aldhide

Glycolysis II

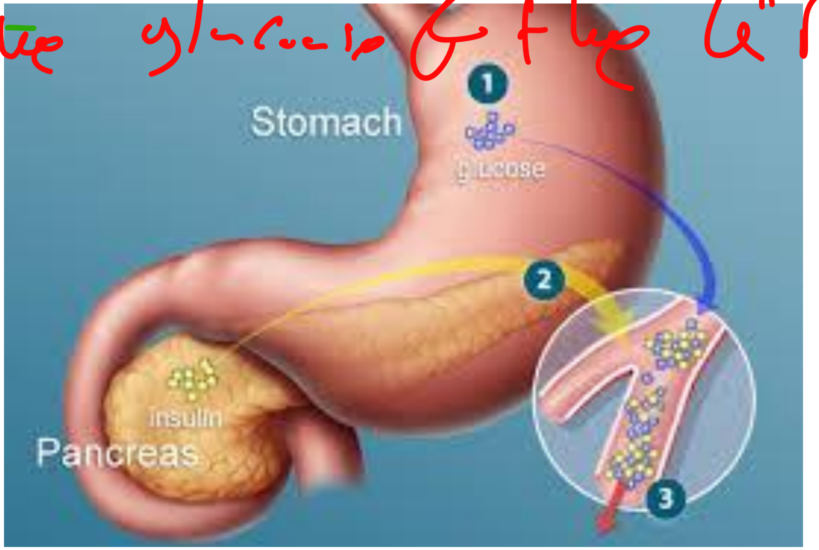
φ link between the glucose & the lipid are :

① DHAP

② GAP

③ Acetyl CoA

④ glecyeral dhyd



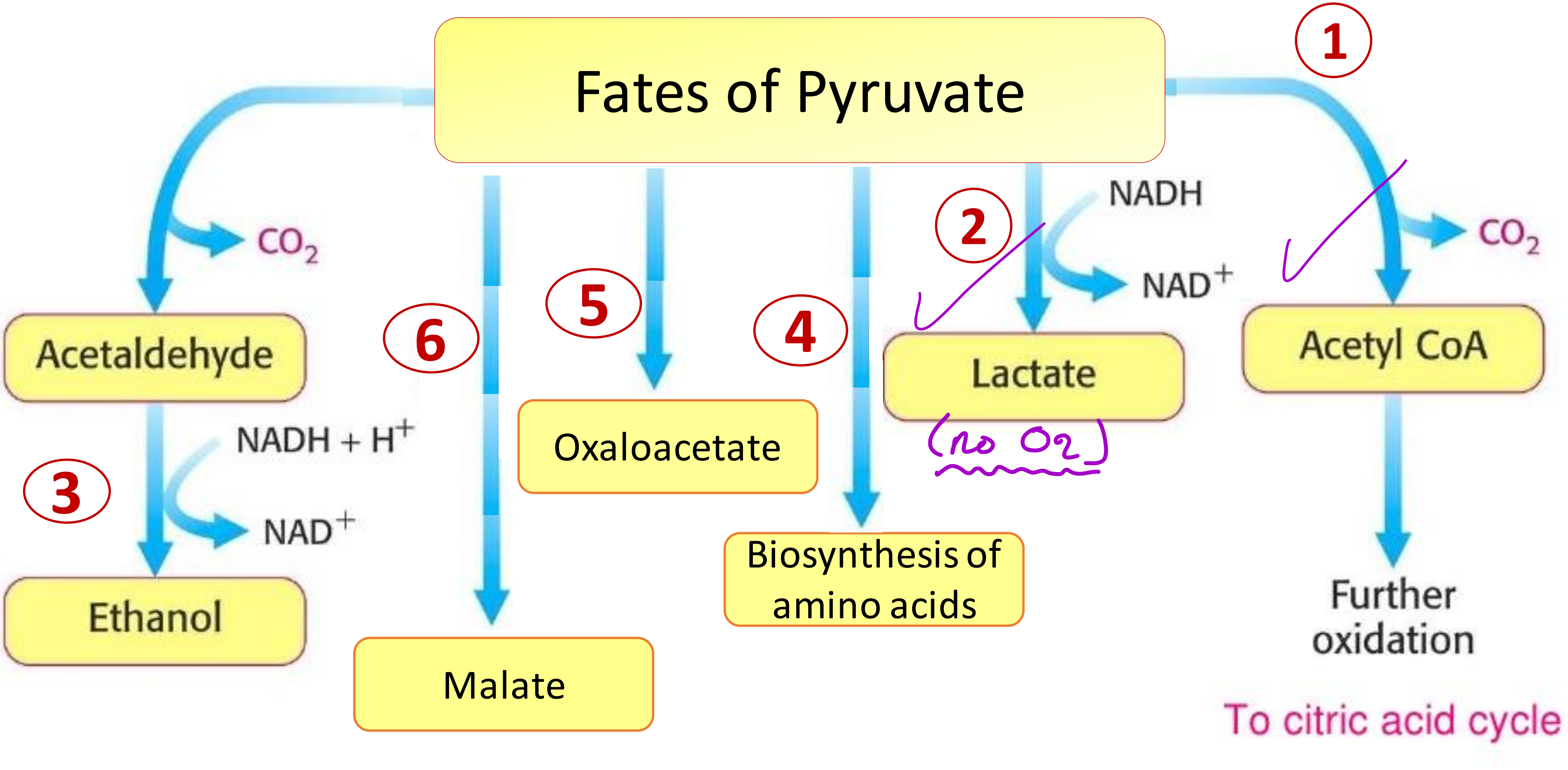
Dr. Nesrin Mwafi

Biochemistry & Molecular Biology Department

Faculty of Medicine, Mutah University

ap ال cytosolic extract هو المحيط له :

Metabolic Fates of Pyruvate



Fates of Pyruvate

① Acetyl CoA (CO_2 released) → Further oxidation → To citric acid cycle

② Lactate (NADH → NAD^+)

(no O_2)

③ Acetaldehyde (CO_2 released) → Ethanol ($NADH + H^+$ → NAD^+)

④ Biosynthesis of amino acids

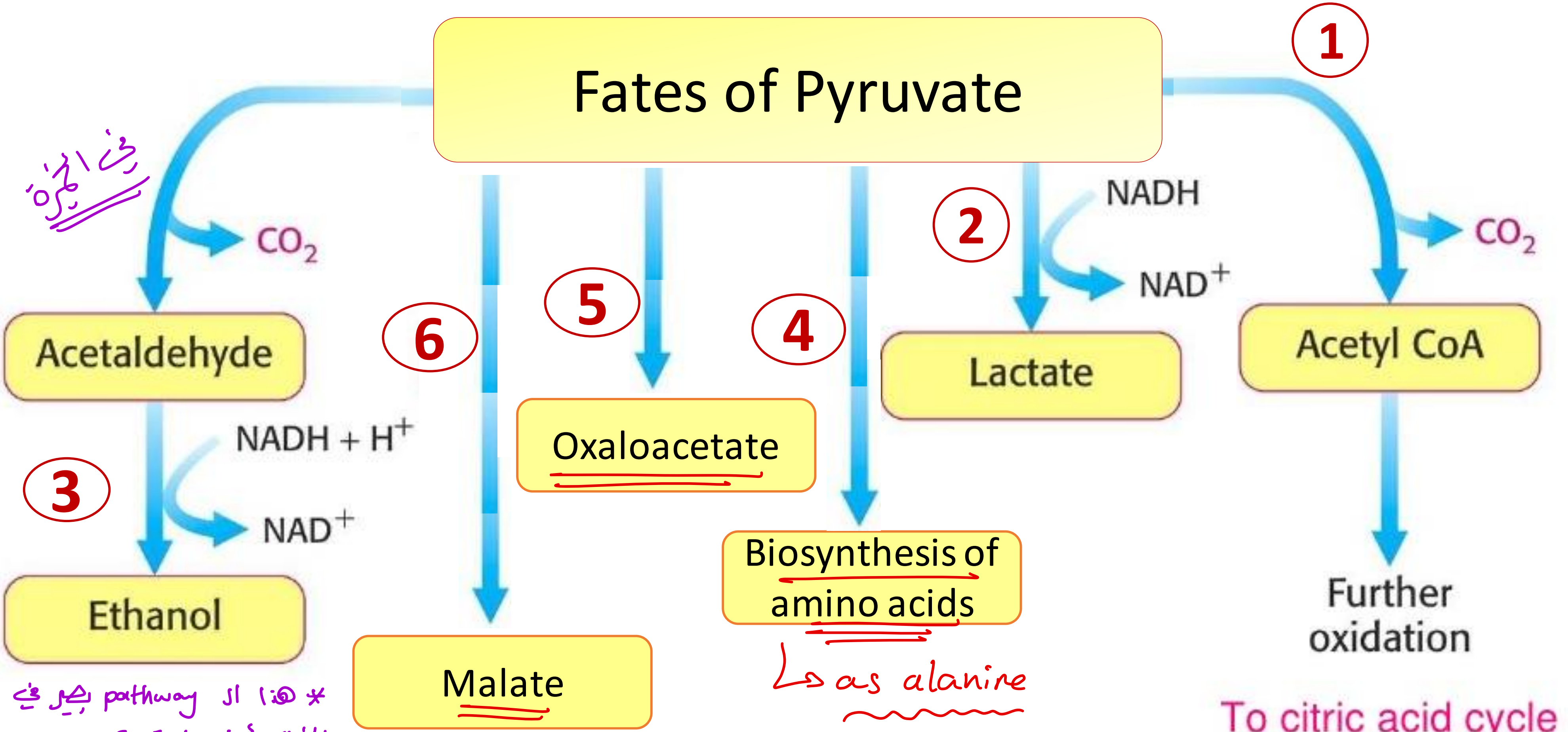
⑤ Oxaloacetate

⑥ Malate

and

electron transport chain

Metabolic Fates of Pyruvate



Fates of Pyruvate

① CO_2 → Acetyl CoA → Further oxidation

② NADH → NAD^+ → Lactate

③ CO_2 → Acetaldehyde → NADH + H^+ → NAD^+ → Ethanol

④ Biosynthesis of amino acids

⑤ Oxaloacetate

⑥ Malate

في الخميرة

as alanine

To citric acid cycle

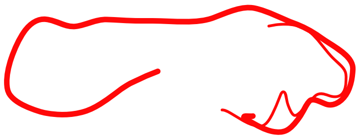
and

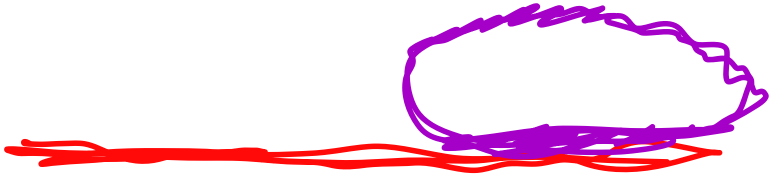
electron transport chain

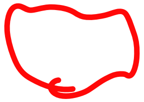
* هذا ال pathway بصير في الخميرة لأنها غير قادرة على عمل lactic acid fermentation. + yeast

* فقط اعرف إنه أنا بلشت ب pyruvate
وانتهيت ب ethanol ومن النواتج أيضًا
CO_2 , NAD^+
رح يتبخر

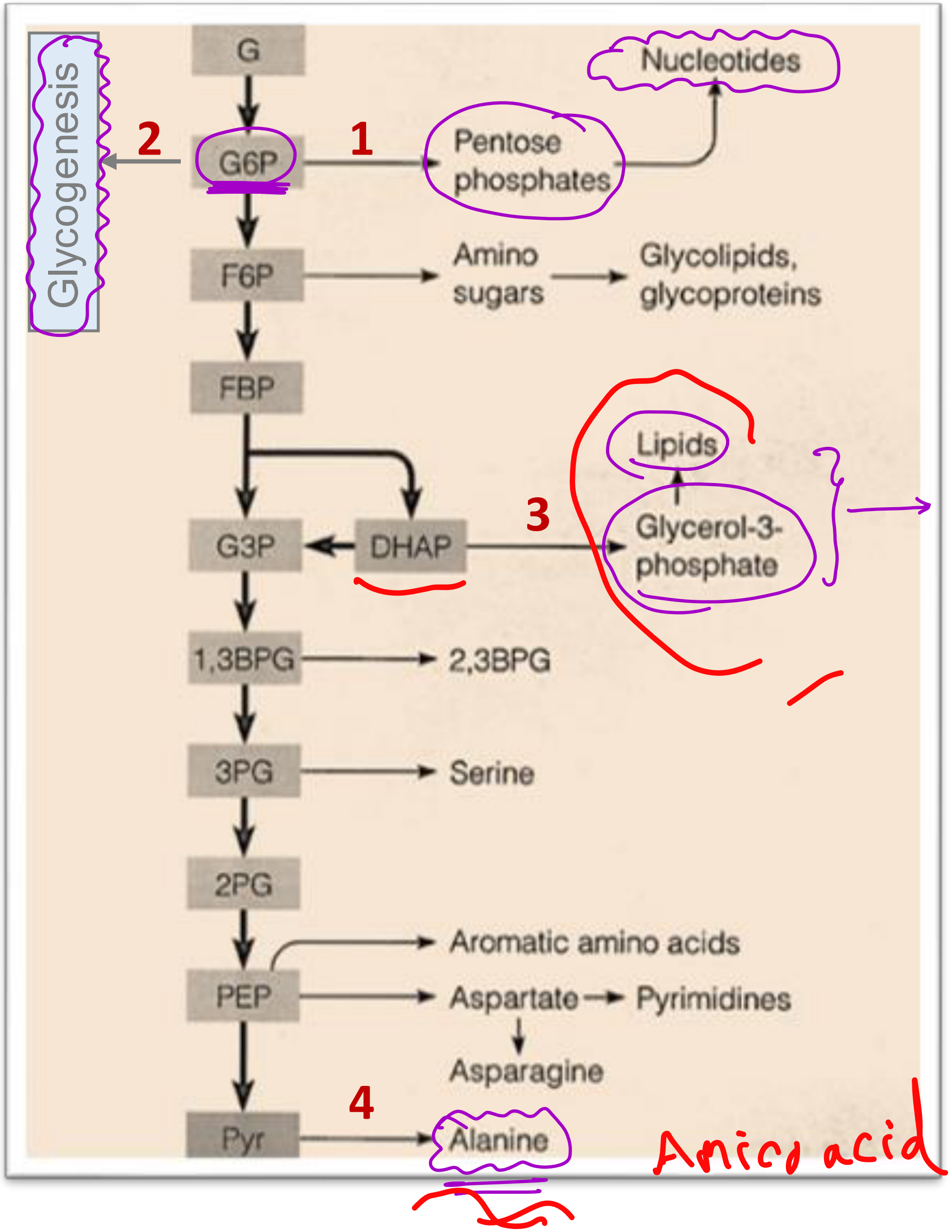
هذا إلي لسبب







Glycolysis as Anabolic Pathway

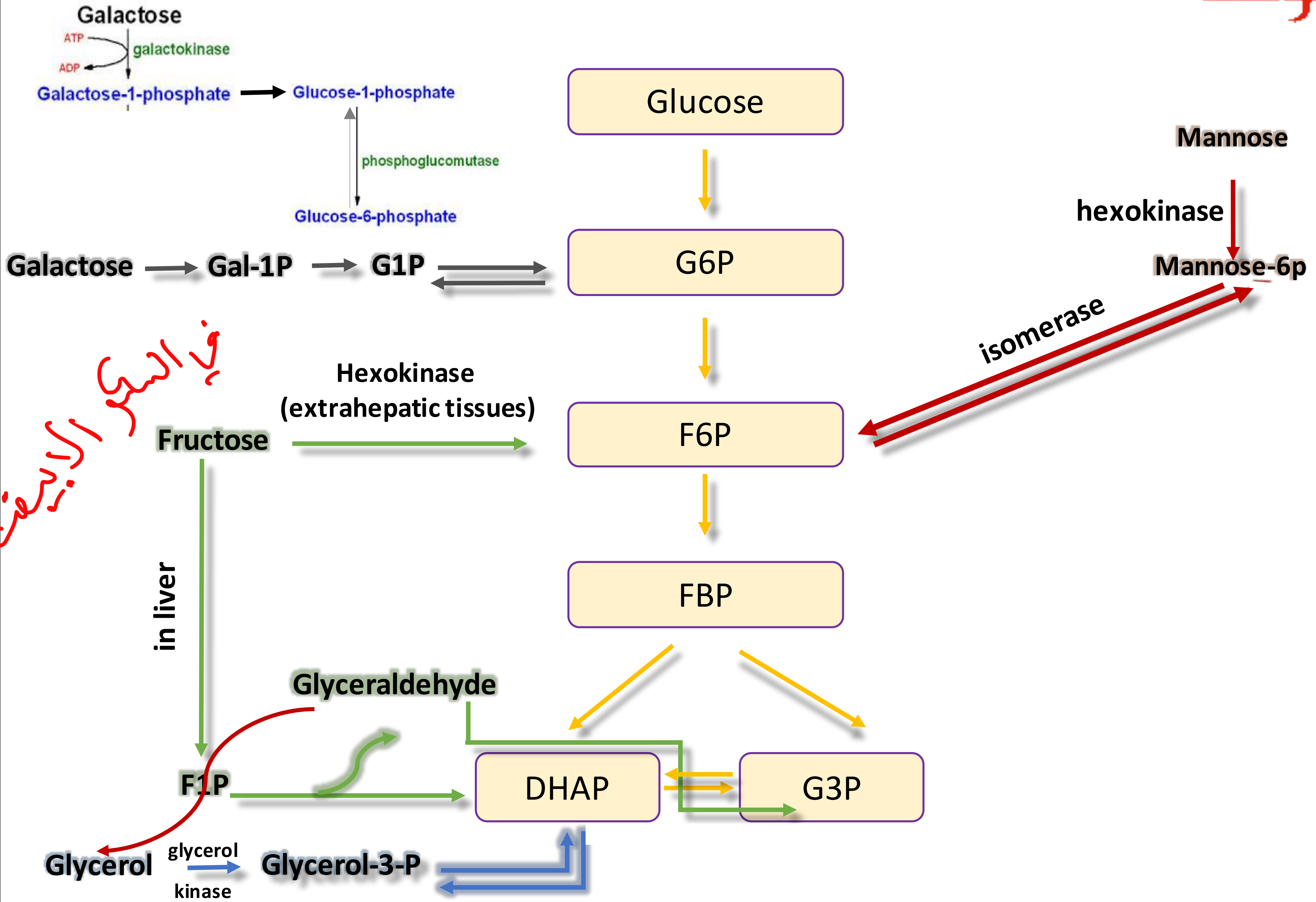


Major alternative fates of glycolytic intermediates in biosynthetic pathways

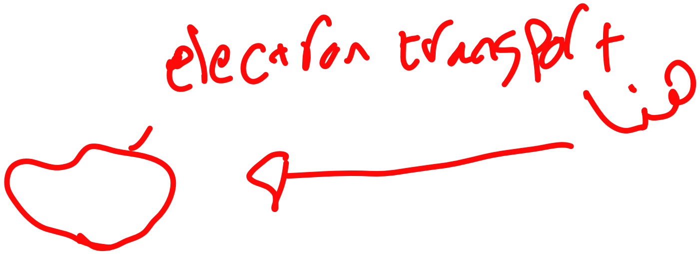
A link between Carbohydrates and lipid pathways.

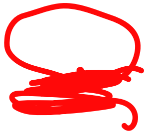
X هذا السلايد مش مطلوب

Other substrates enter Glycolysis



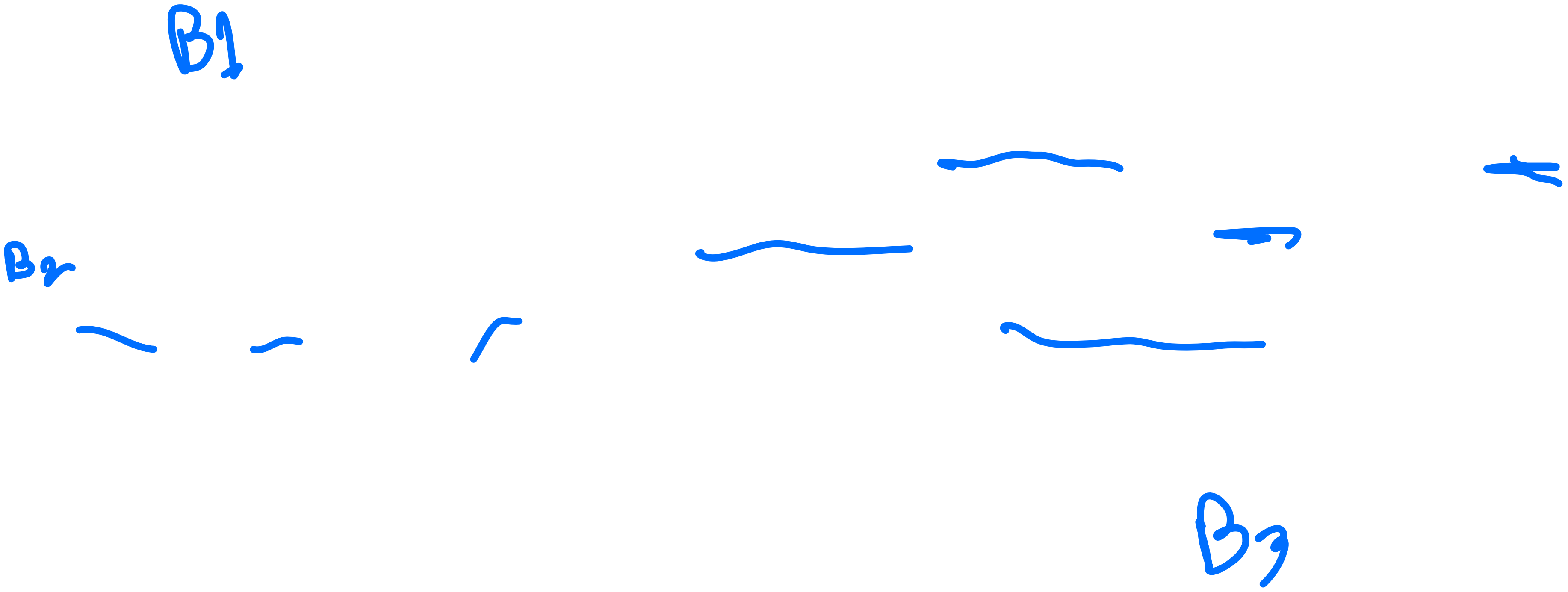
في السكر الابيض





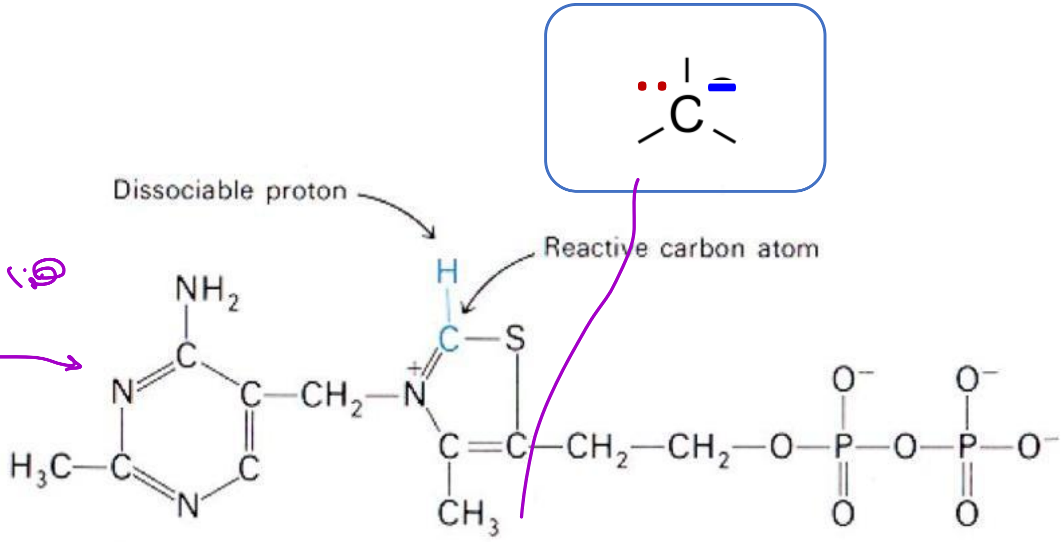
cryp cycle
که [illegible] در matrix

⊖ اما إذا كان بعيد عنه يبقى اسمها Coenzyme

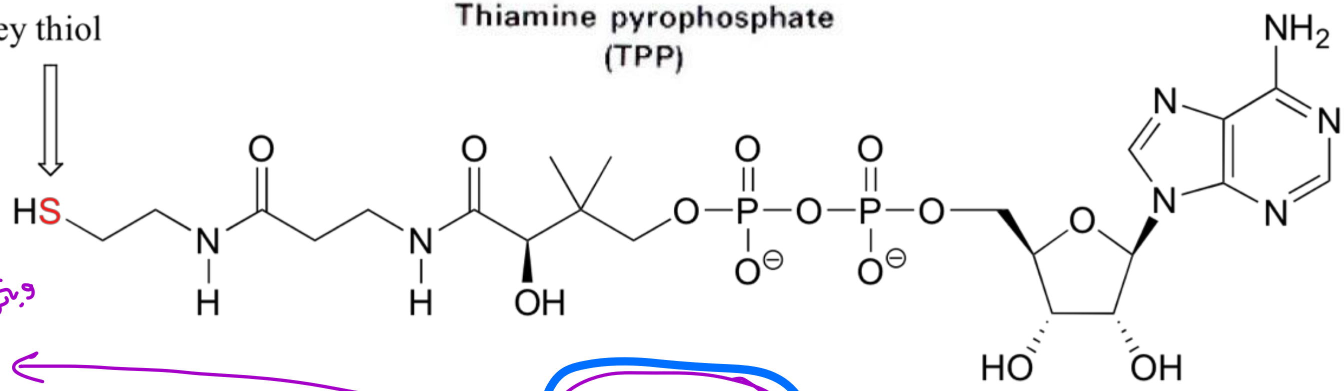

B1
B2
B3

Coenzymes Structure

هذا ما طلبت منه اشي



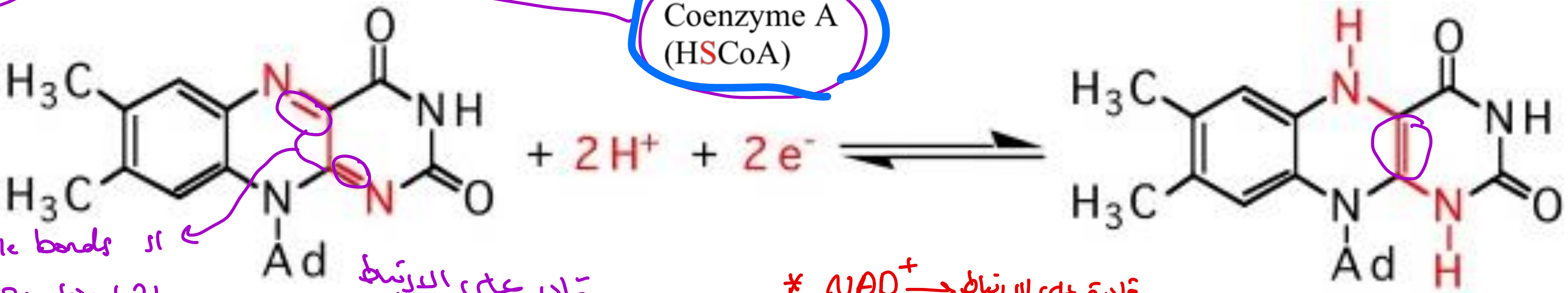
Thiamine pyrophosphate (TPP)



Coenzyme A (HSCoA)

من هذا بس اعرف إنه يحتوي على Sulfhydral

ويكون thioester bond.



ال 2 double bonds

ال2 ـيروحوا ورح يصيروا وحدة (بنشوف الشكل الثاني)

FAD → قادر على الارتباط مع 2 Hydrogen atoms

* عشان هيك بتكون

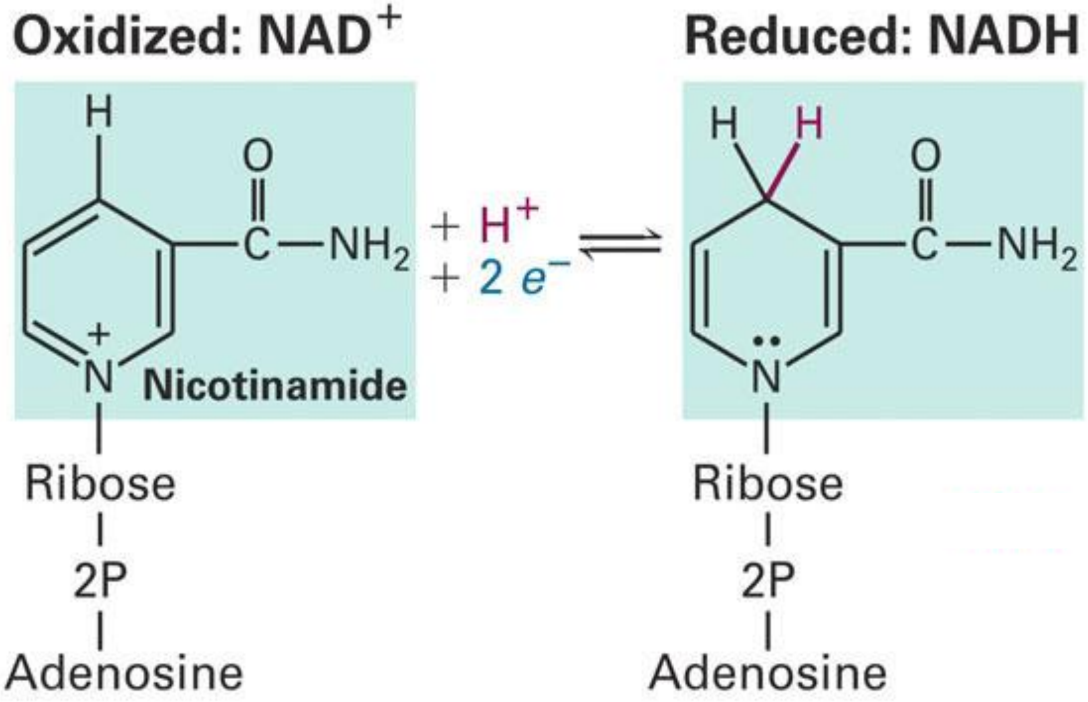
FADH2

* NAD+ → قادرة على الارتباط مع 1 Hydrogen atom.

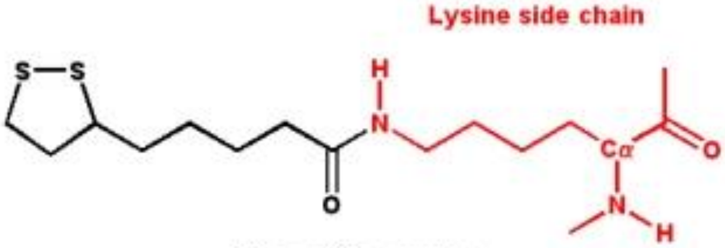
Coenzymes Structure

X

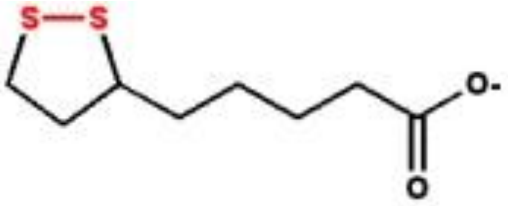
غير مطالبين فيها



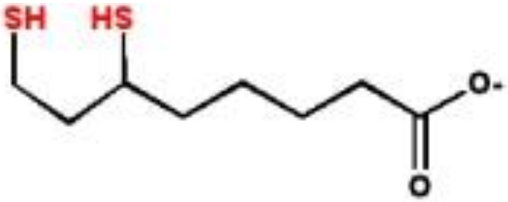
$NAD^+ + H^+ + 2e^- \rightleftharpoons NADH$



Lipoamide complex

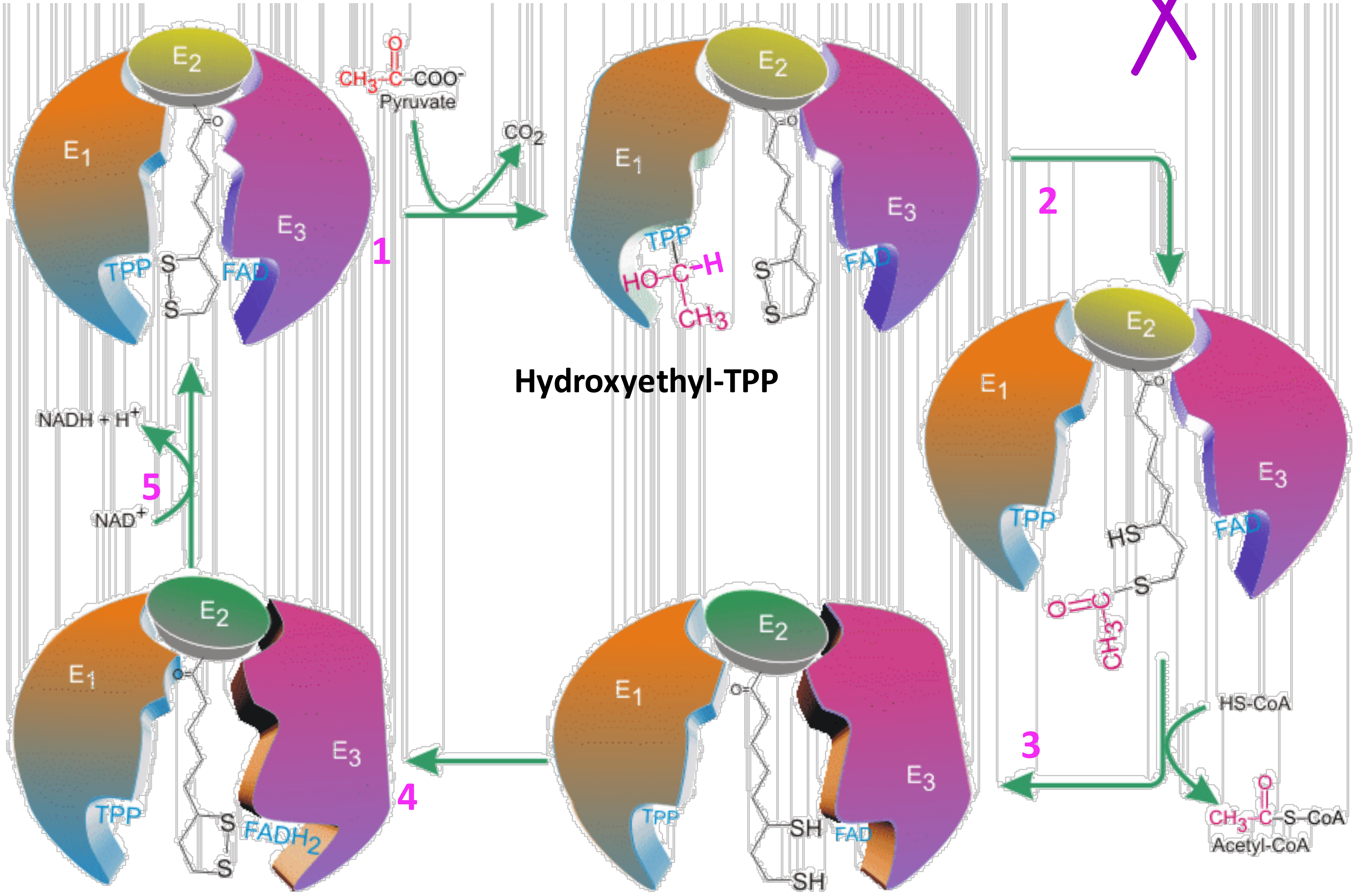


Lipoic acid (oxidized form)



Lipoic acid (reduced form)

Pyruvate Dehydrogenase Complex



Mechanism of PDC

X

- The mechanism by which this complex catalyzes the reaction is complicated but the main processes involve (5 steps):

1. Decarboxylation of pyruvate and the release of CO_2 a reaction catalyzed by E1-TPP. The product of this reaction “Hydroxyethyl moiety” is a substrate for the next reaction
2. The transfer of Hydroxyethyl moiety from TPP of E1 to lipoic acid of E2. This step is mediated by an oxidation of Hydroxyethyl to acetyl group coupled with reduction of disulfide bond
3. Transfer of acetyl group from lipoamide to CoA forming thioester bond and consequently Acetyl CoA is produced

Mechanism of PDC X

4. Regeneration of disulfide bond of lipoamide via FAD (E3 prosthetic group) which is reduced to FADH2
5. Regeneration of FAD by NAD^+ which is reduced to NADH with the electrons transferred during the reaction (originally from Hydroxyethyl oxidation)