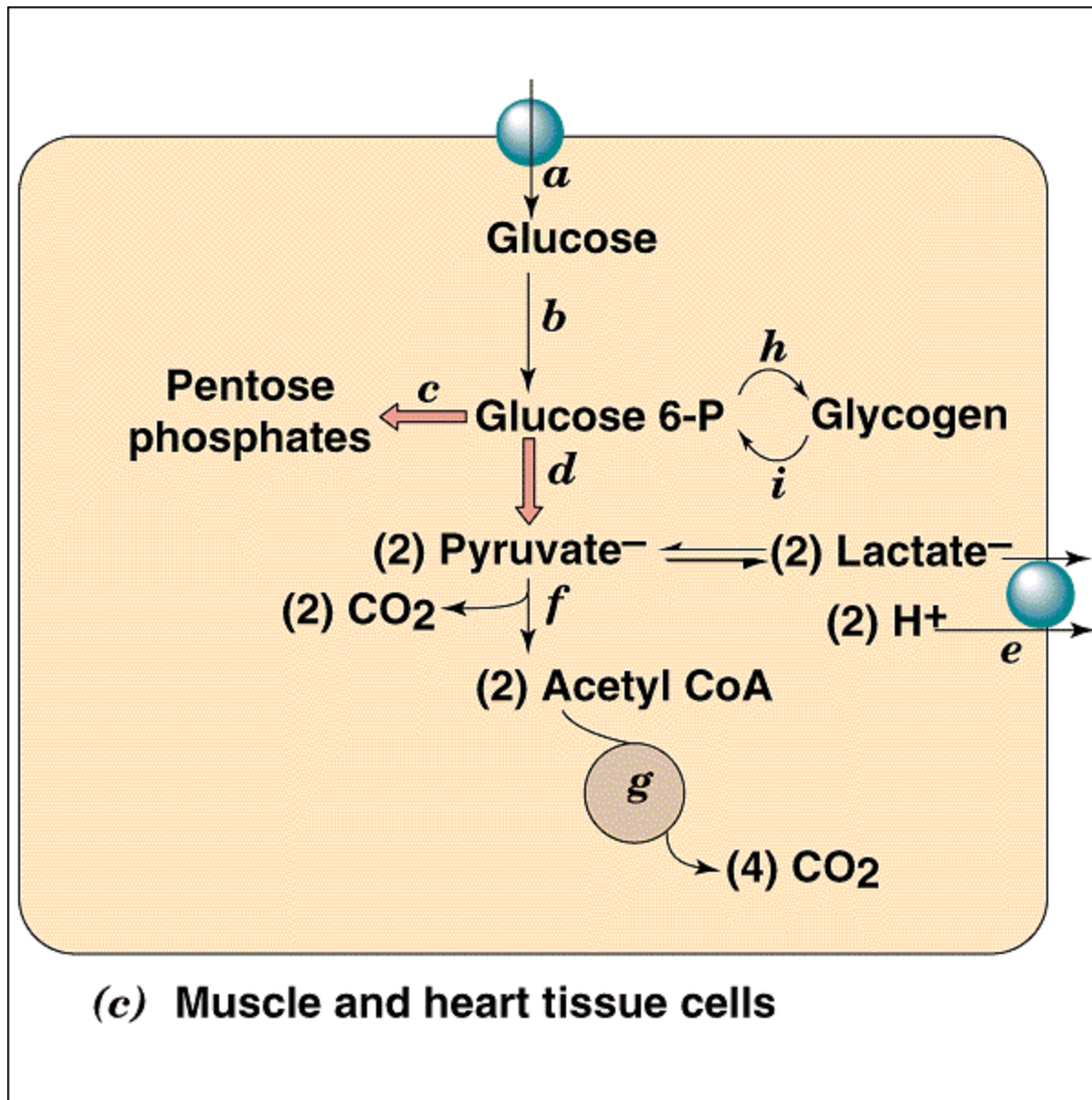
Estereoisômeros / diastômeros / epimeros / enantiômeros

Enantiômero: forma D ou L feita de acordo com a convenção de **Fischer** (forma L - imagem especular da forma D. O centro assimétrico na configuração do D-gliceraldeído)



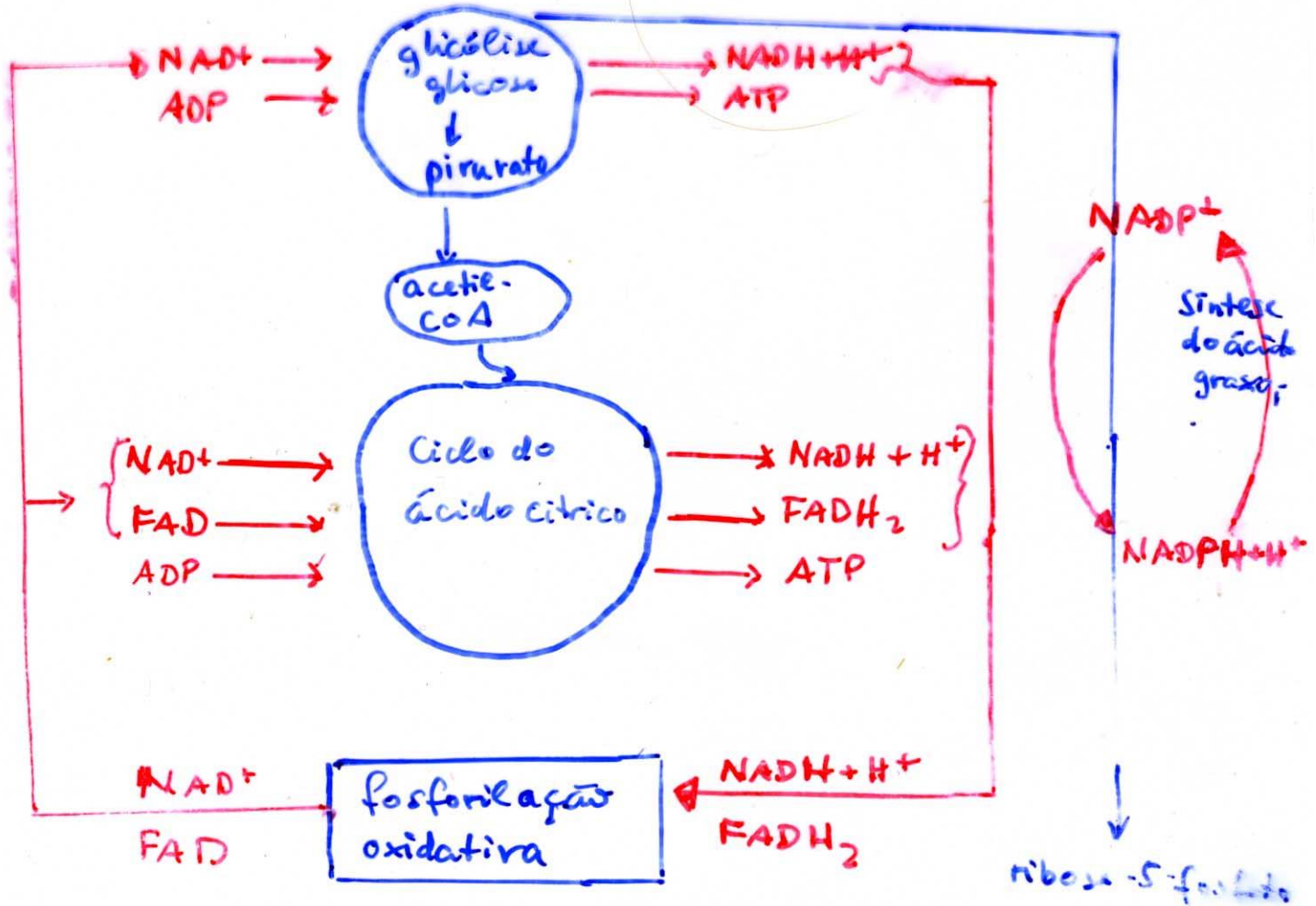
estereoisômeros (configuração do átomo carbonílico) → anomeros





(0)

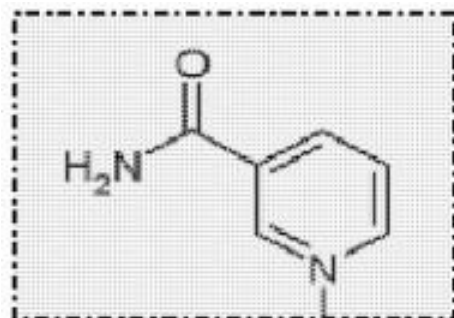
Metabolismo e formação de cofatores com potencial redutor.



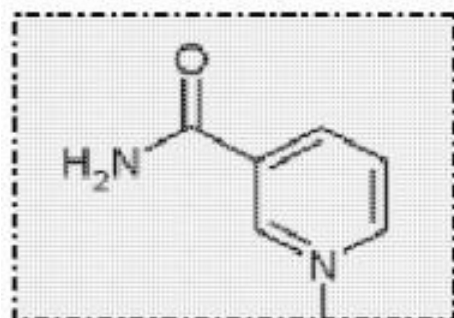
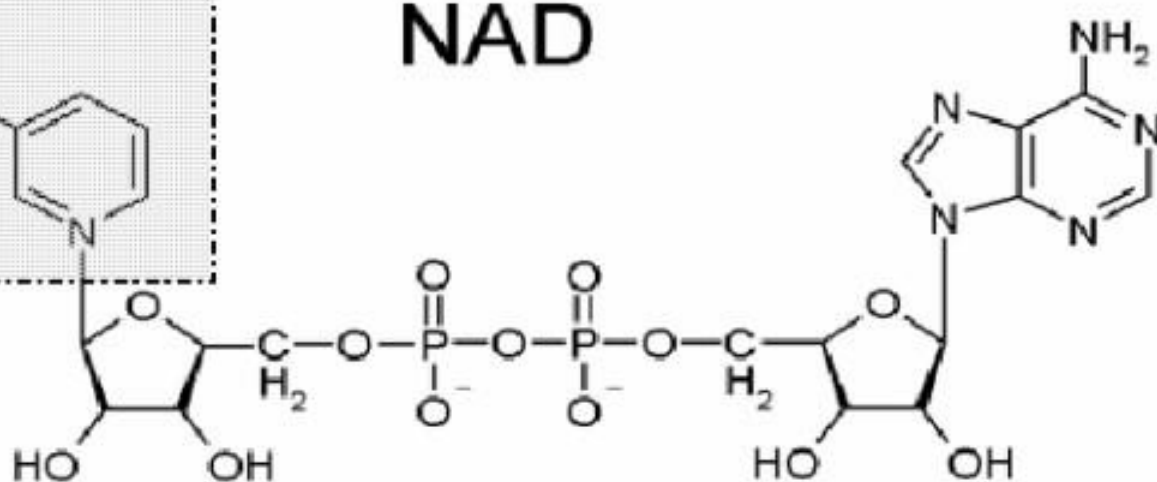
$\text{NAD}^+ \neq \text{NADP}^+$

$\text{NADH} \rightarrow$ oxidado na cadeia respiratória \rightarrow ATP

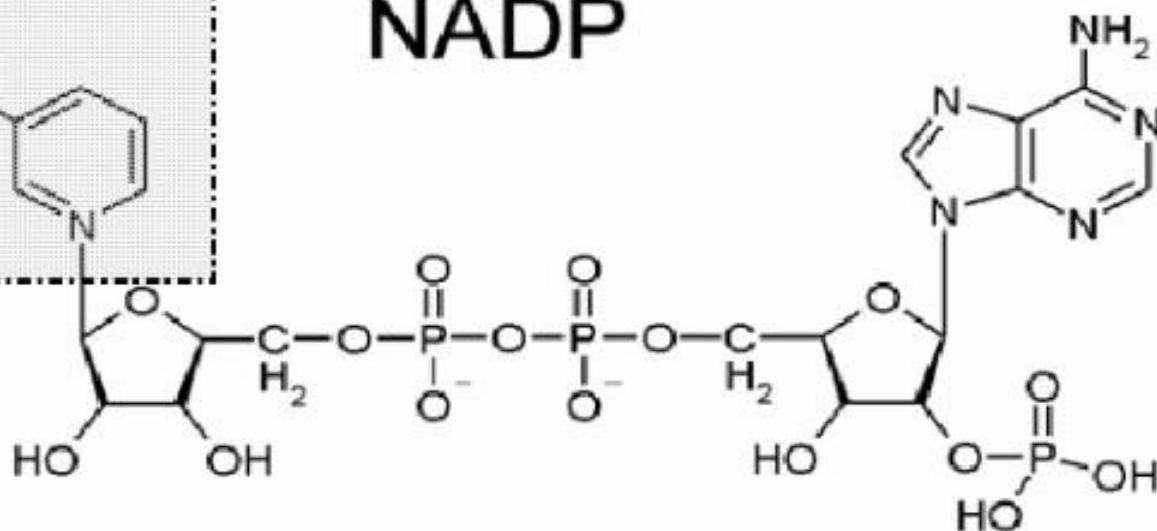
$\text{NADPH} \rightarrow$ doador de elétrons (Hidreto) nas biossínteses redutivas



NAD

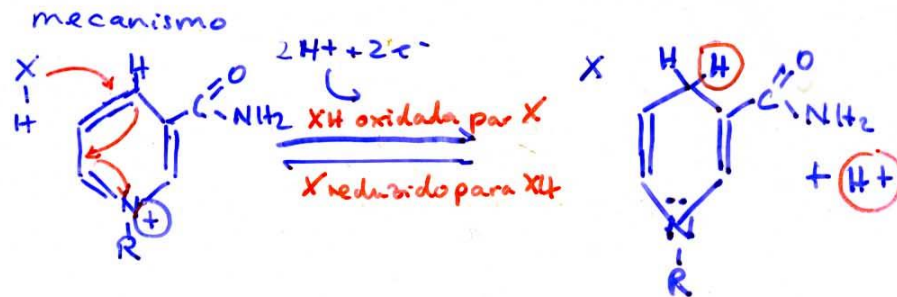
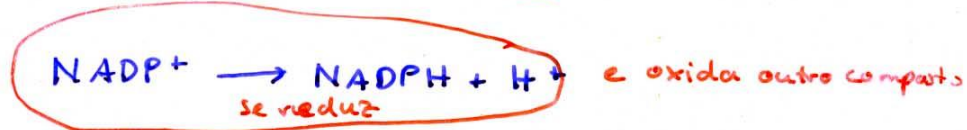
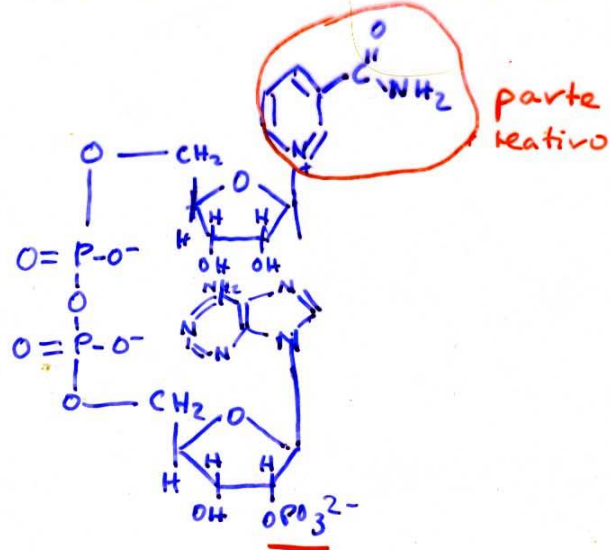


NADP



5.

Reações de oxidação e redução do NADP⁺
para NADPH + H⁺ (nicotinamida - adenina - dinucleotídeo
fosfato)

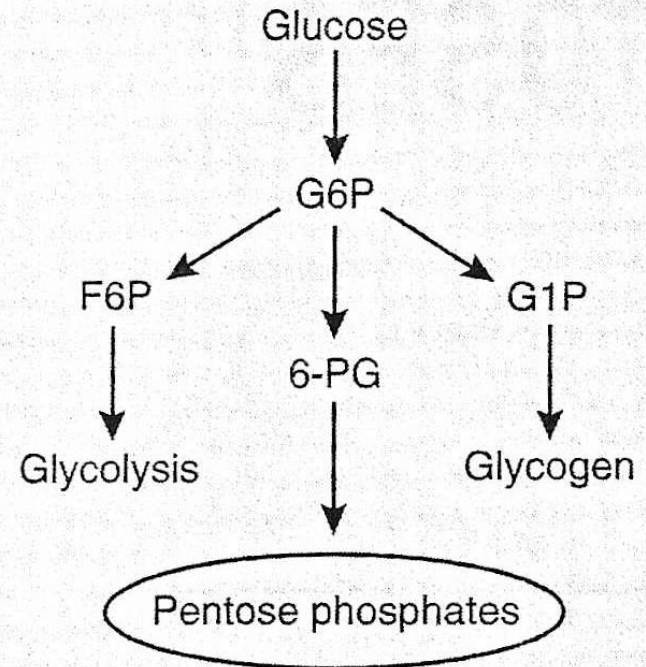


transferência de dois elétrons e um próton
do substrato para NADP⁺; o outro próton
está liberado no meio.

Via das pentose fosfatos

- Função
 - Produção de riboses
 - Produção de potencial redutor
 - Vias de síntese
 - Importante para anti-oxidantes celulares
 - Síntese de riboses
 - Ácidos nucleicos e nucleotídeos

The Pentose Phosphate Pathway Starts with G6P



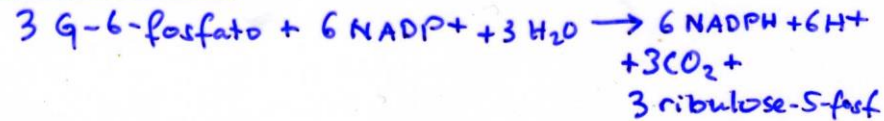
2.

Os passos da via de pentose fosfato

Primeiro estágio: irreversível

Reações oxidativas \rightarrow NADPH + H⁺ e ribulose-5-fosfato

Reação total:



Segundo estágio:

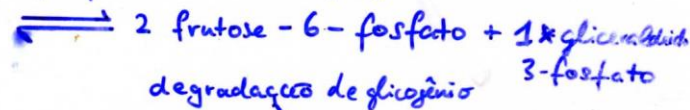
Reações de isomerização e epimerização



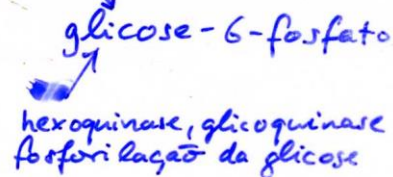
Terceiro estágio:

Clivagem e formação de ligação carbono-carbono

2 Xilulose-5 fosfato + 1 ribose-5 fosfato



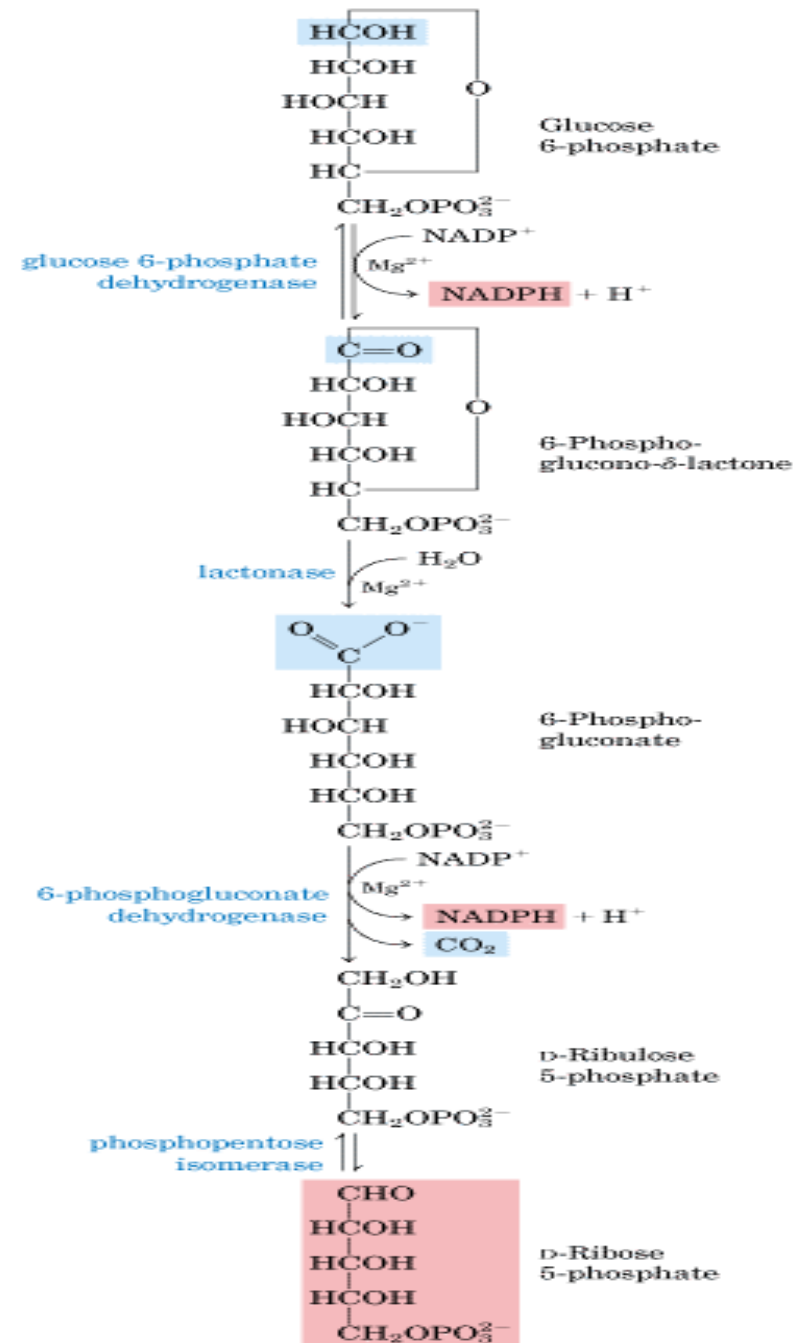
Ponto de partida:



Soma de reações:

- ① $3 \text{ glicose-6-fosfato} + 6 \text{ NADP}^+ \rightarrow 3 \text{ ribulose-5-f} + 3 \text{ CO}_2 + 6 \text{ NADPH} + 6 \text{ H}^+$
- ② $3 \text{ ribulose-5-fosfato} \rightarrow 2 \text{ xilulose-5-f} + \text{ribose-5-f}$
- ③ $2 \text{ xilulose-5-f.} + \text{ribose-5-f.} \rightarrow 2 \text{ frutose-6-p} + \text{gliceraldeído-3P}$

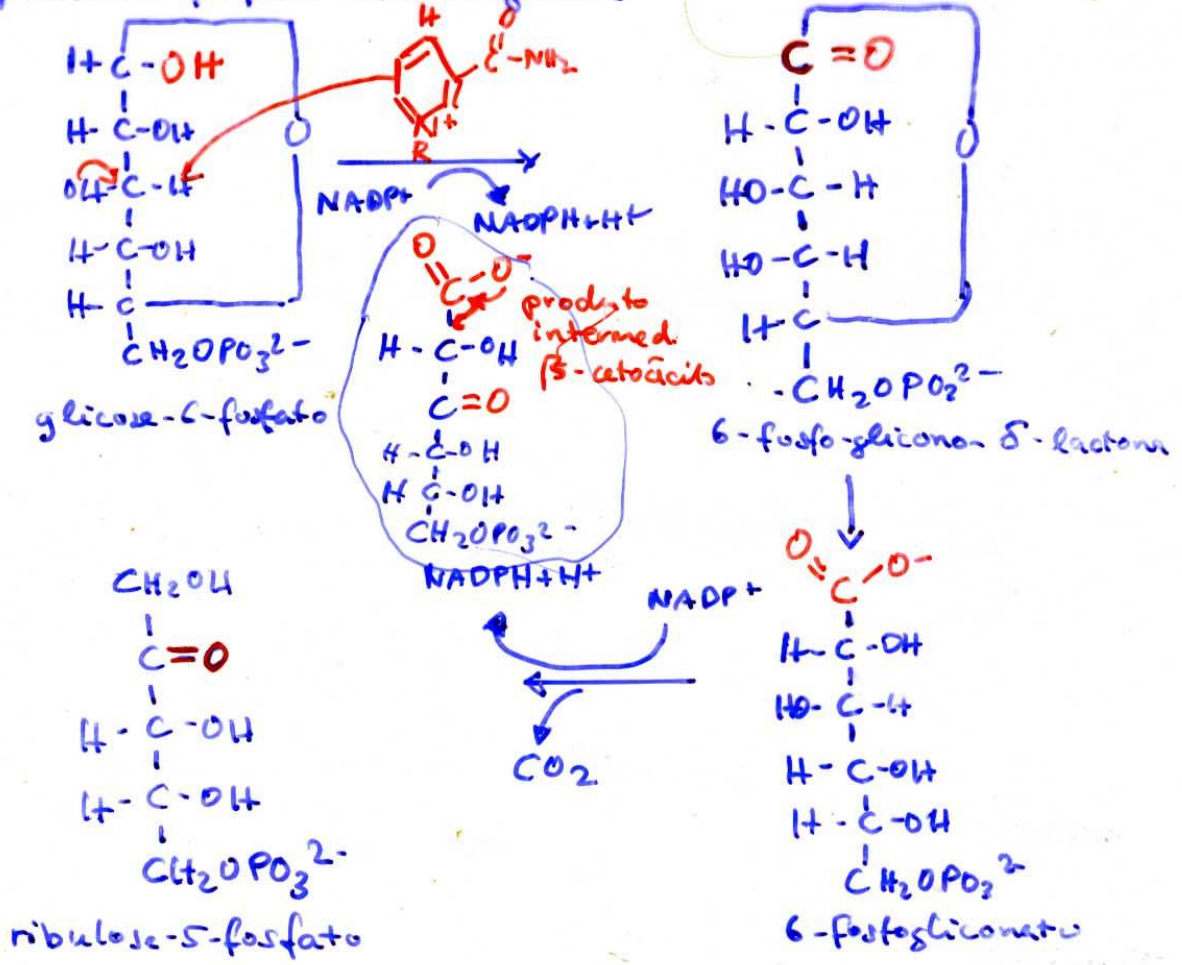
Etapas da via das pentoses



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1. Estágio : A reação oxidativa
glicose-6-fosfato-desidrogenase

catalisada pela



Pontos de regulação

- controlados pela velocidade da reação de glicose-6-fosfato desidrogenase
- disponibilidade do substrato (NADP+)

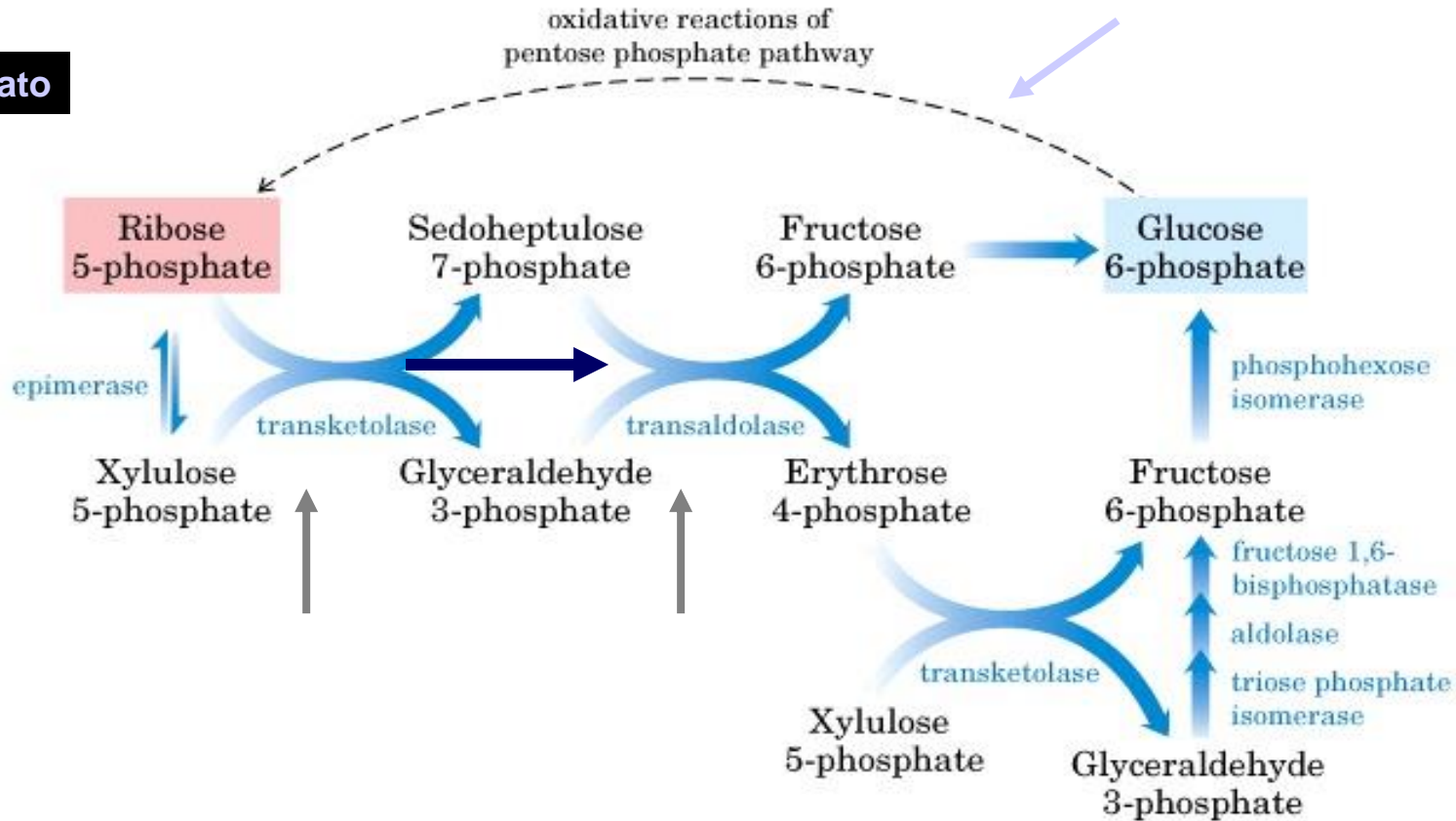
Regulação da via das pentoses -fosfato

As partes oxidativa e não oxidativa da via podem ser acionadas separadamente

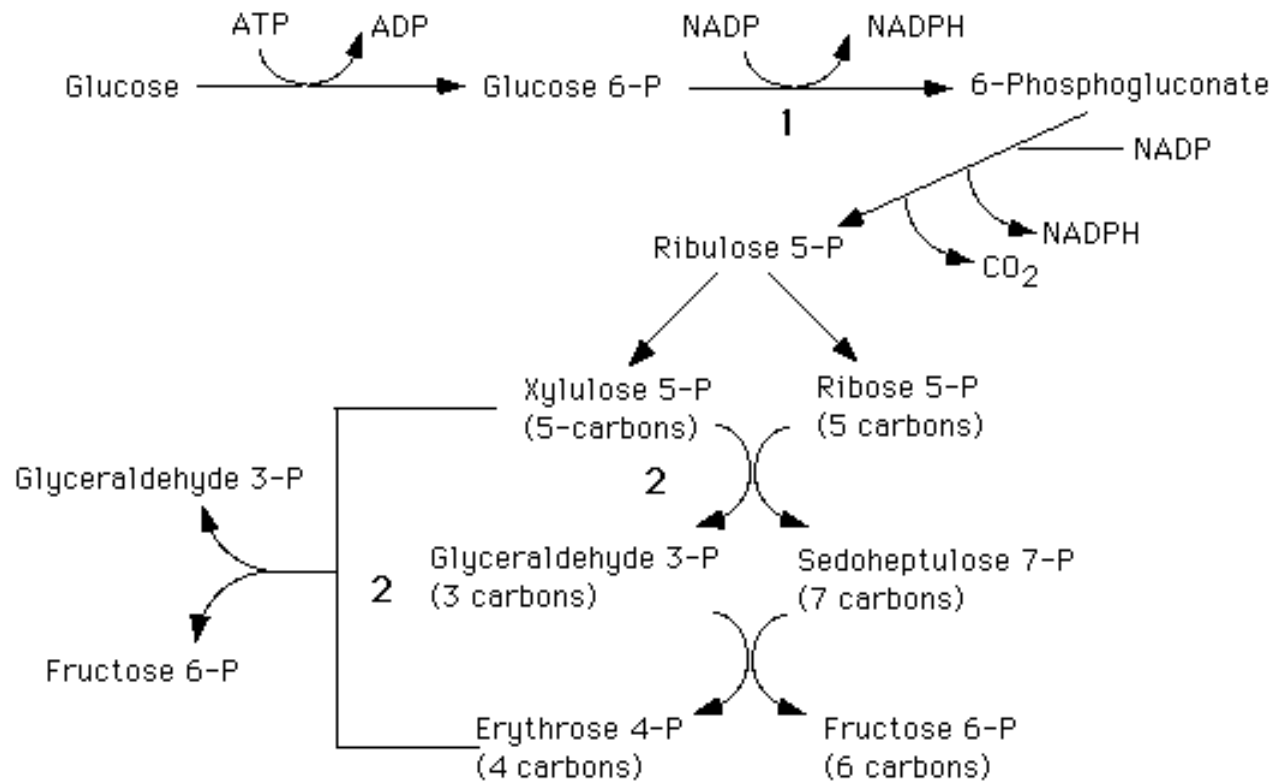
NAPH e Ribose 5-fosfato

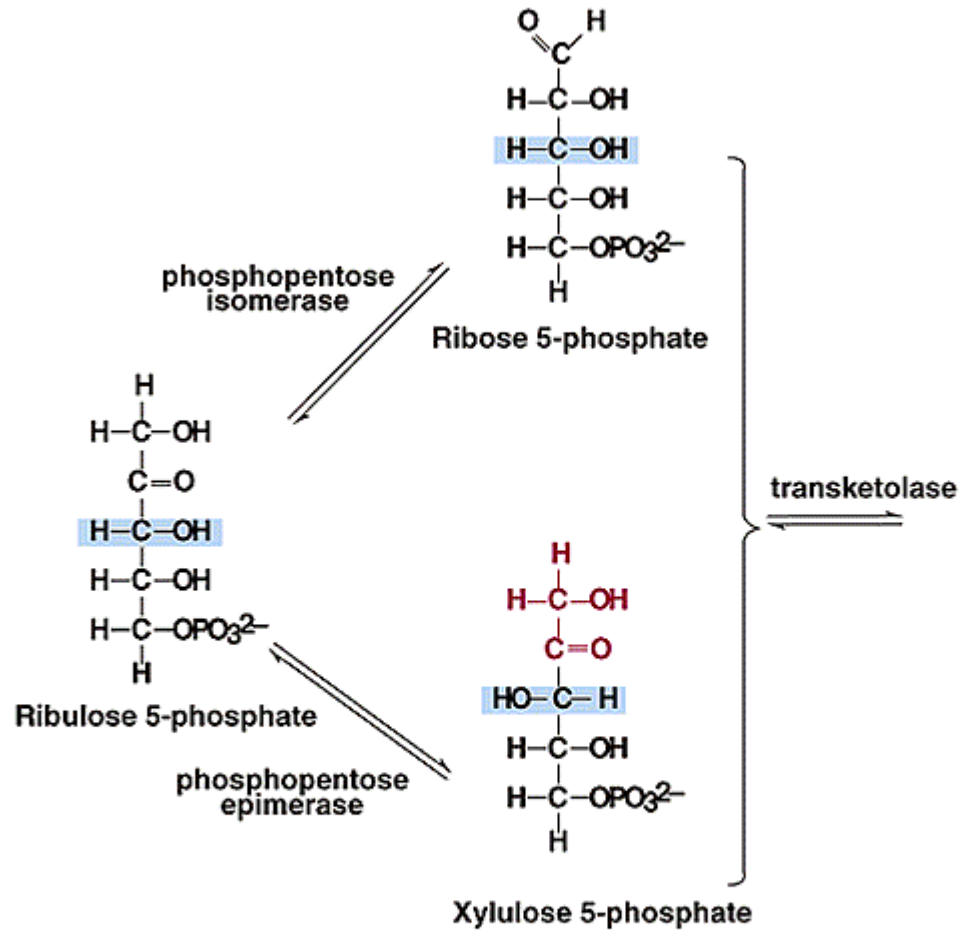
Ribose 5-fosfato

NADPH



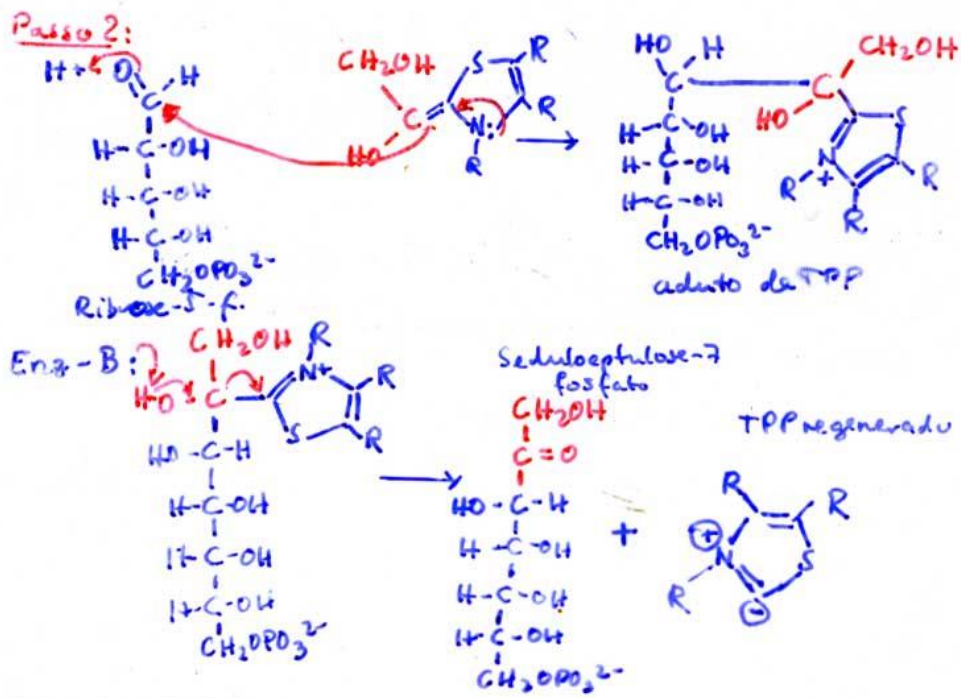
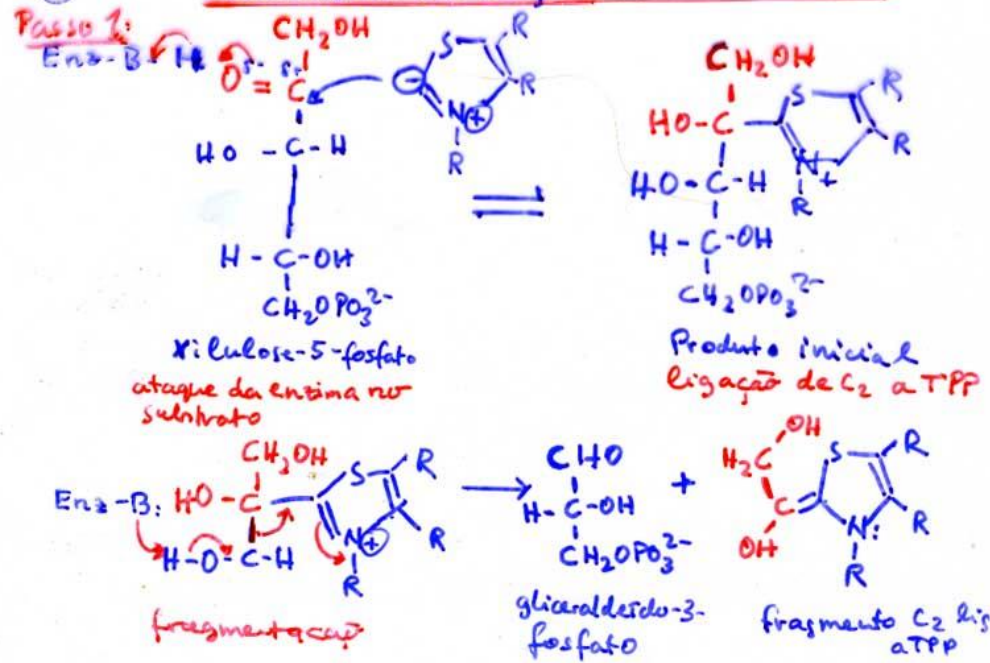
(a)

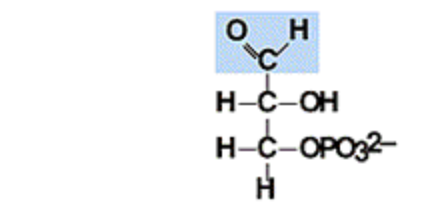




a)

3) Mecanismo da reação de transcetolase

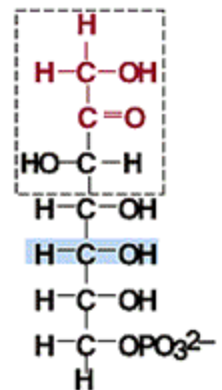




Glyceraldehyde 3-phosphate

+

transketolase



Sedoheptulose 7-phosphate

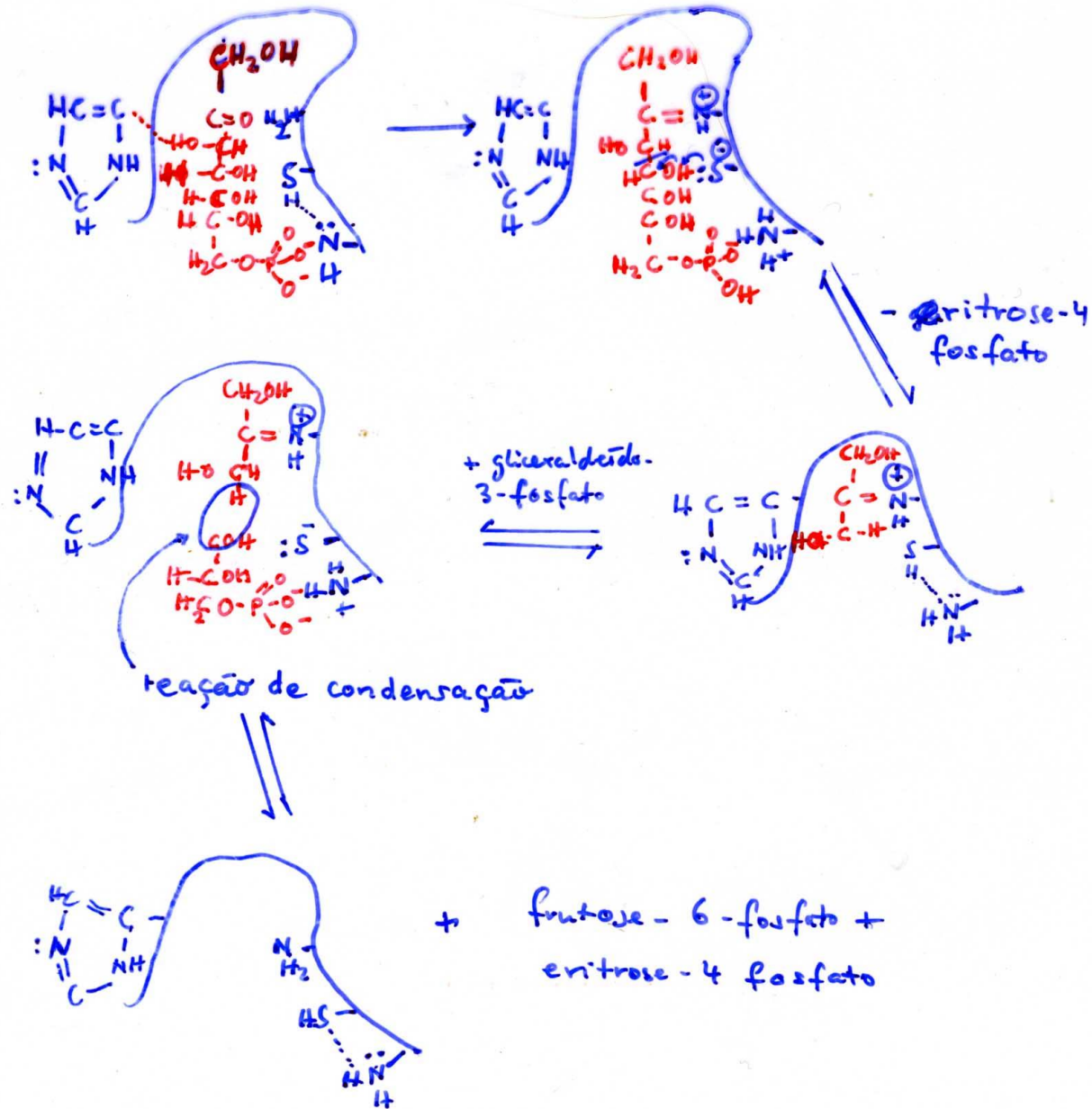
transaldolase

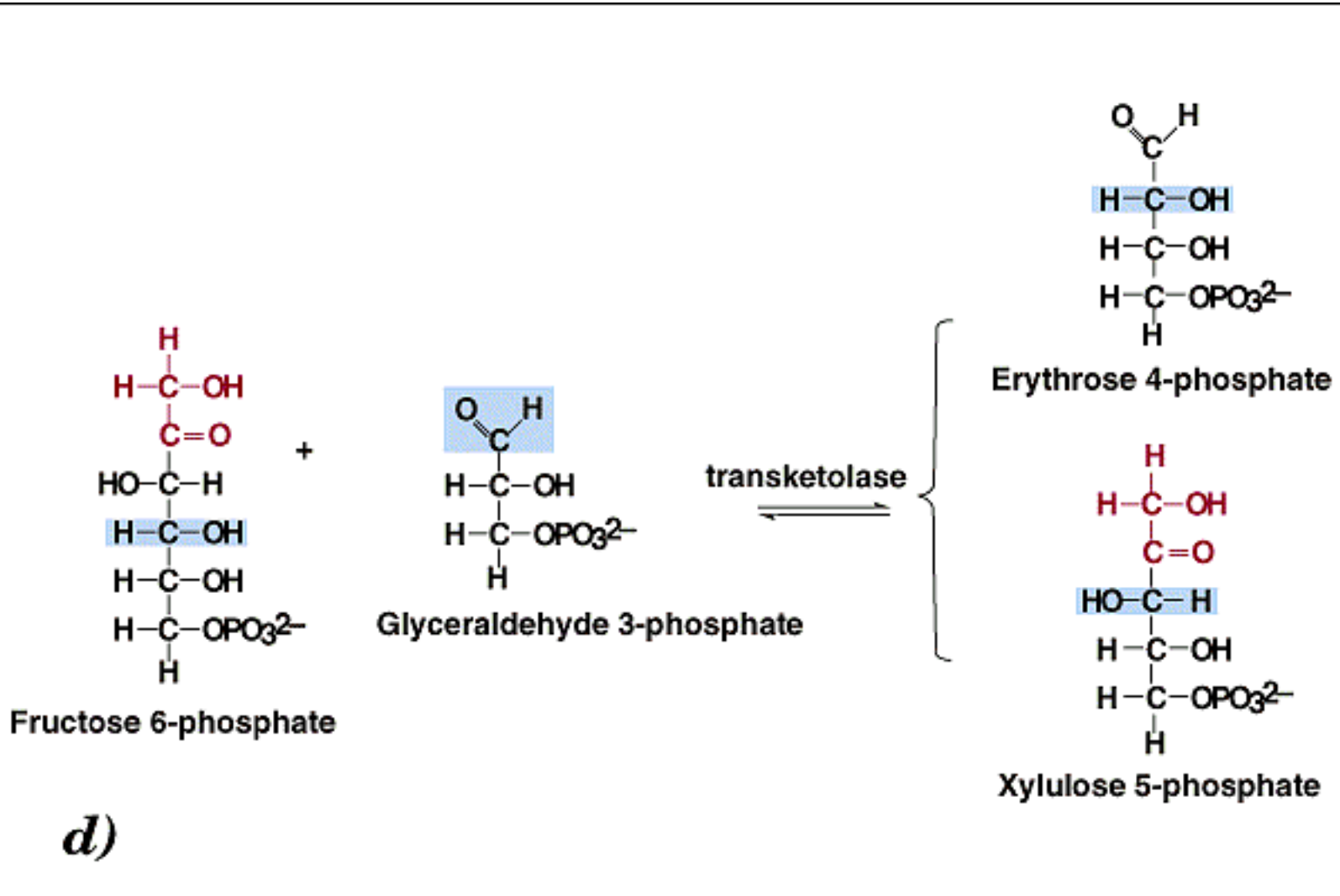


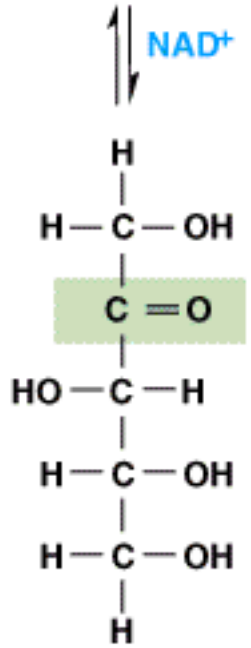
b)

9a

Mecanismo da reação de transaldolase

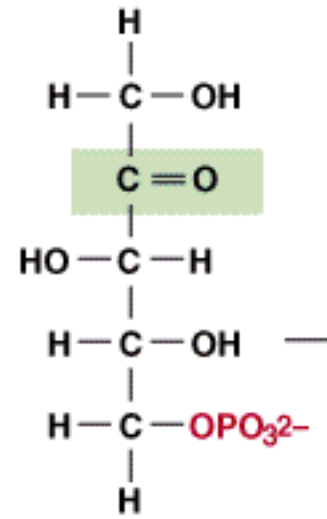






D-Xylulose

$\xrightarrow[\text{xylulose kinase}]{\text{ATP}}$

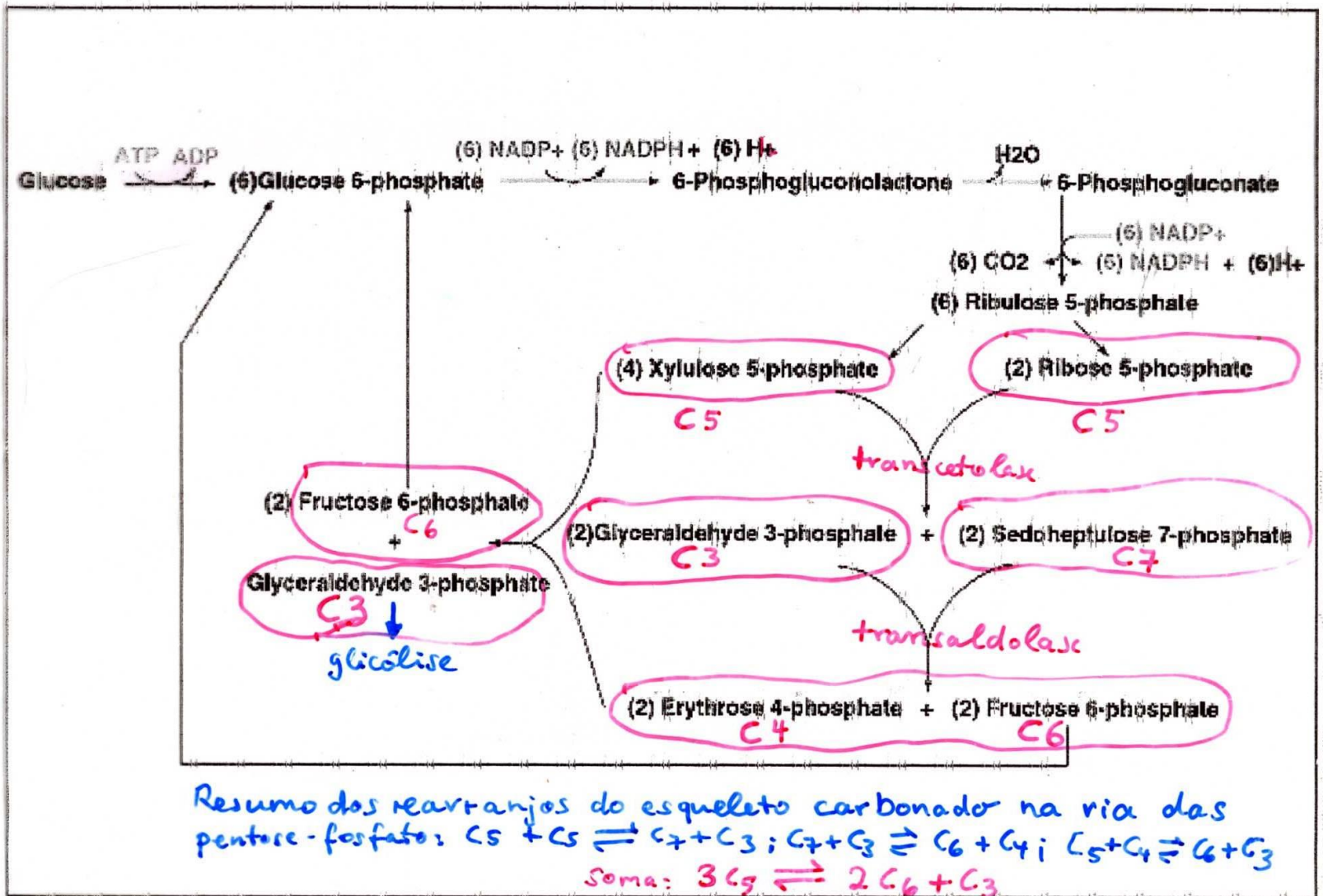


Xylulose 5-phosphate

\longrightarrow Pentose phosphate pathway

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Via das Pentose fosfatos



Controle:

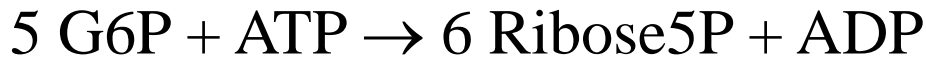
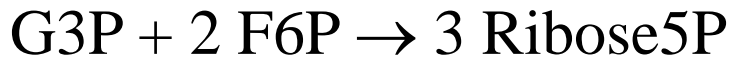
1- Primeiro passo IRREVERSÍVEL!! Fator determinante é nível de NADP^+ .

2- $\text{NAD}^+ / \text{NADH} \sim 700$

$\text{NADP}^+ / \text{NADPH} \sim 0.014$

Operação da Via,

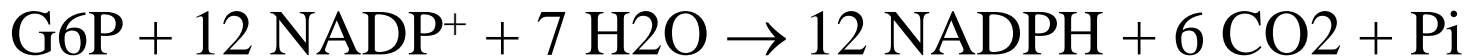
Caso1 – célula necessita de Ribose5P , células em divisão



Caso2 - necessita NADPH e Ribose5P



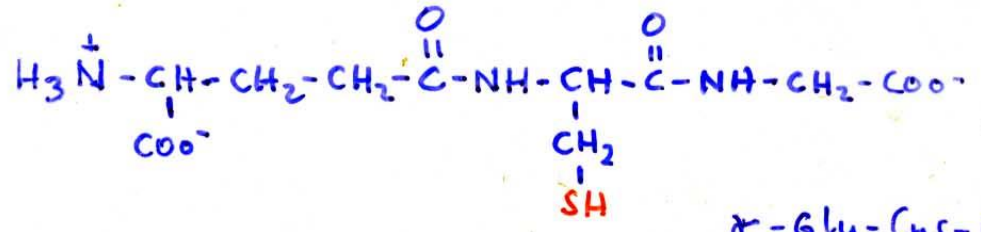
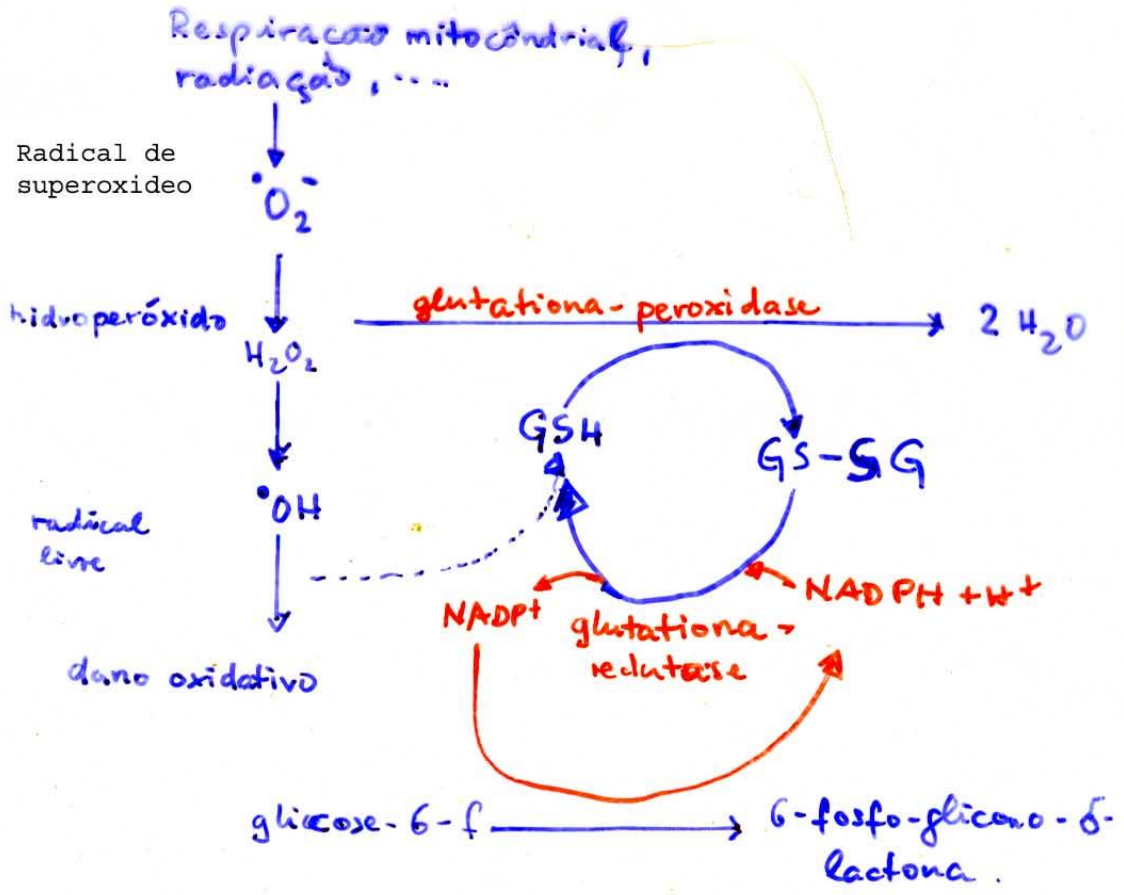
Caso 3 – necessita de NADPH



Detalhe-Tecido Adiposo faz muito mais Via das Pentoses do que Músculo Esquelético. **Por que????**

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NADPH + H⁺ é importante para proteger as membranas contra danos oxidativos.



glutathiona reduzida

