



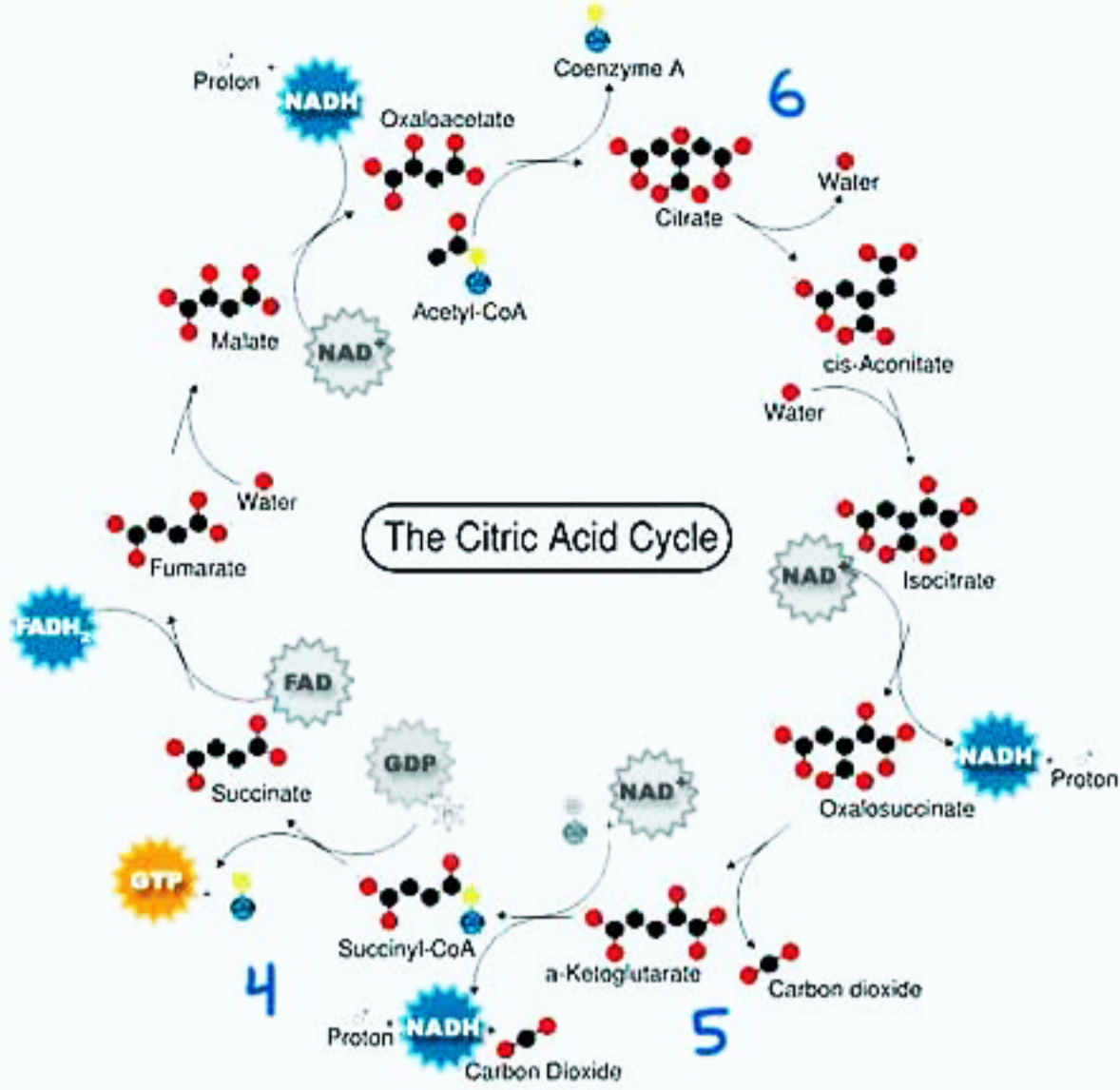
# Module 10

# Citric Acid Cycle

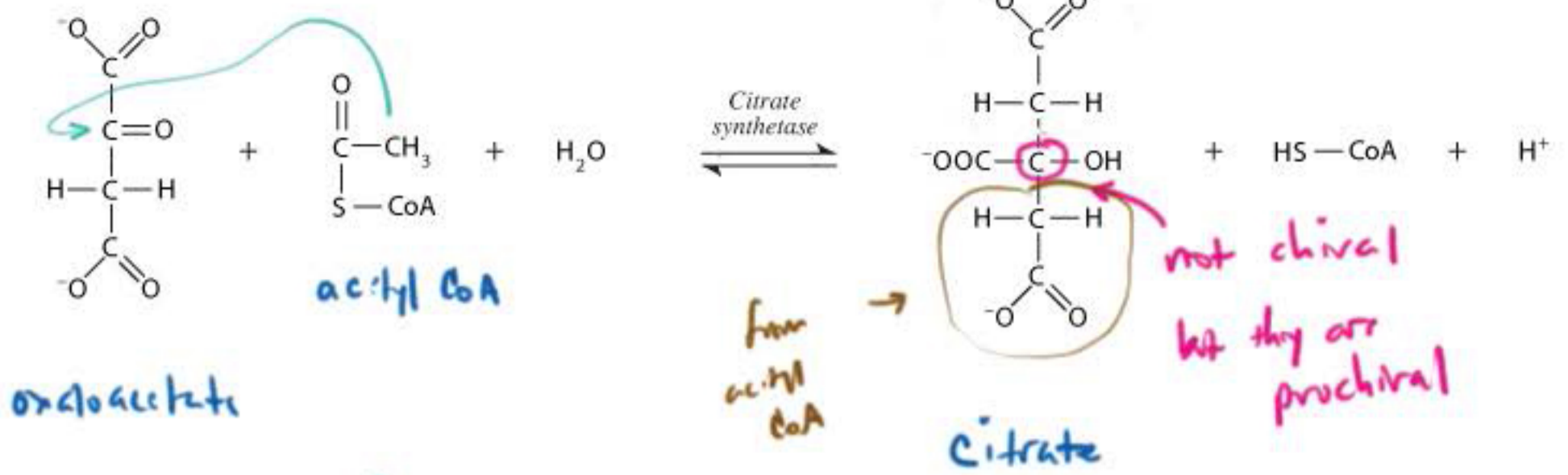
## Session Slides with Notes

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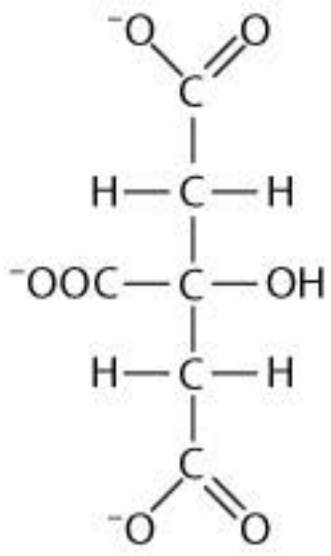


The plot is  
oxidative  
phosphorylation

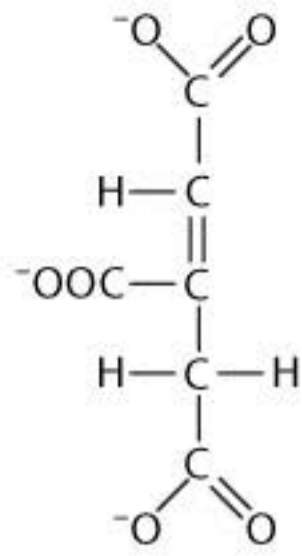
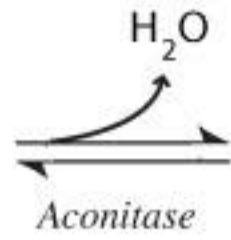


$\Delta G$  is from hydrolysis of CoA

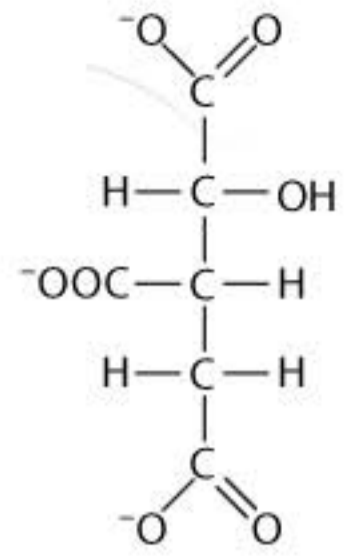
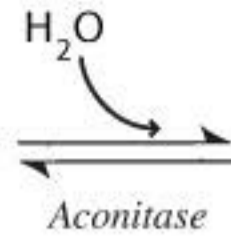
The  $\text{CO}_2$  produced is never from the acetyl CoA end.



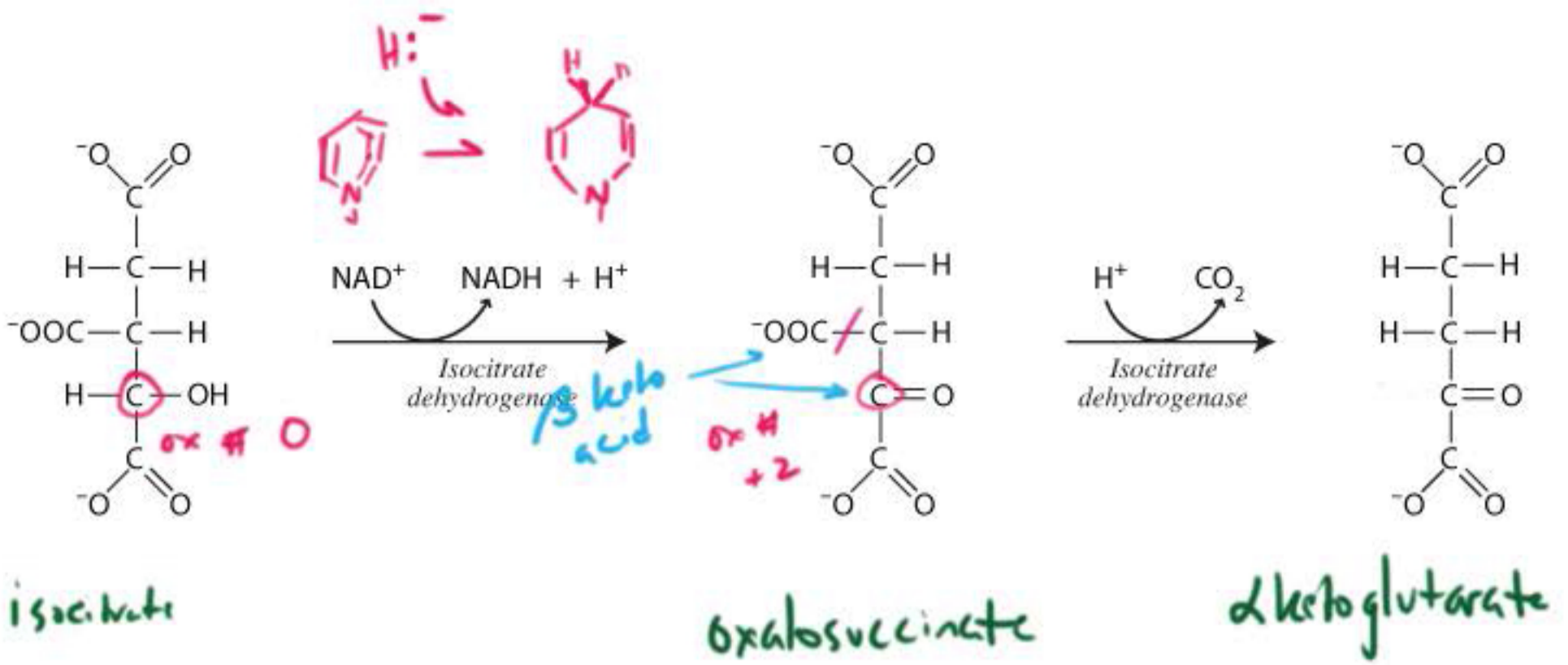
citrate

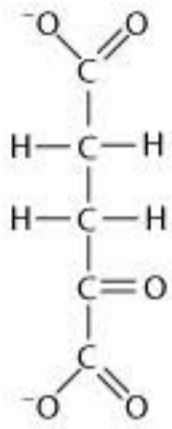


aconitate



isocitrate





$\alpha$  ketoglutarate

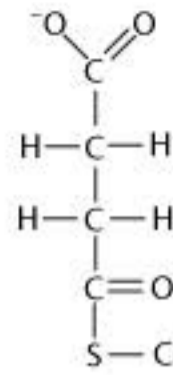
+

CoA

+

NAD<sup>+</sup>

*a-ketoglutarate  
dehydrogenase  
complex*



succinyl CoA

+

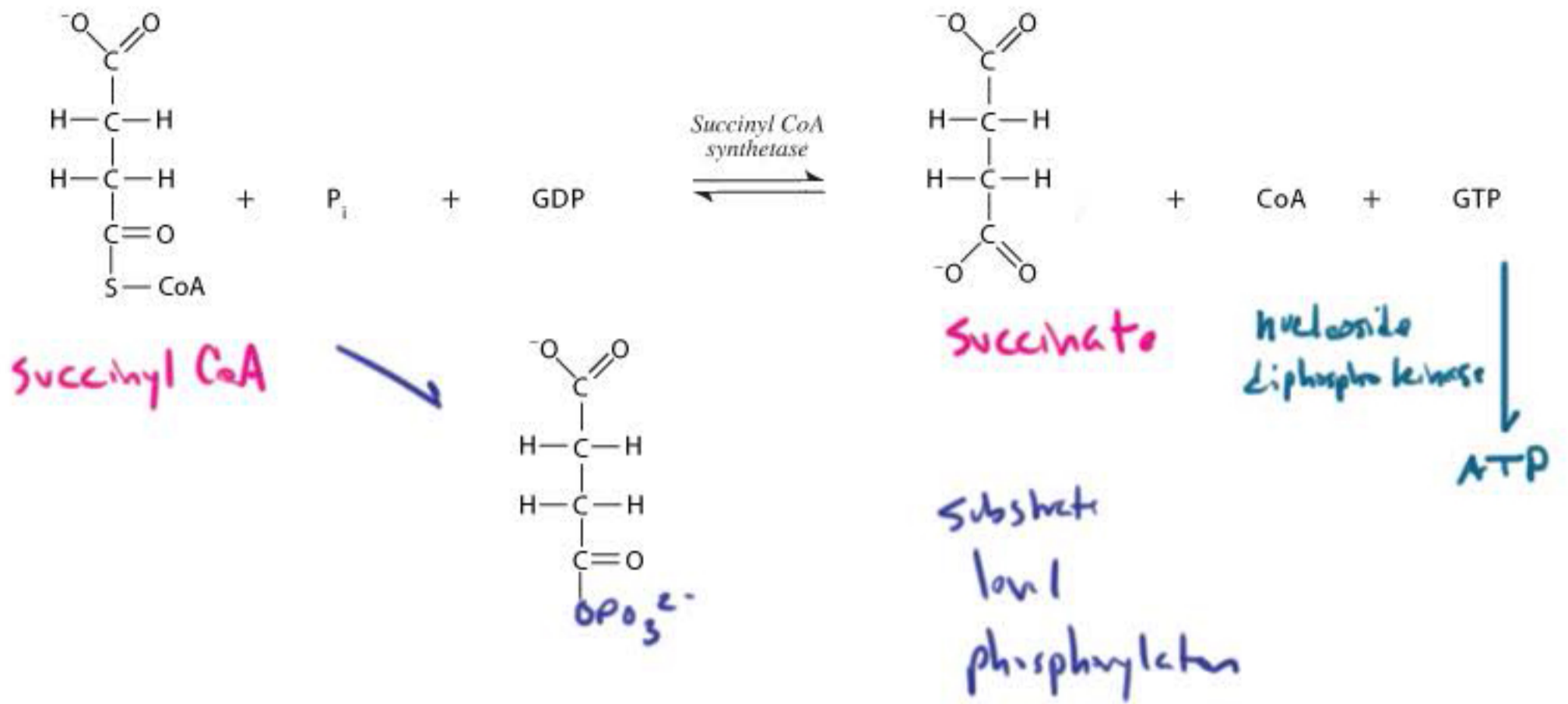
CO<sub>2</sub>

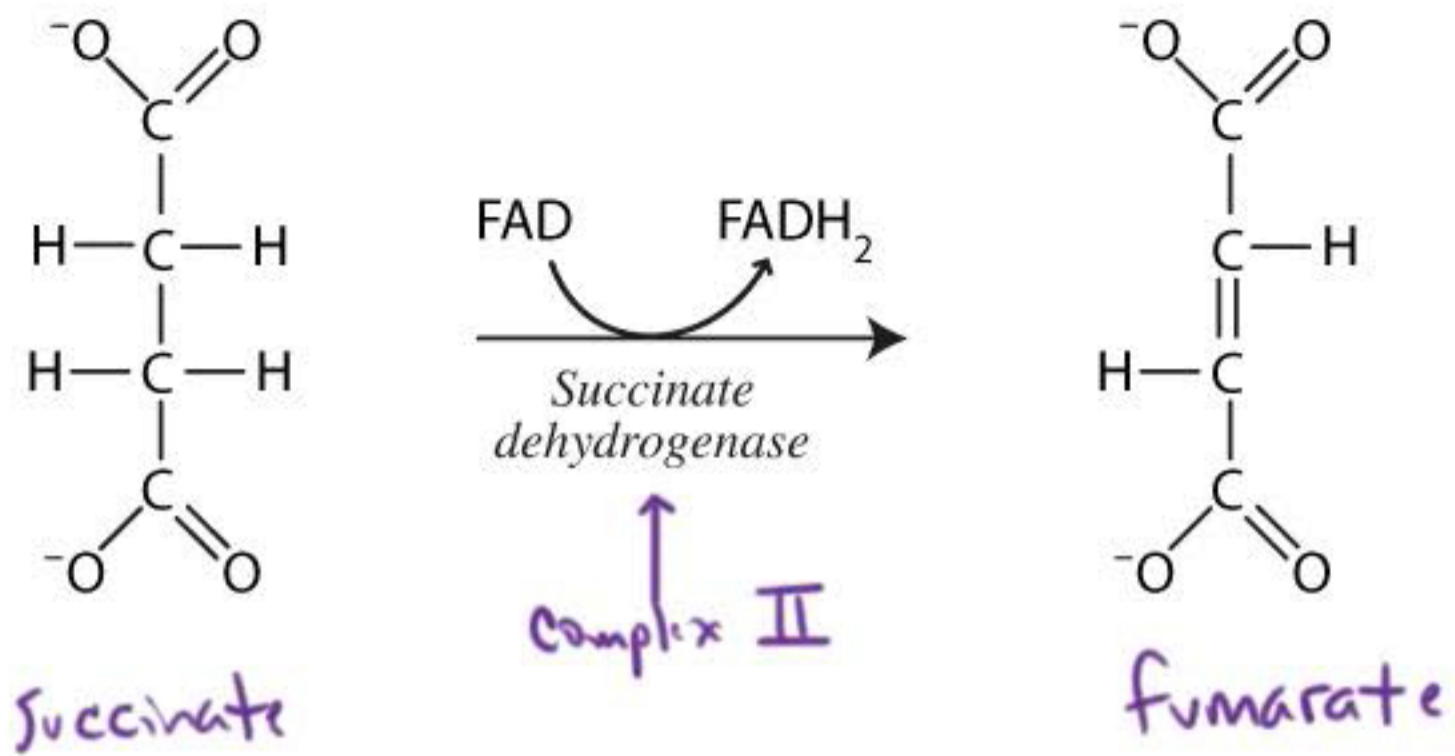
+

NADH

homologous to  
pyruvate  
dehydrogenase

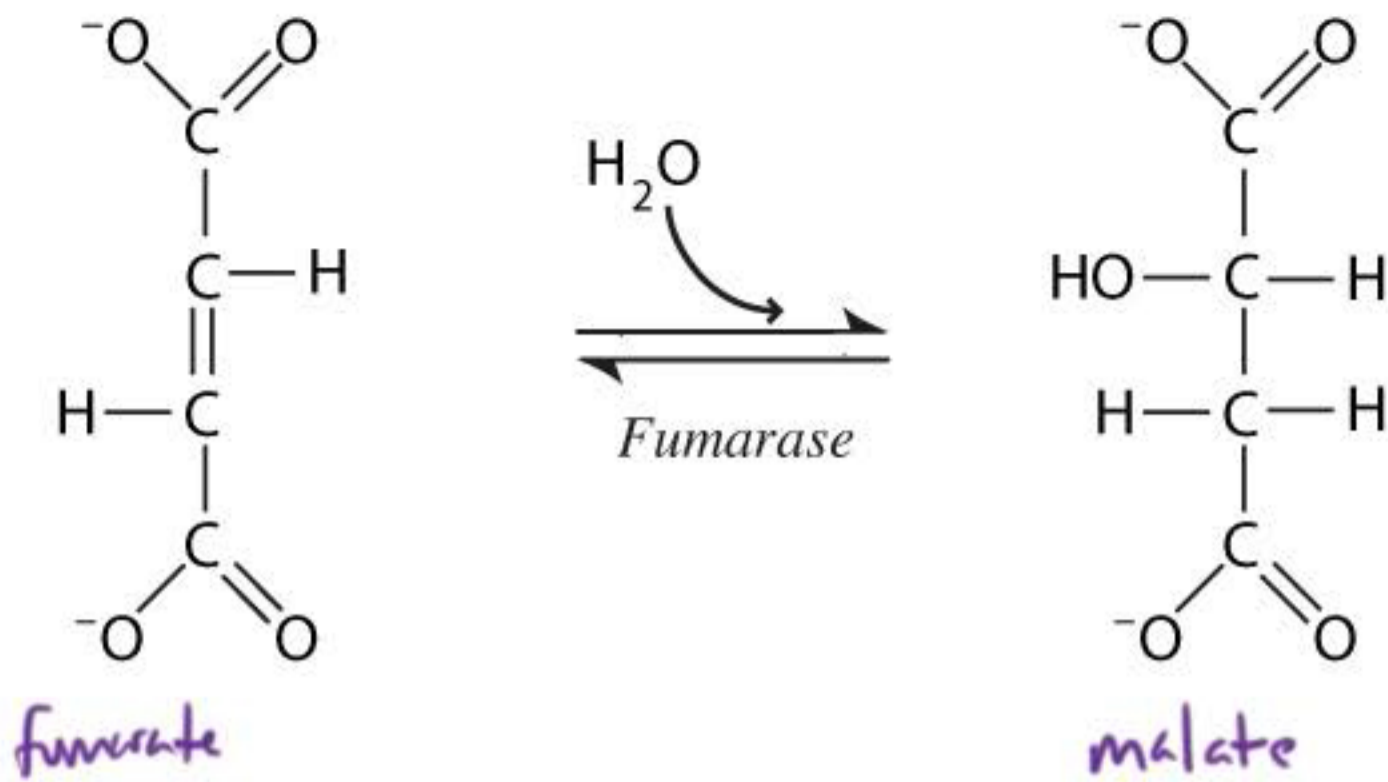
TPP  
lipoamide  
CoA  
FAD  
NAD<sup>+</sup>





The step in TCA  
intersects with the  
electron transport chain.





$$K_M = \frac{k_2 + k_{-1}}{k_1}$$

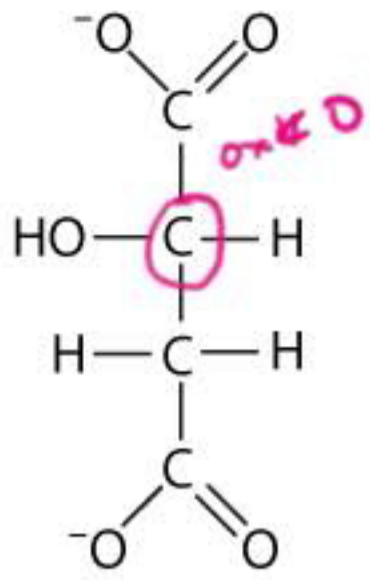
• has achieved enzymatic perfection

$$k_2 = k_{cat}$$

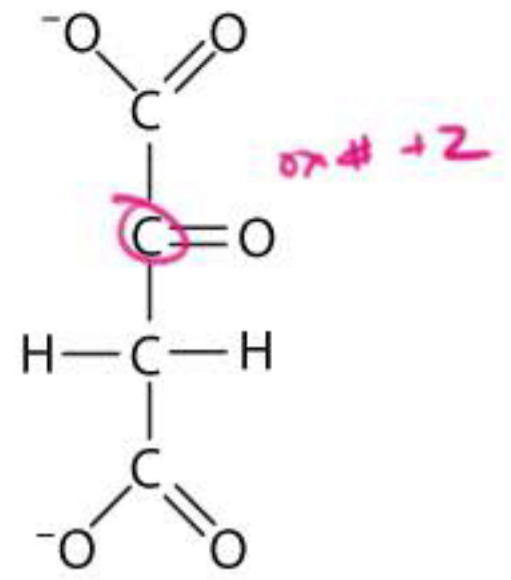
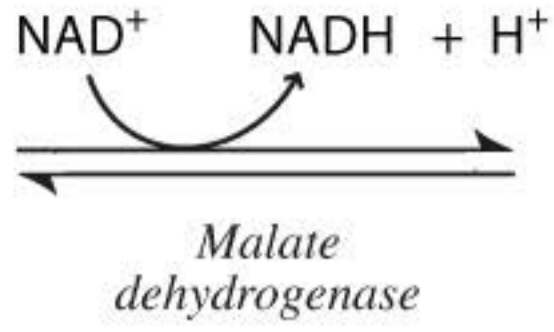
catalytic efficiency :  $\frac{k_{cat}}{K_M}$

as high as possible

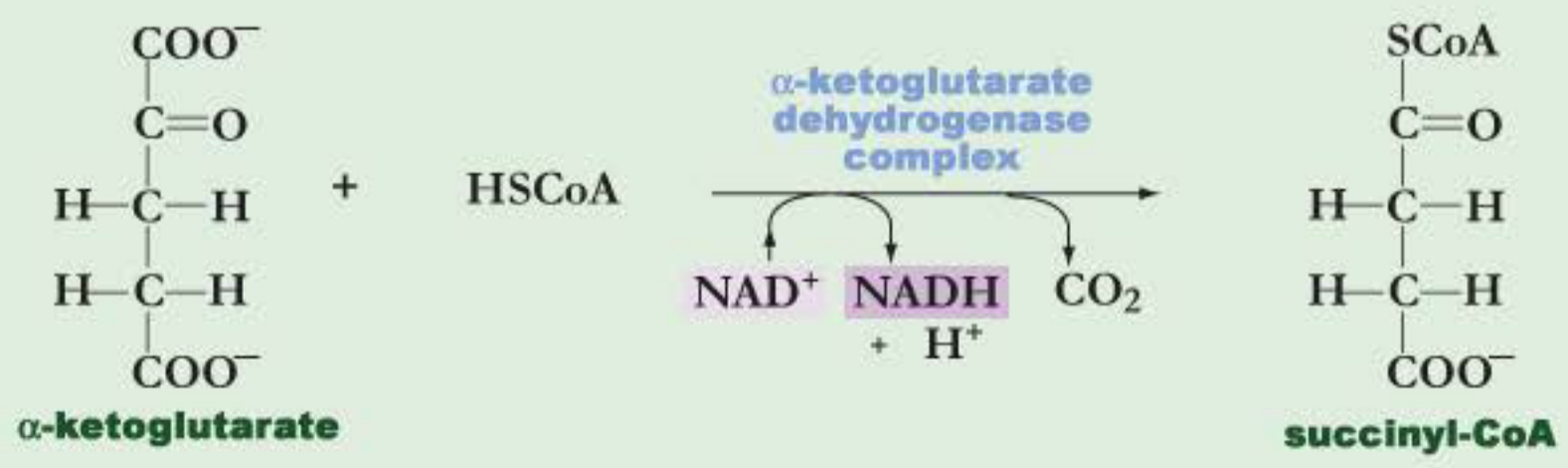
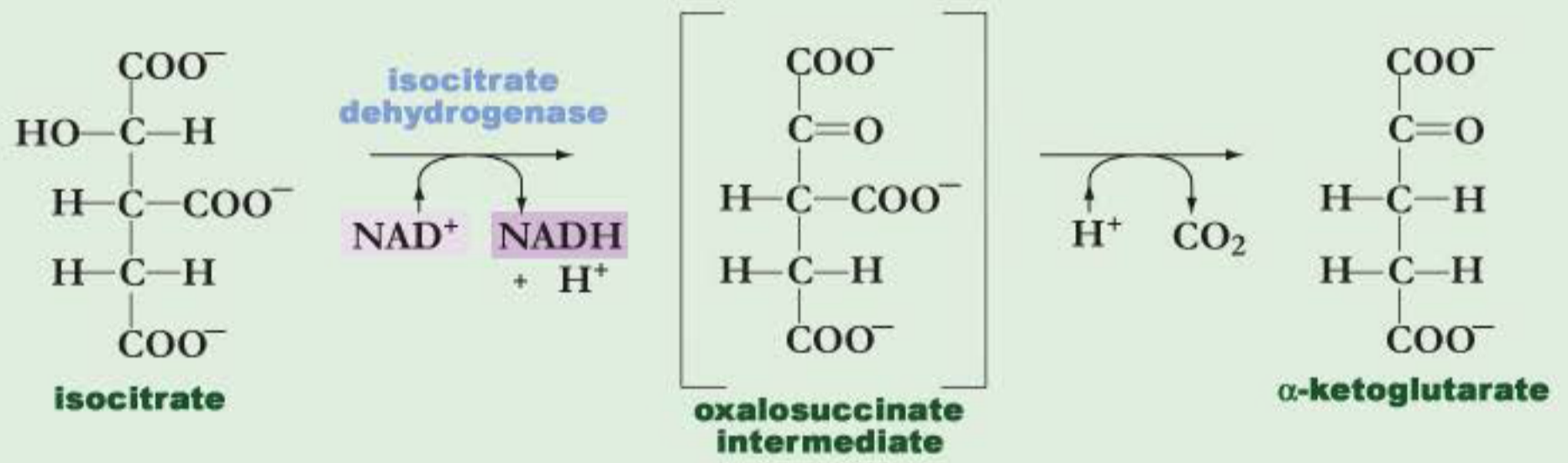
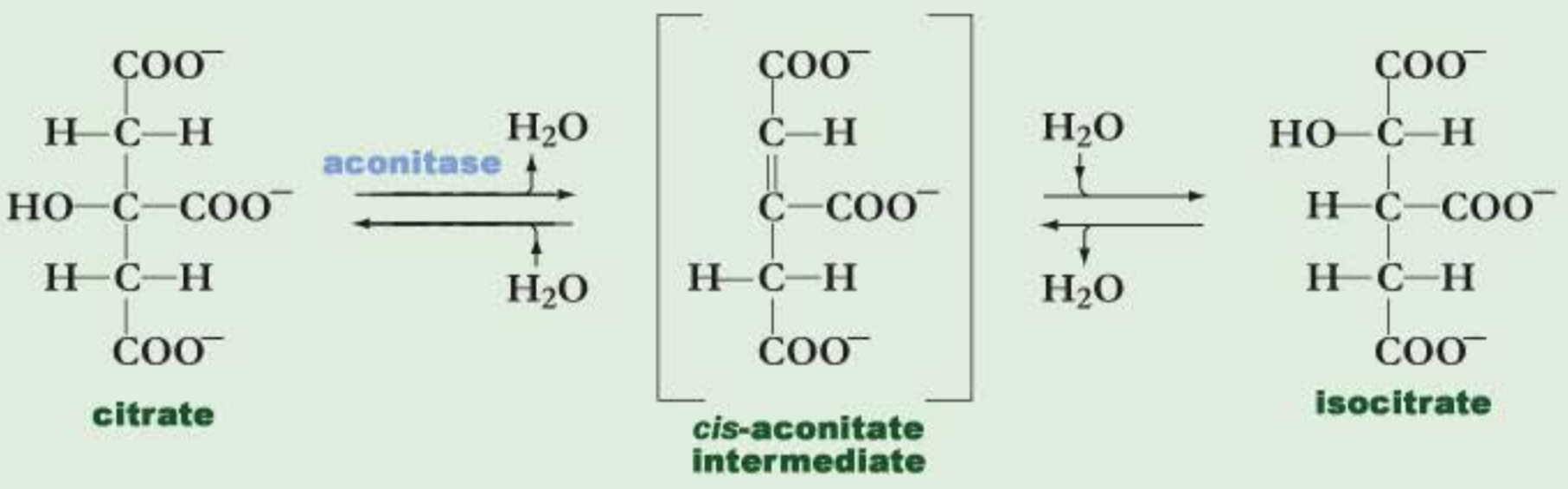
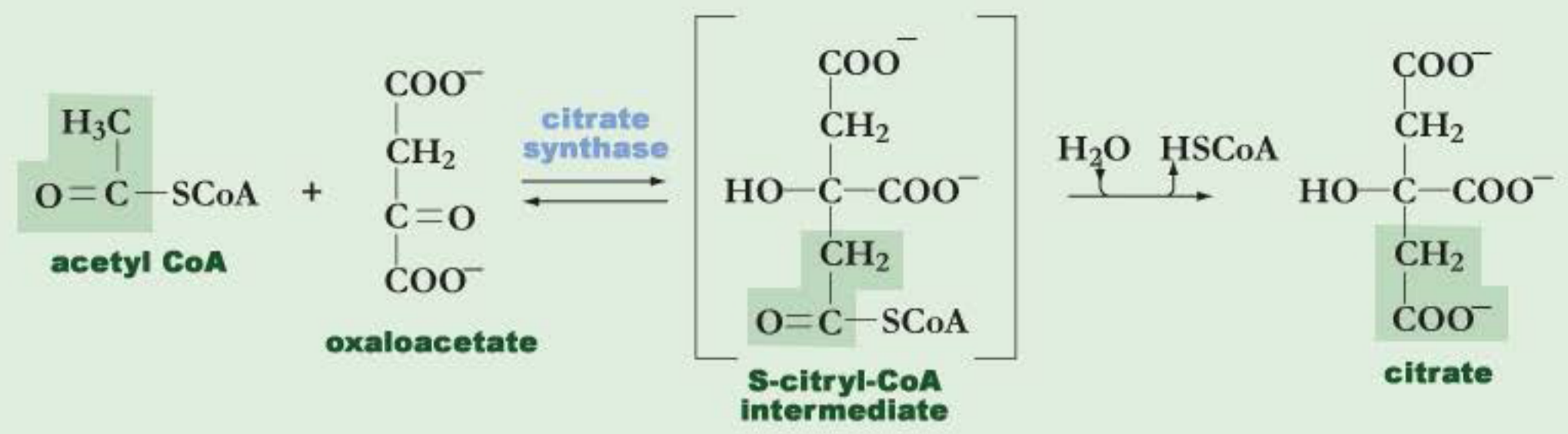
$$= \frac{k_1 k_{cat}}{k_{cat} + k_{-1}}$$

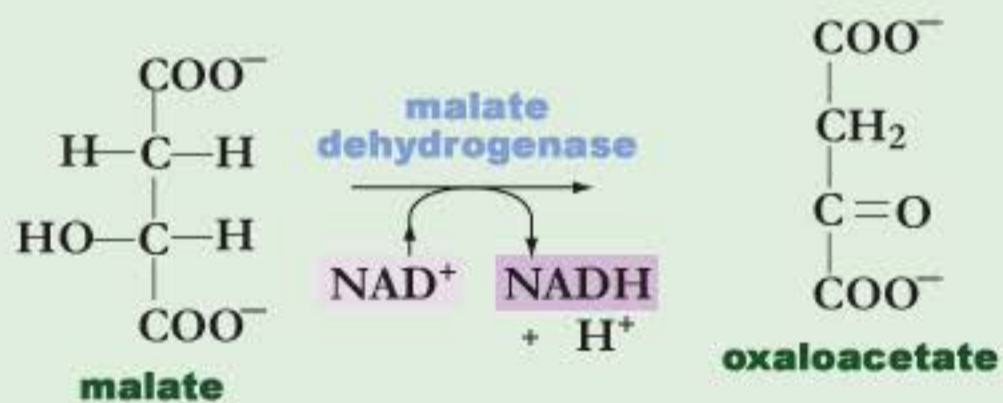
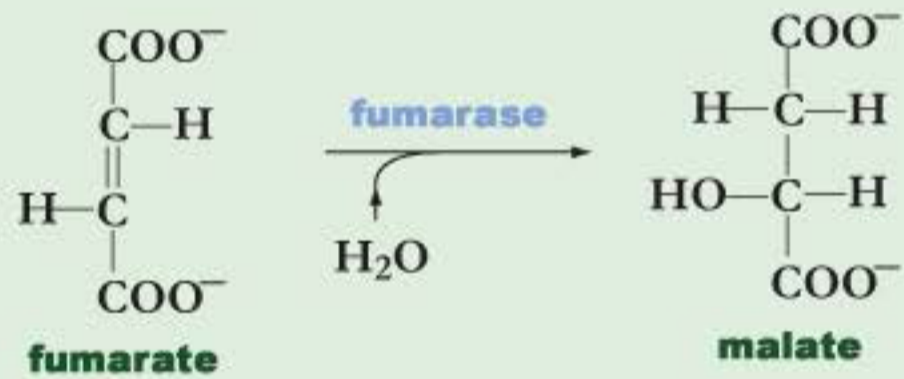
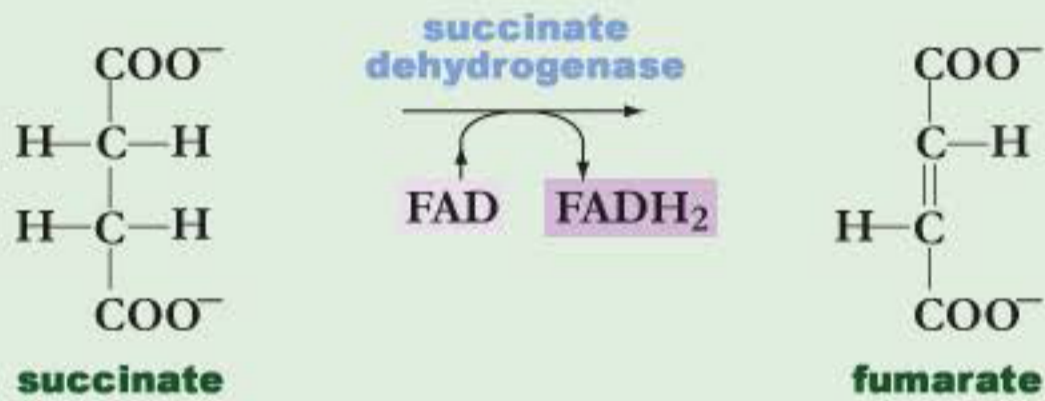
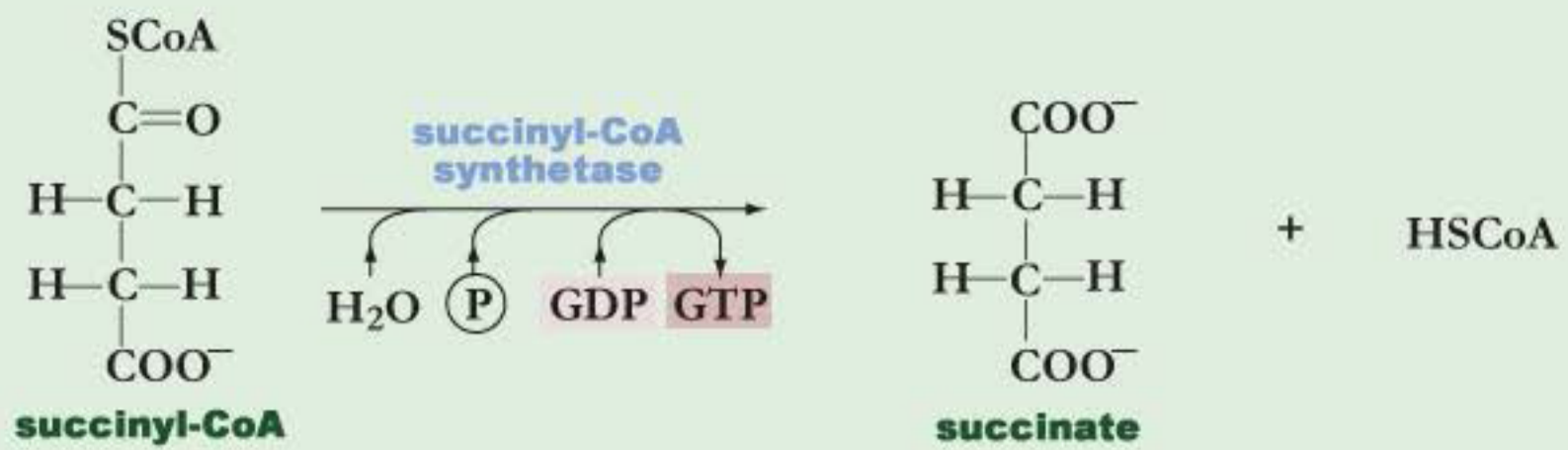


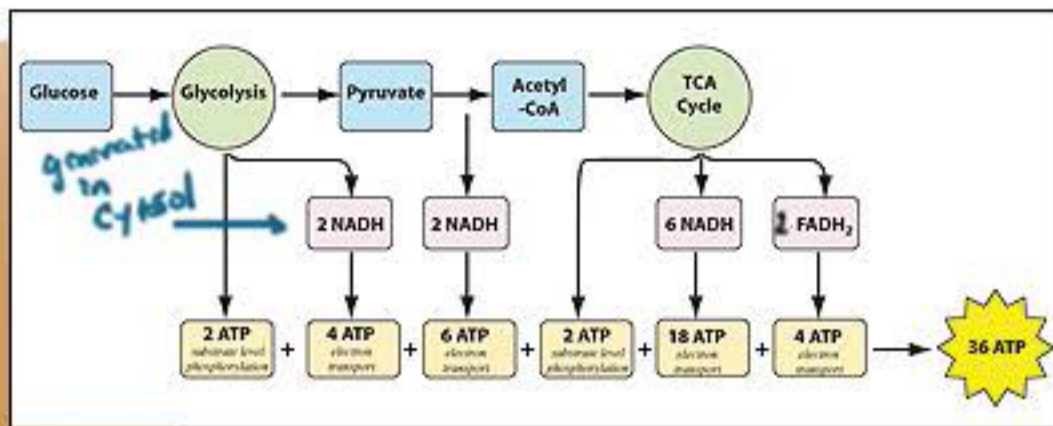
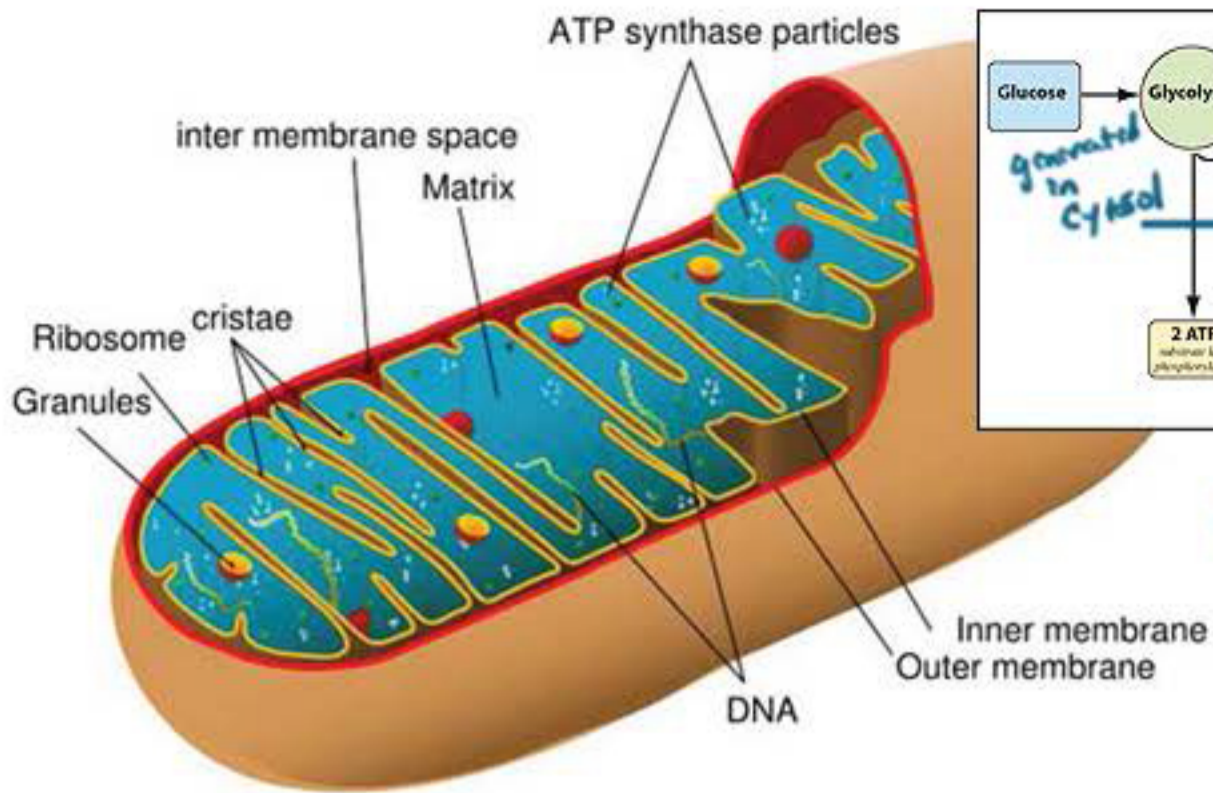
Malate



Oxaloacetate







*NADH from glycolysis, electrons are shuttled.*

*Aerobic bacteria yield 38 ATP*