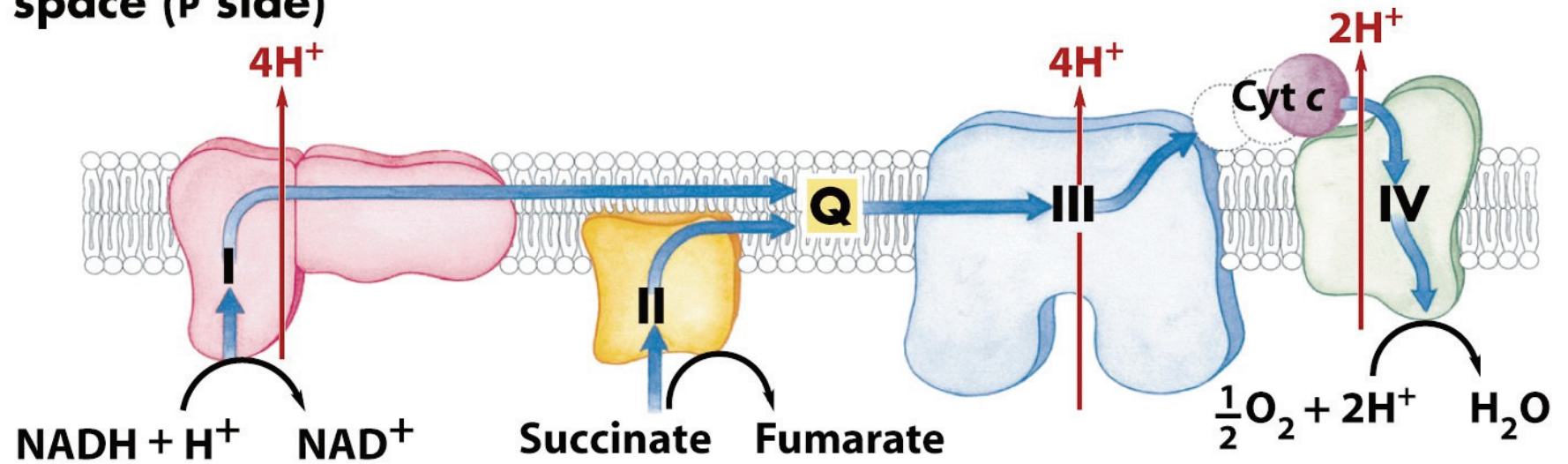
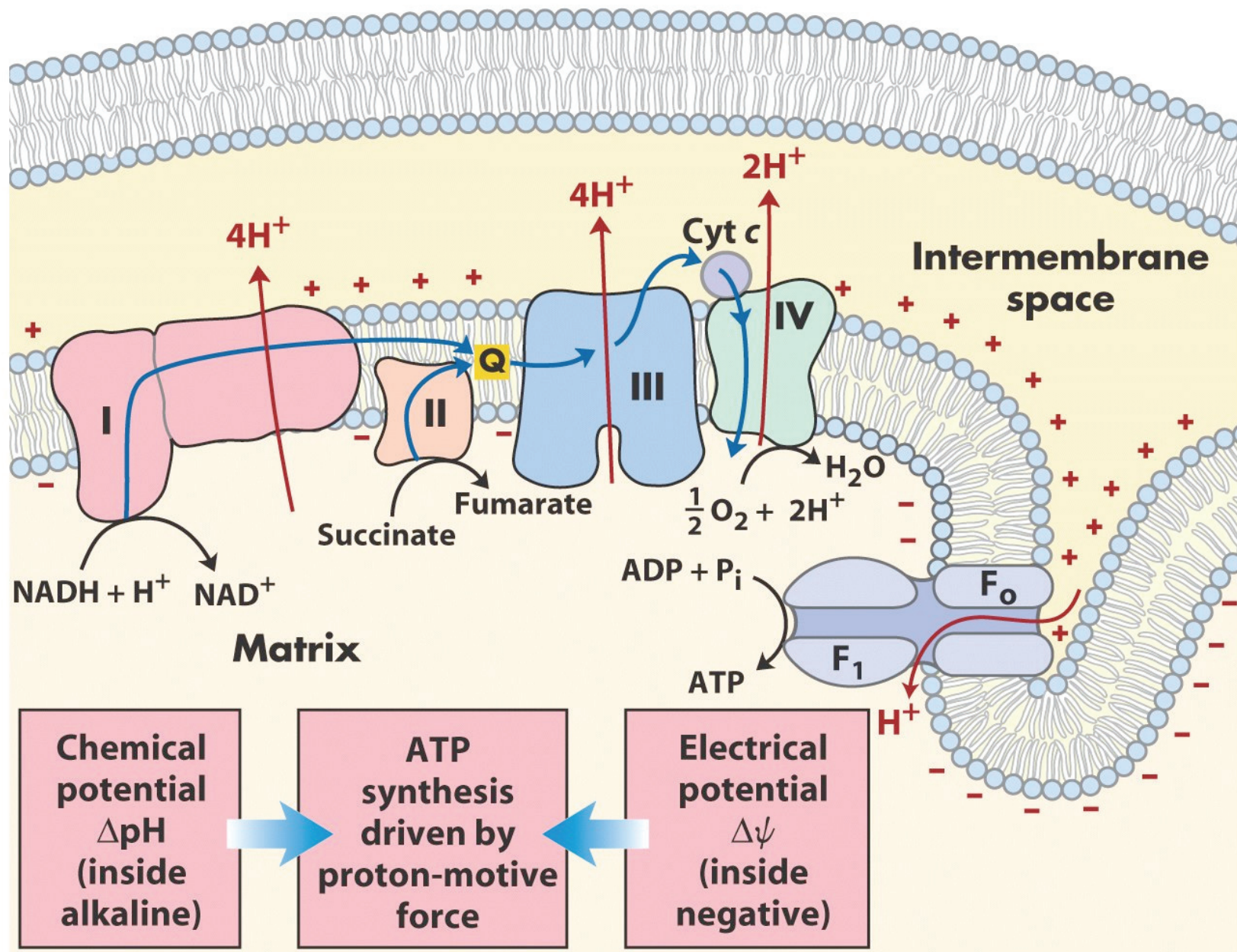
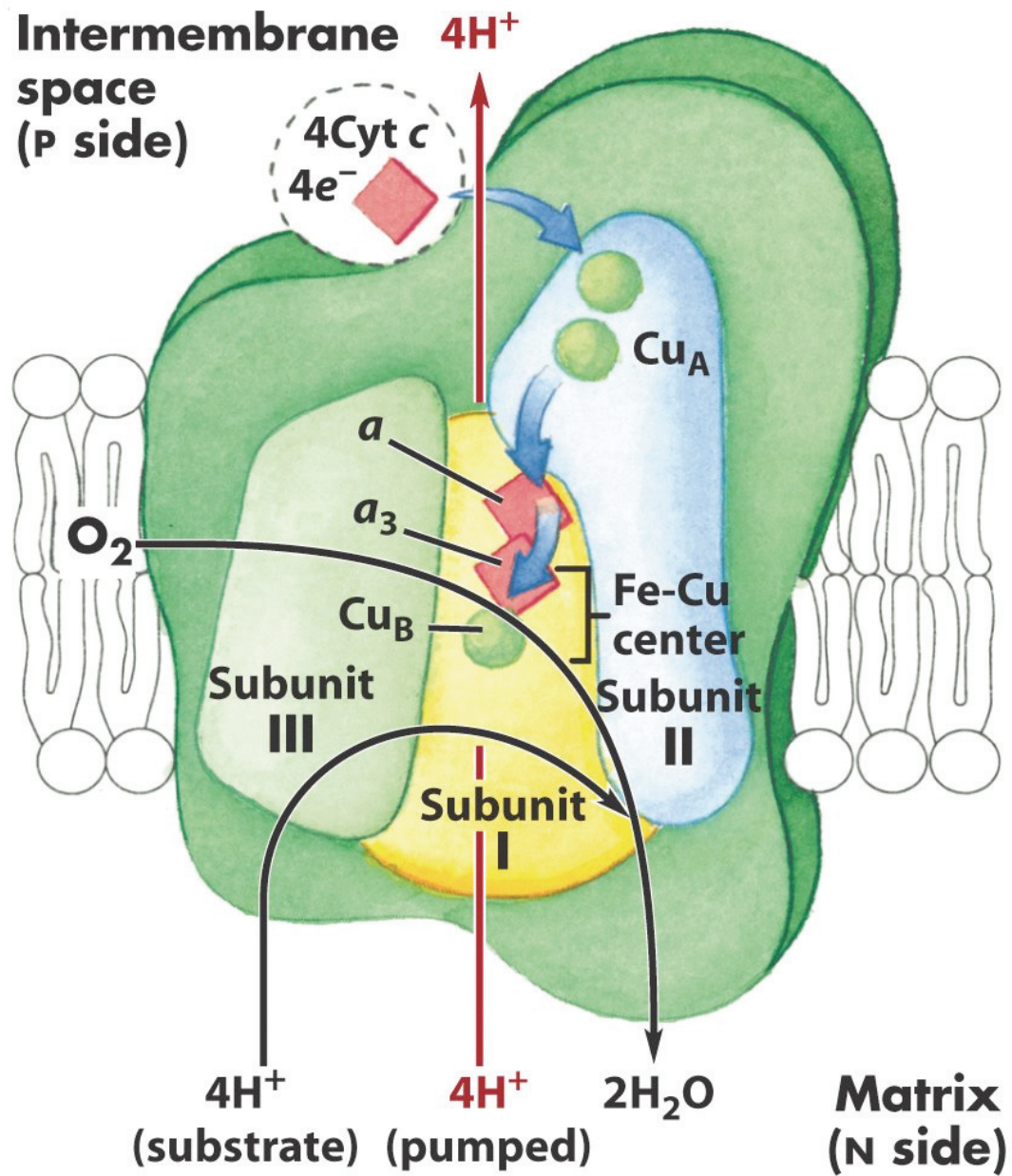


**Intermembrane  
space (P side)**

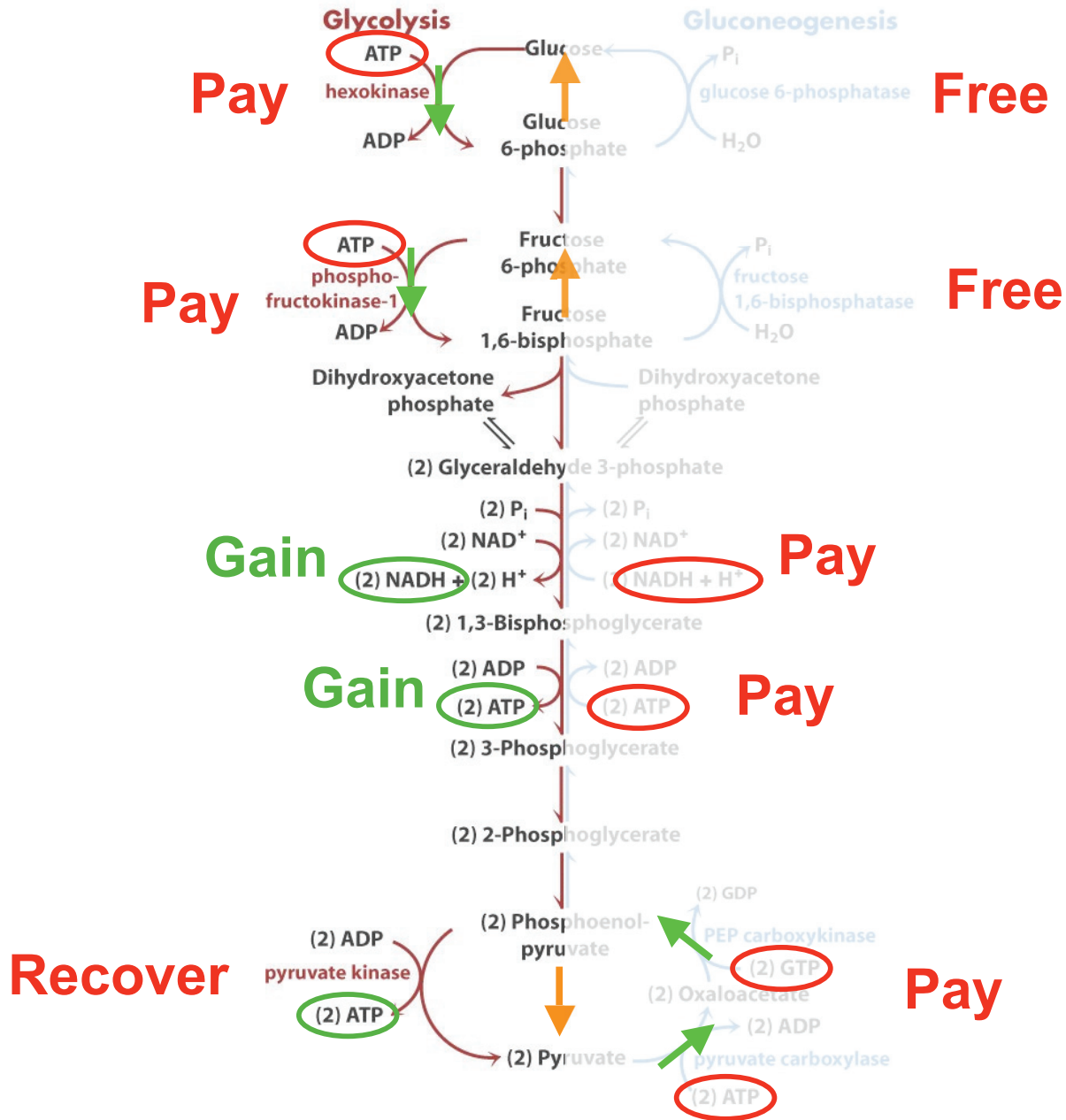


**Matrix (N side)**





Degrade sugars



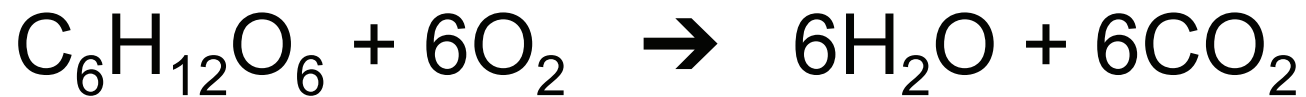
Synthesize sugars



# Break 'em down - Build 'em up

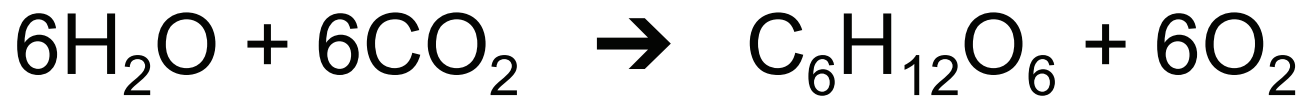
## Glycolysis

-686 kcal/mol



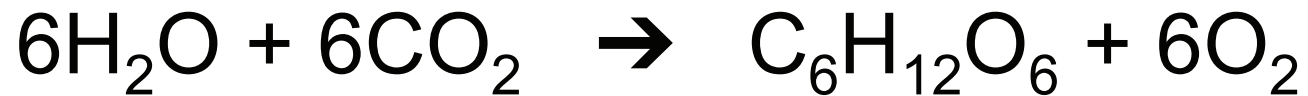
## Gluconeogenesis

+686 kcal/mol



## Gluconeogenesis

+686 kcal/mol



Where does all of that energy  
come from?

1)  $\text{NAD}^+$

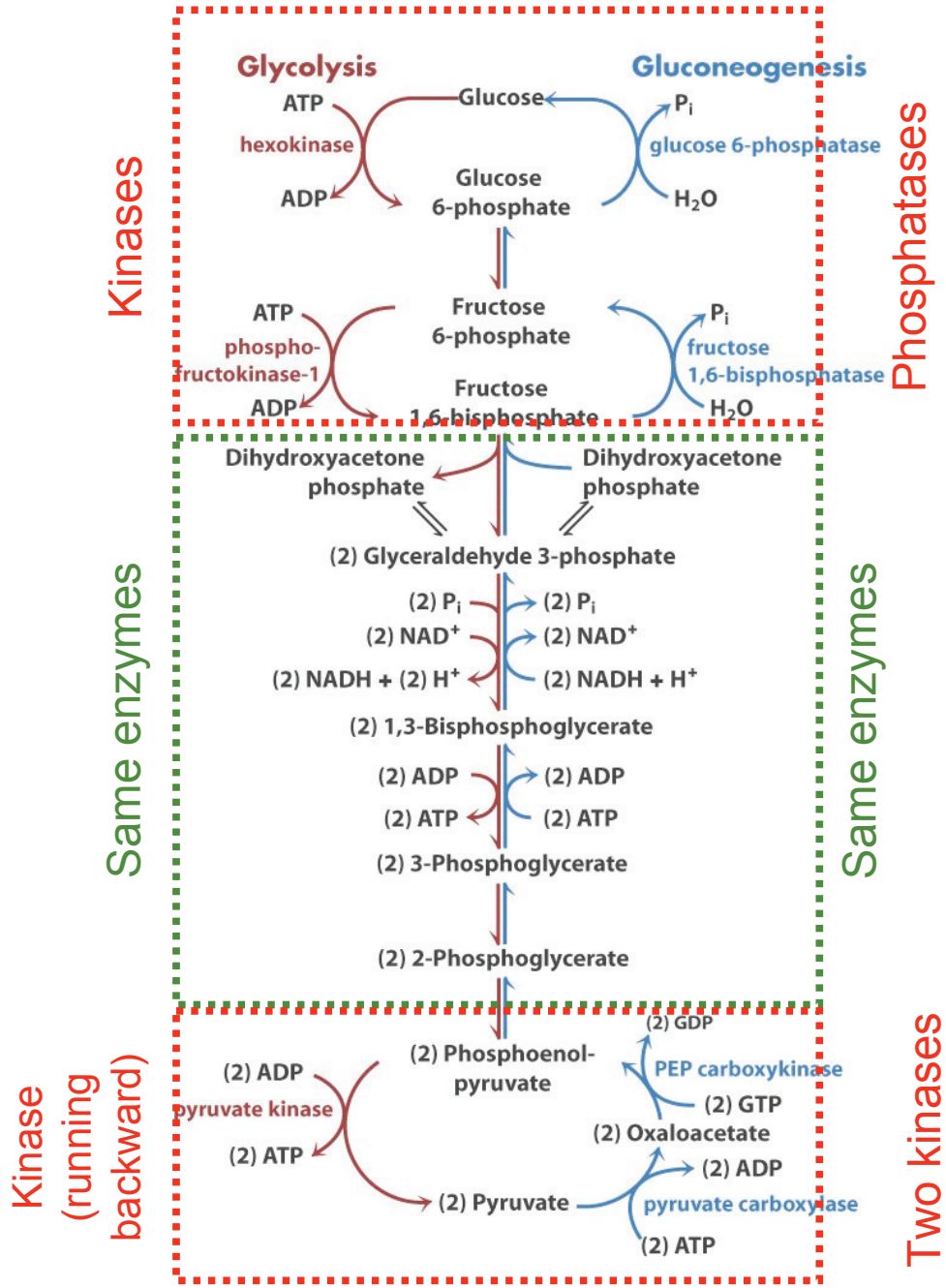
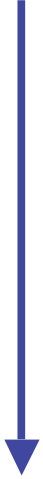
2) ATP

3) electric aura



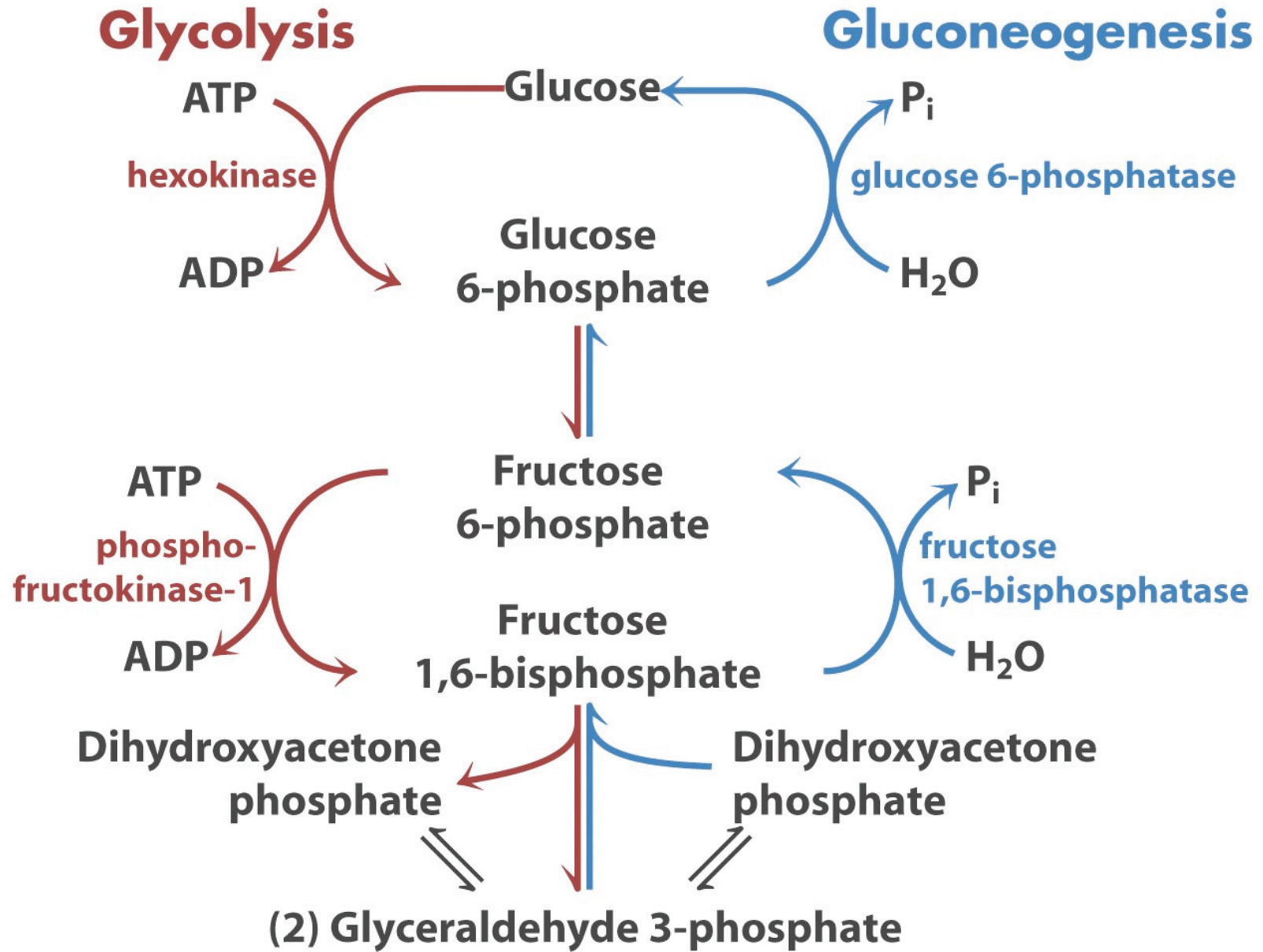


Degrade sugars

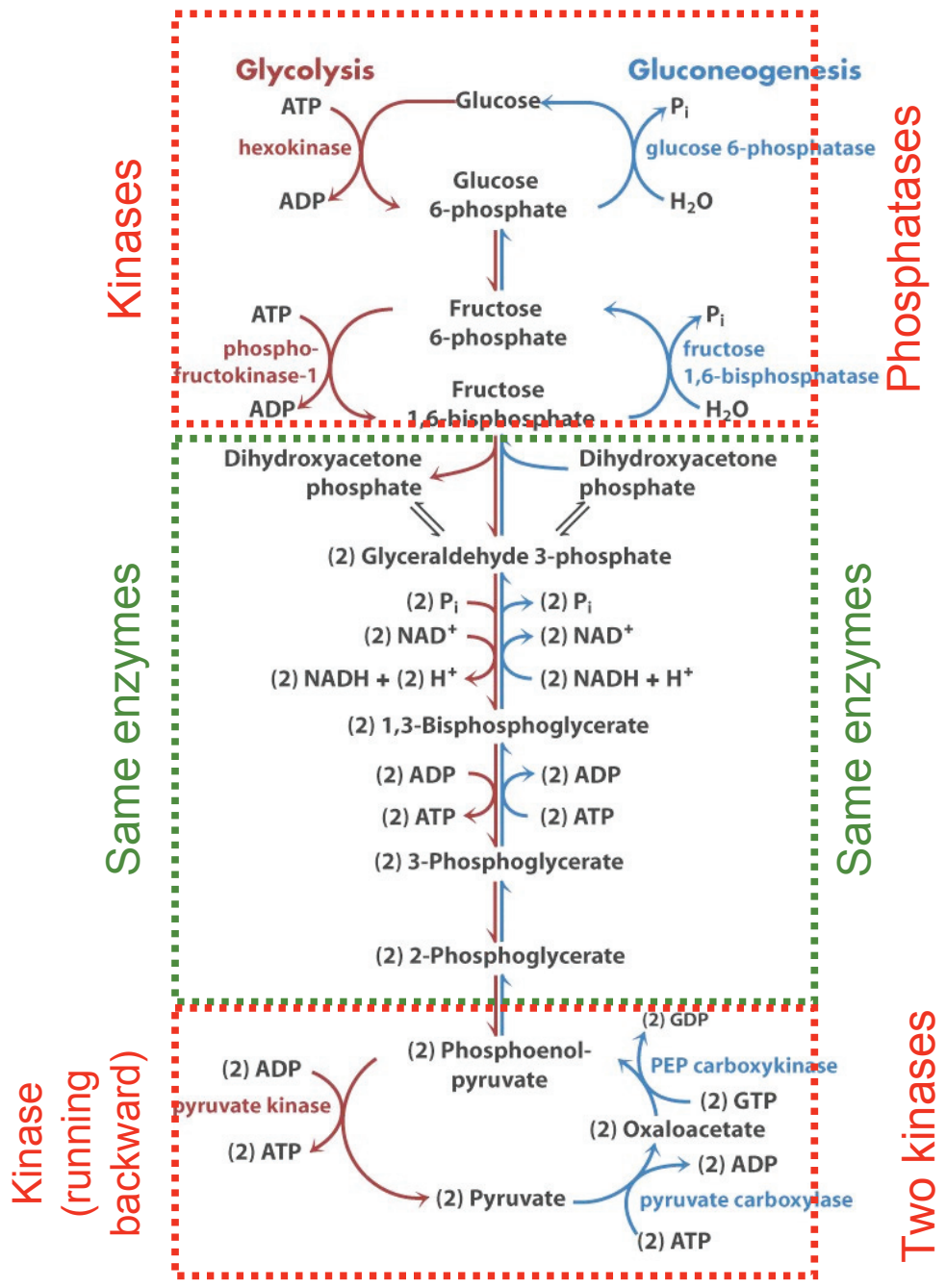


Synthesize sugars



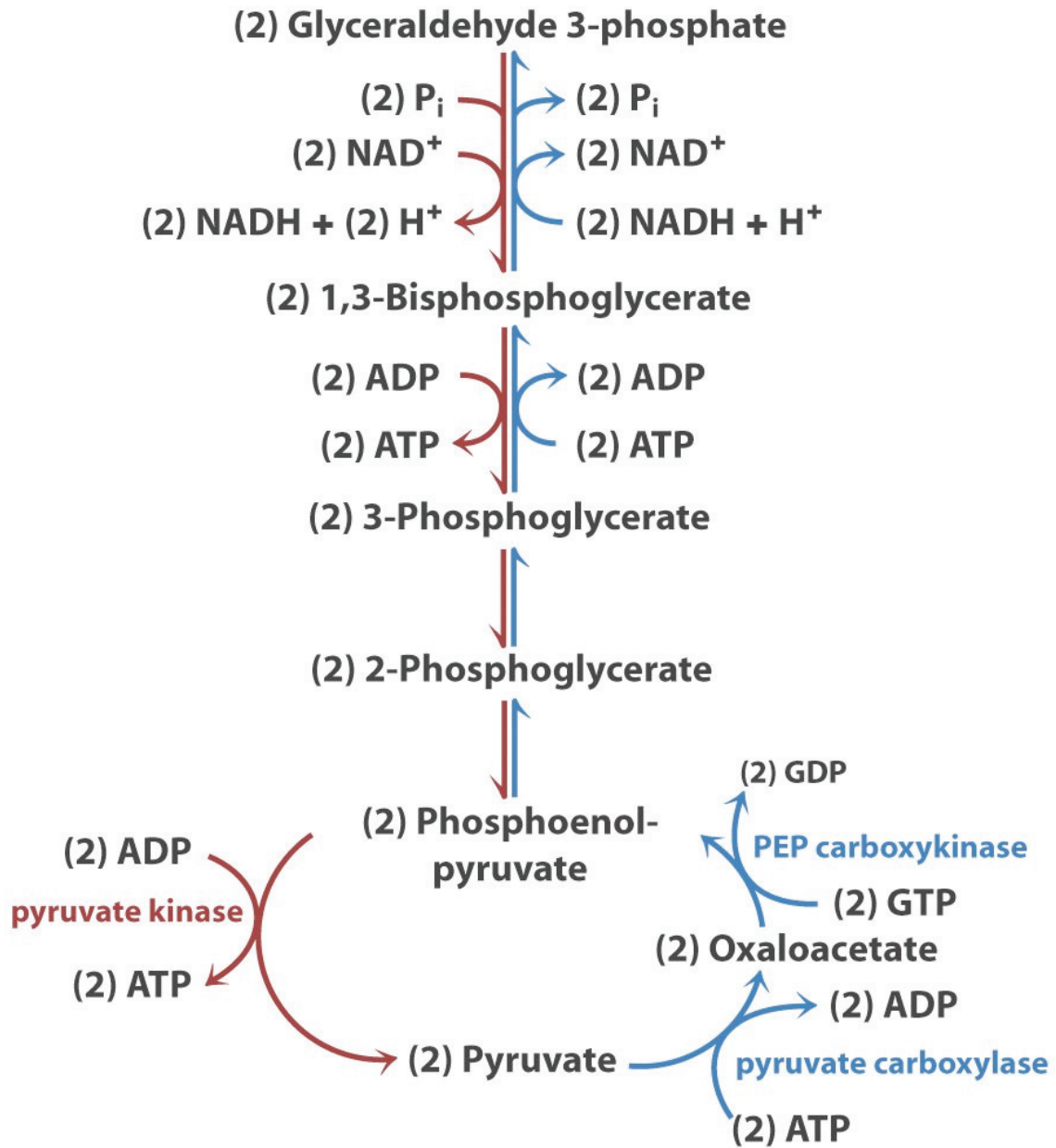


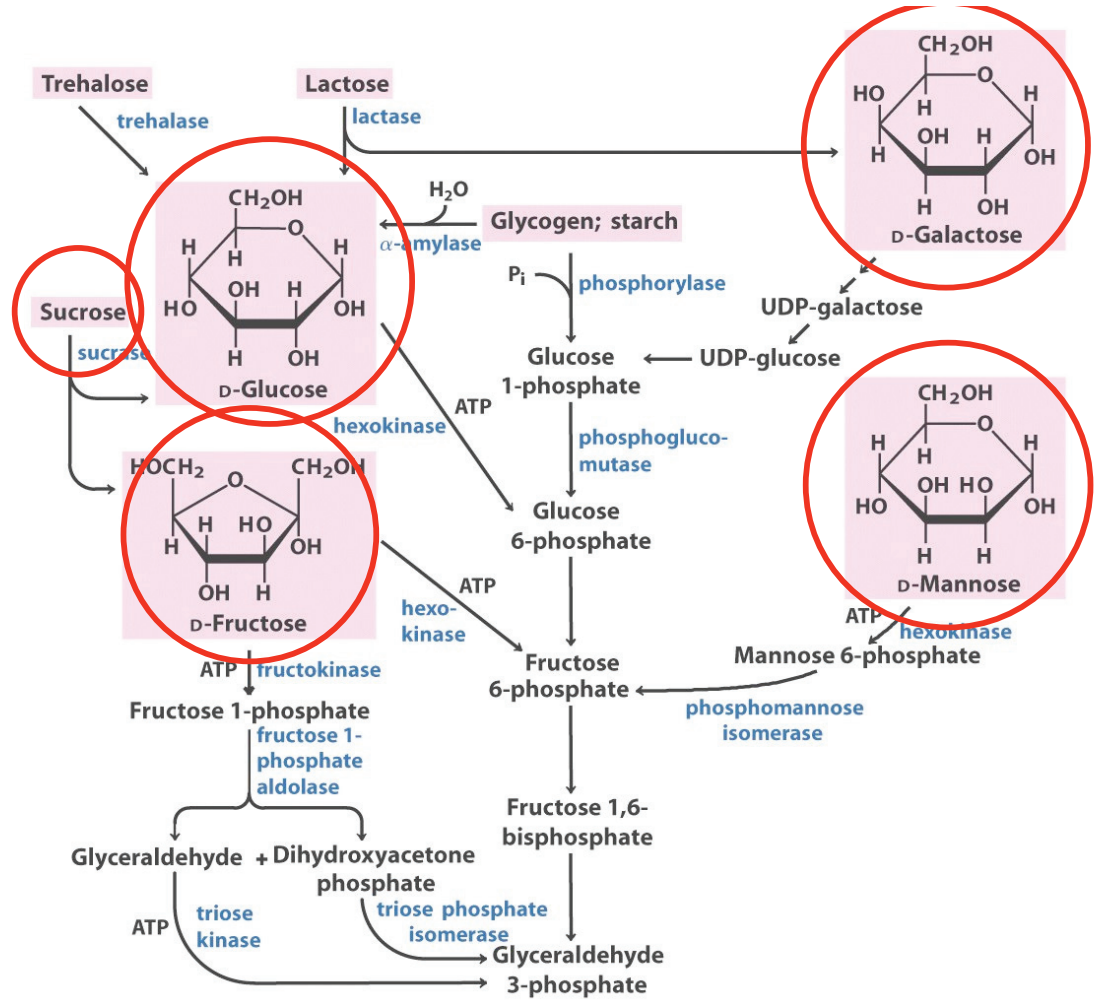
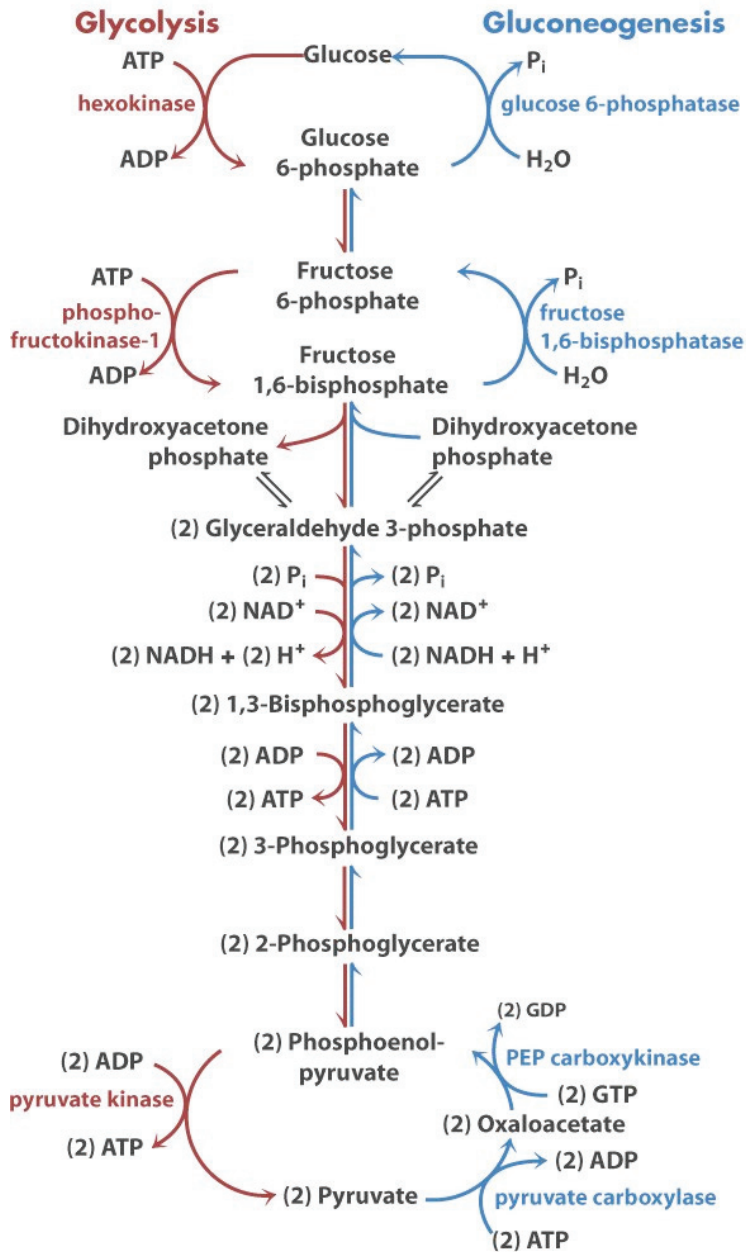
Degrade sugars



Synthesize sugars







Various sugars feed into Glycolysis

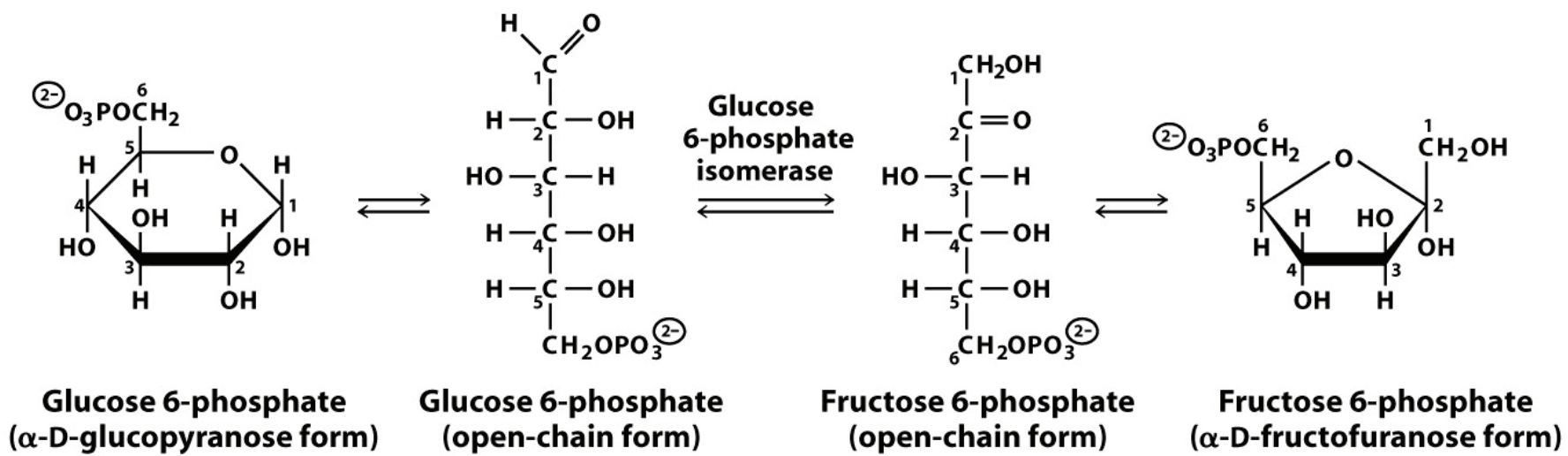
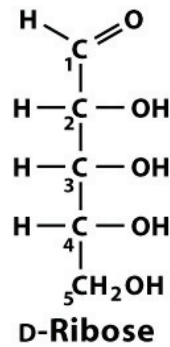
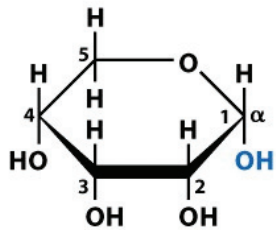
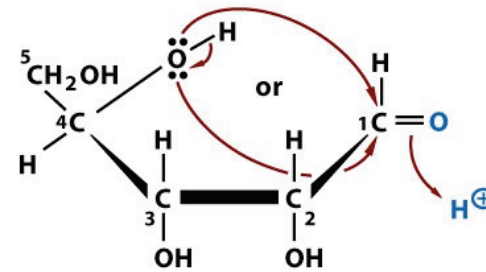
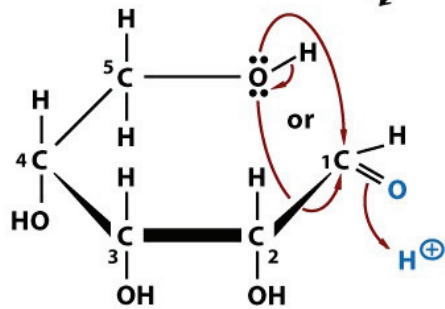


Figure 11-4 Principles of Biochemistry, 4/e  
 © 2006 Pearson Prentice Hall, Inc.

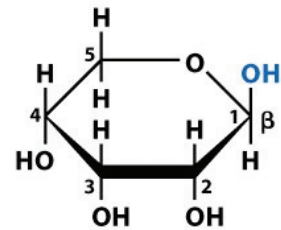


D-Ribose  
(Fischer projection)



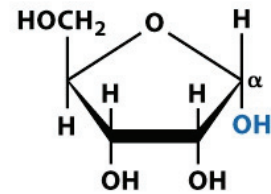
$\alpha$ -D-Ribopyranose  
(Haworth projection)

21.5%



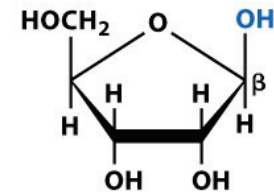
$\beta$ -D-Ribopyranose  
(Haworth projection)

58.5%



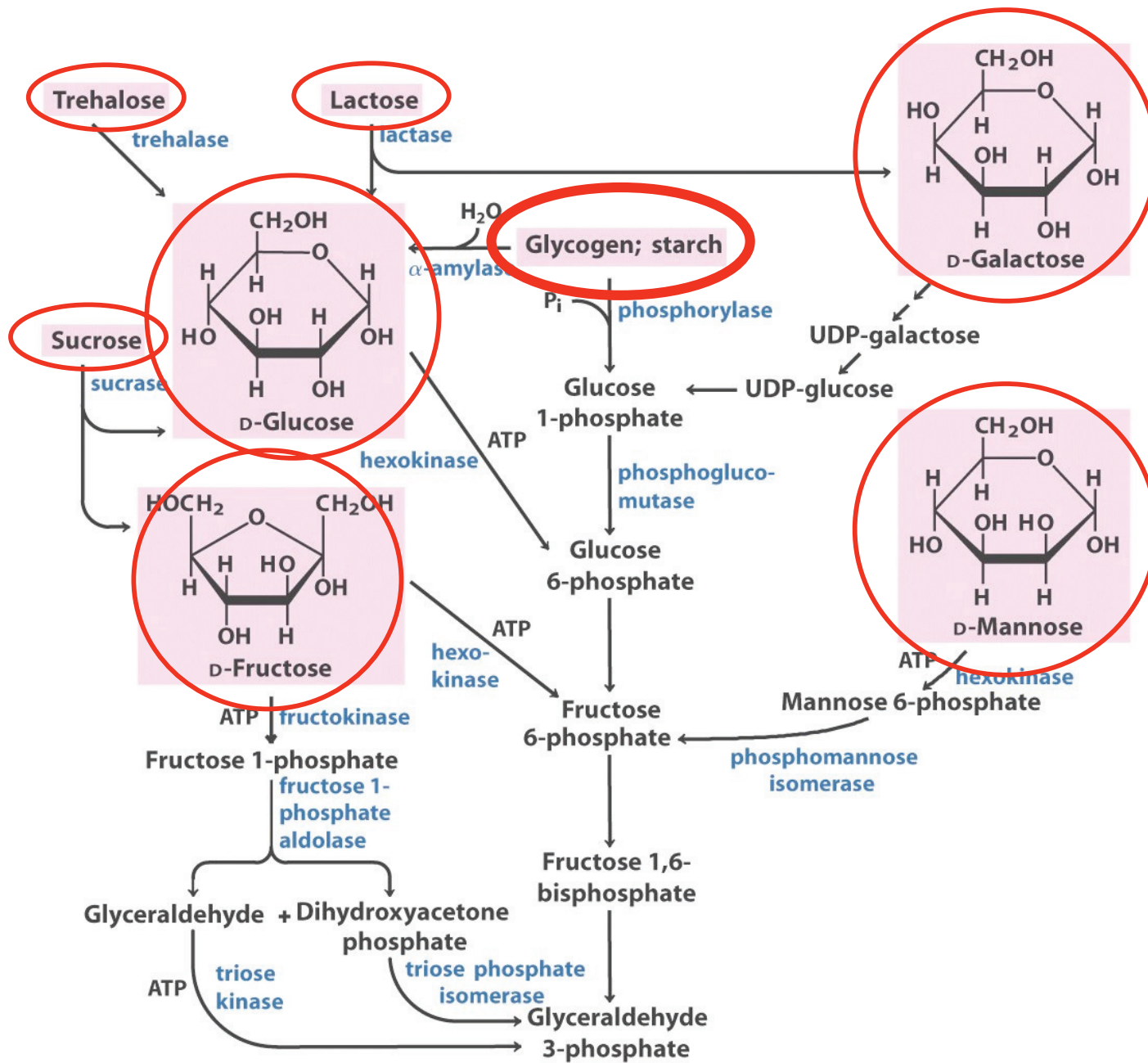
$\alpha$ -D-Ribofuranose  
(Haworth projection)

6.5%

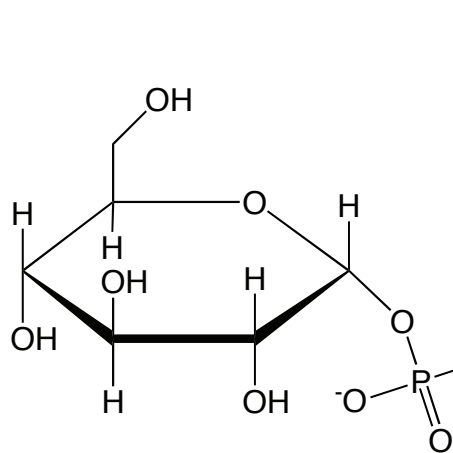


$\beta$ -D-Ribofuranose  
(Haworth projection)

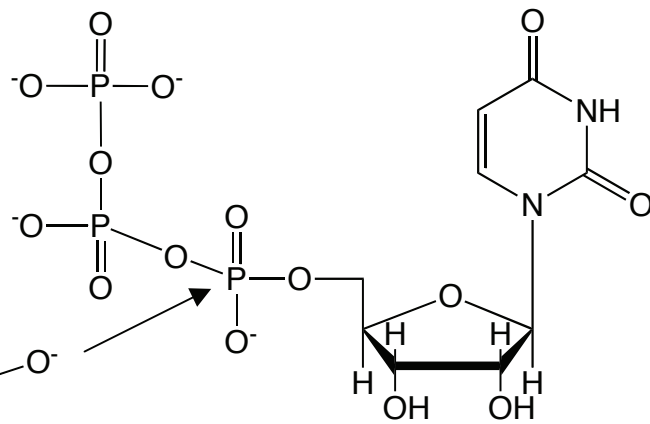
13.5%



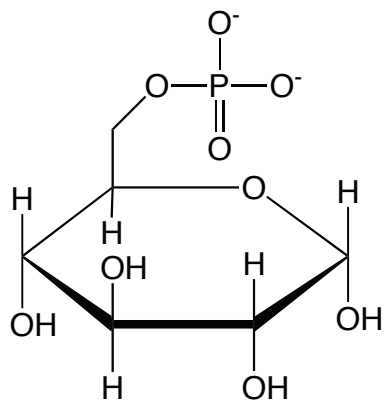




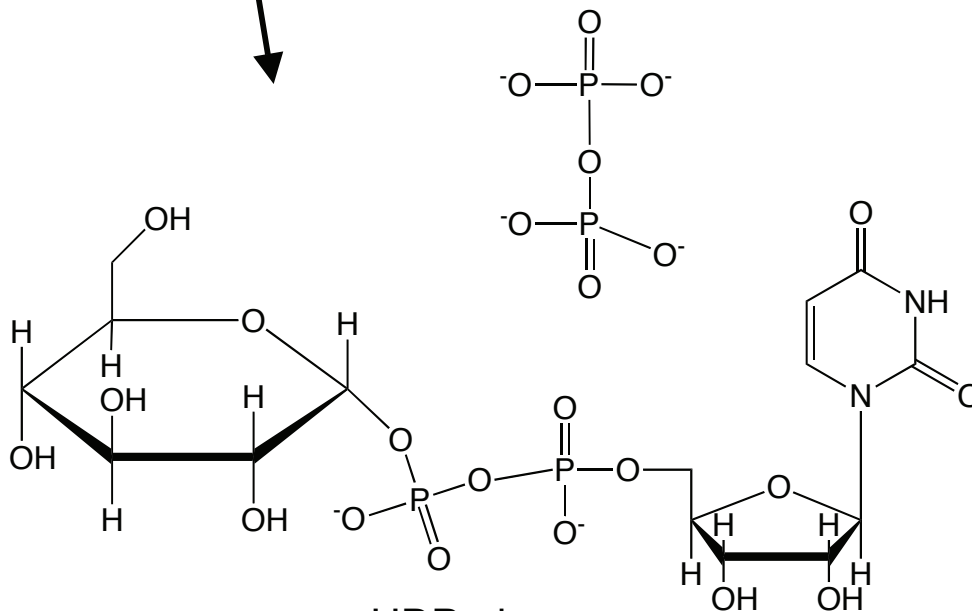
$\alpha$ -D-glucose-1-phosphate



UTP

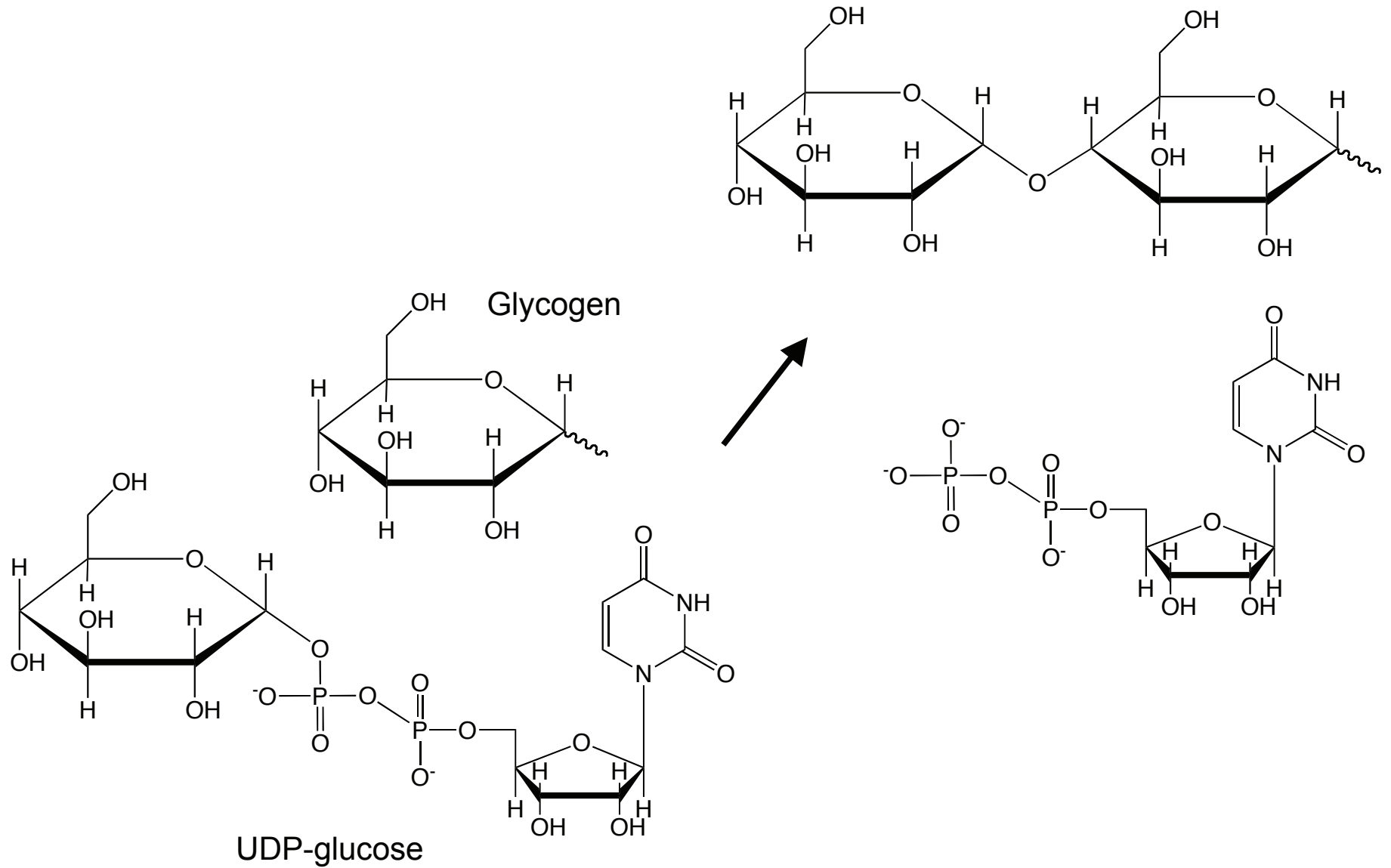


$\alpha$ -D-glucose-6-phosphate

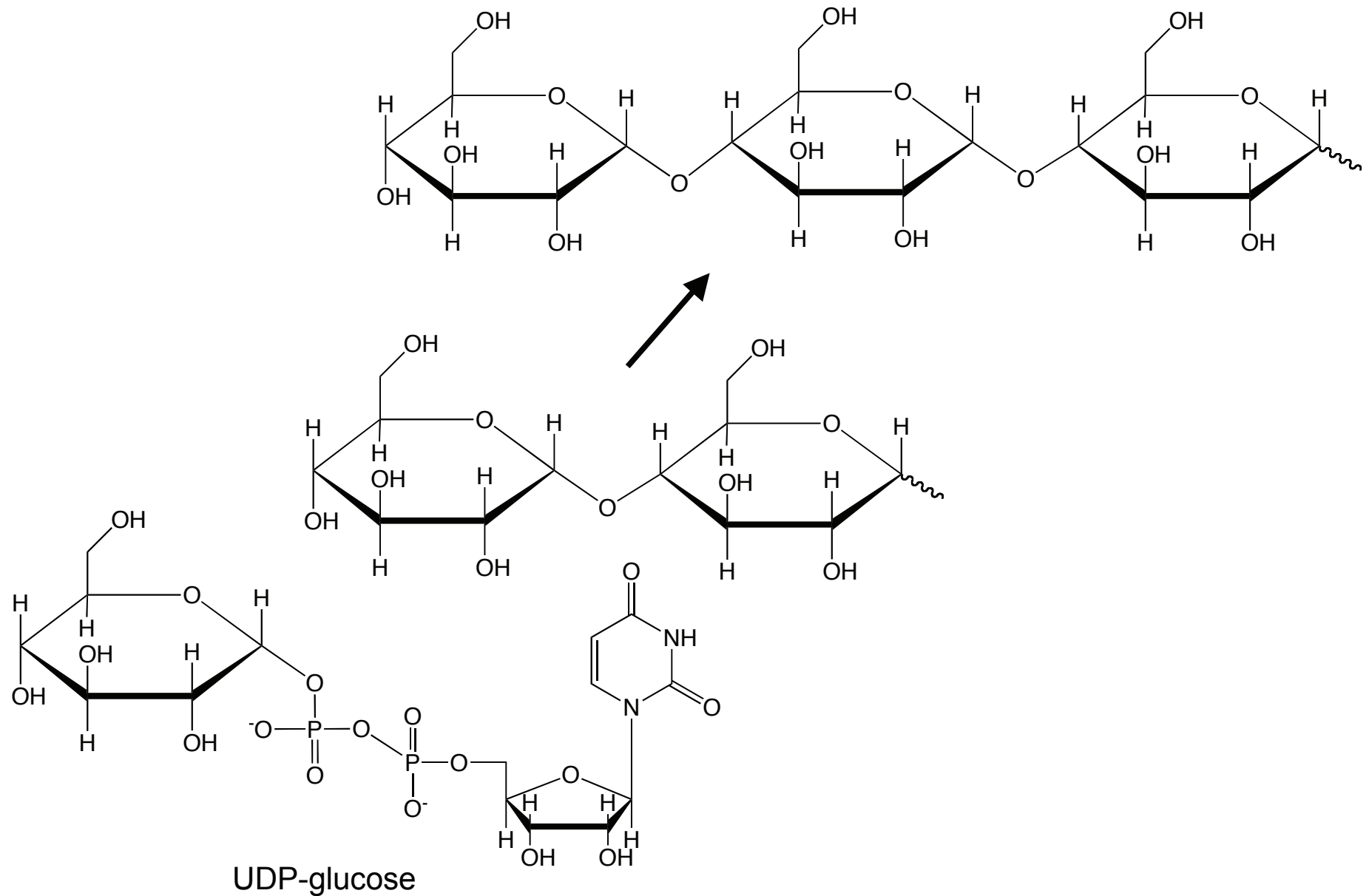


UDP-glucose

# Glycogen synthesis

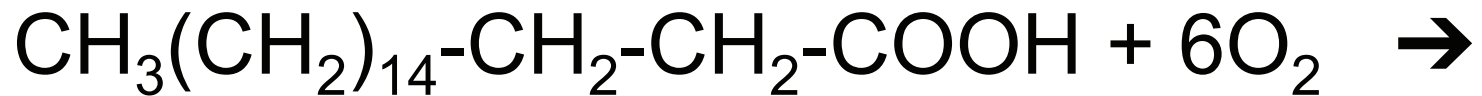


# Glycogen synthesis



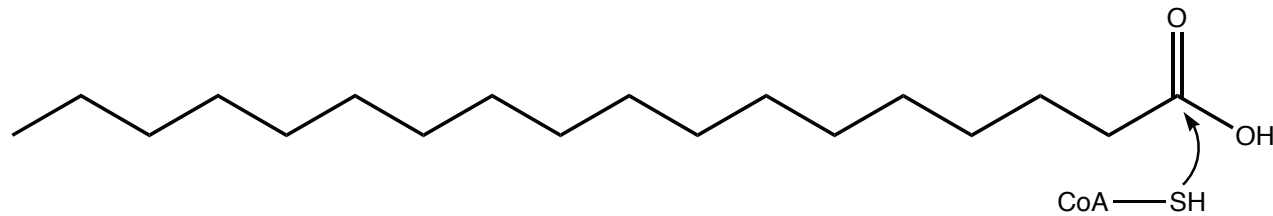
# Catabolism of Fatty Acids

Break 'em down

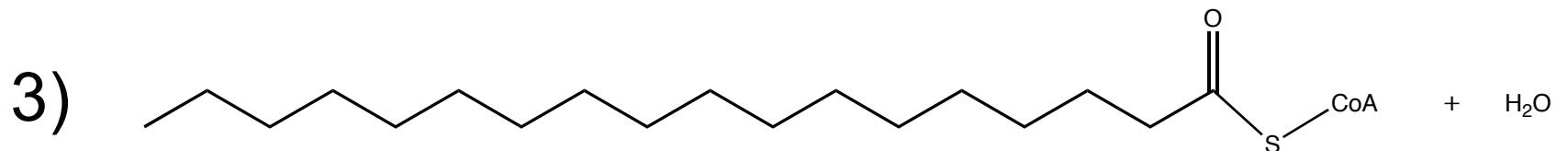
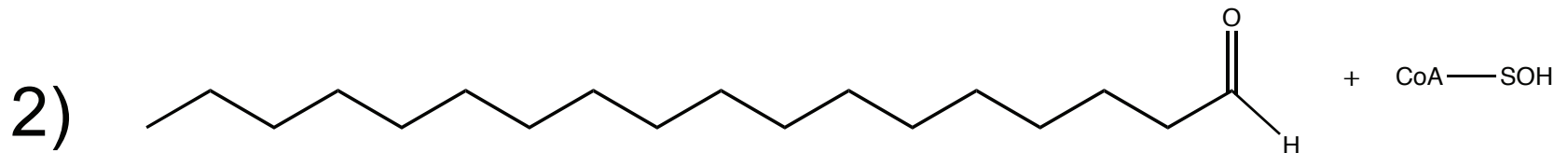
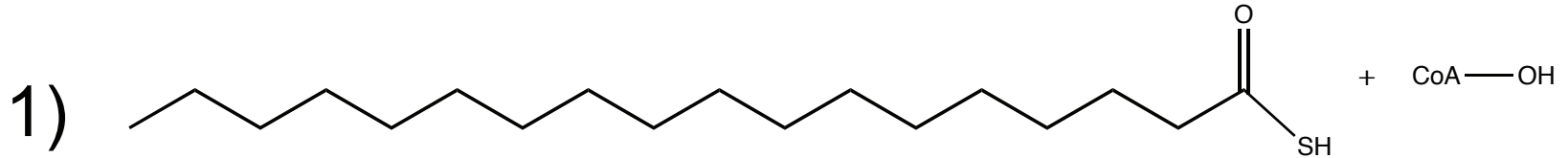




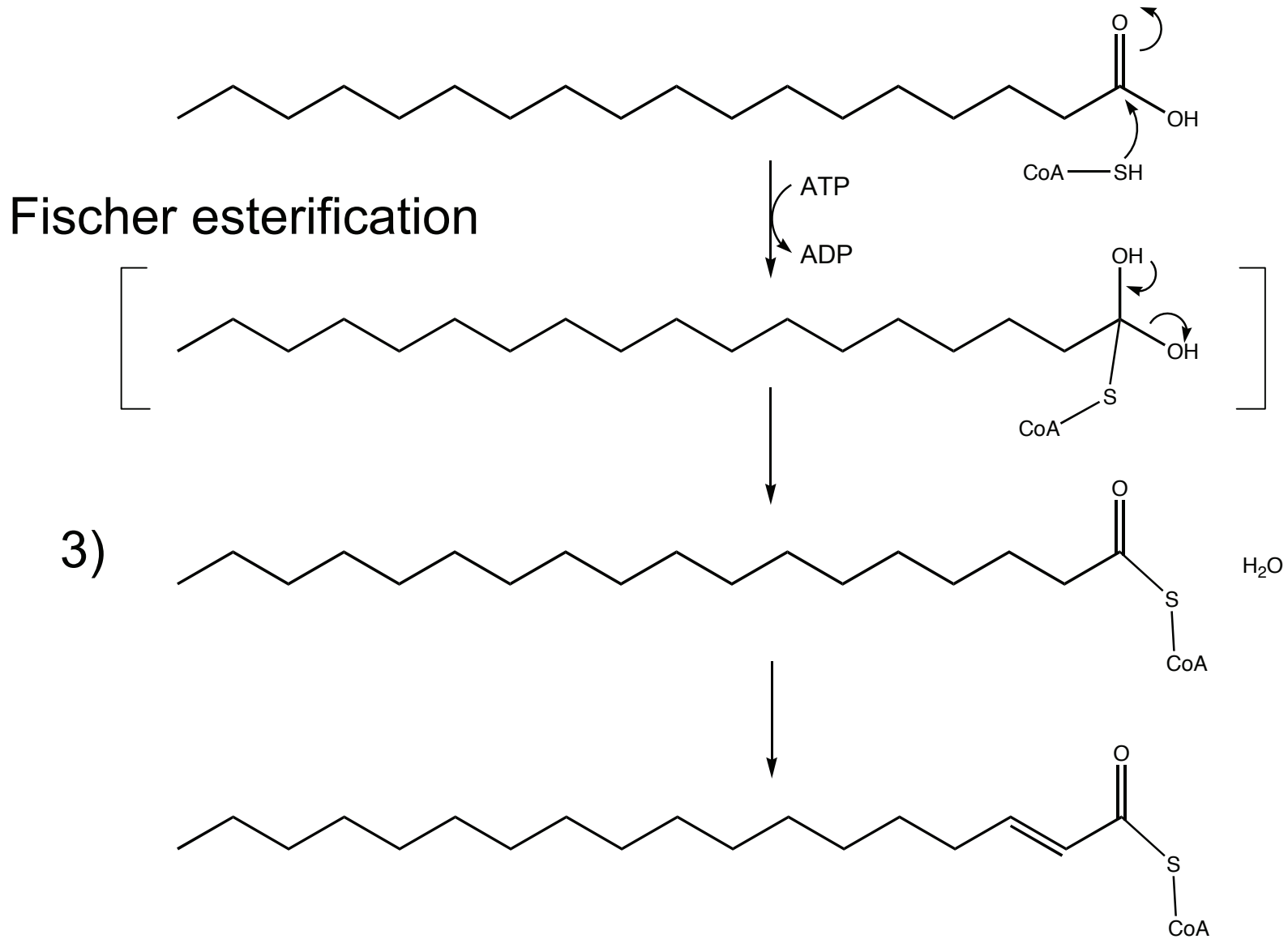
# Catabolism of fatty acids



Will likely yield



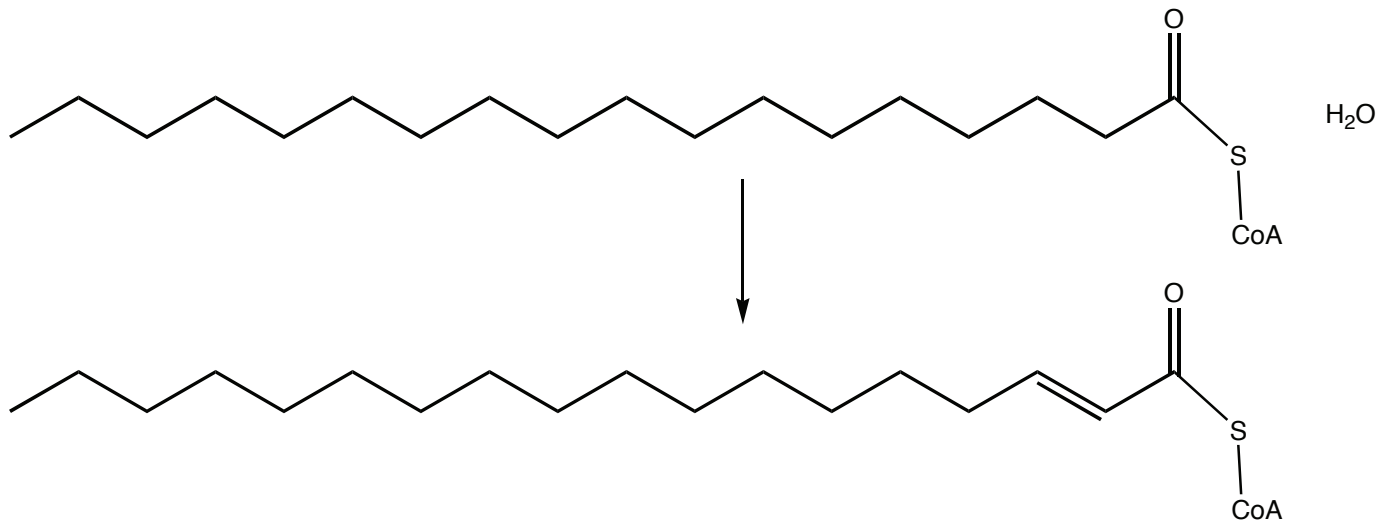
# Catabolism of fatty acids



# Catabolism of fatty acids

What kind of reaction is this?

- 1) Oxidation
- 2) Reduction
- 3) Hydrolysis
- 4) Nucleophilic attack

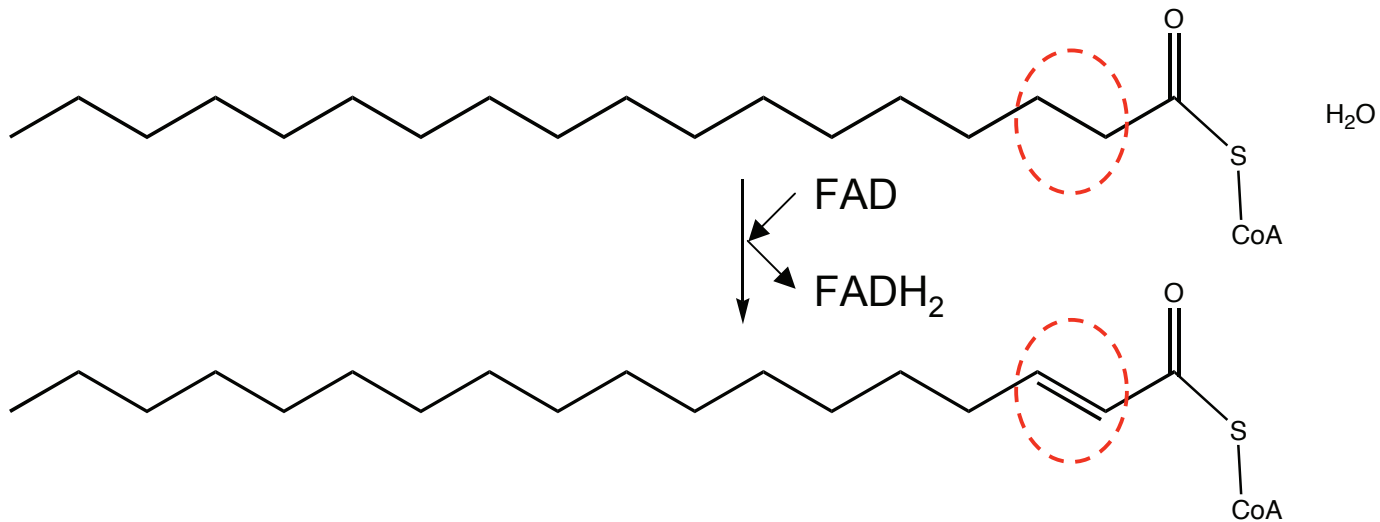




# Catabolism of fatty acids

What kind of reaction is this?

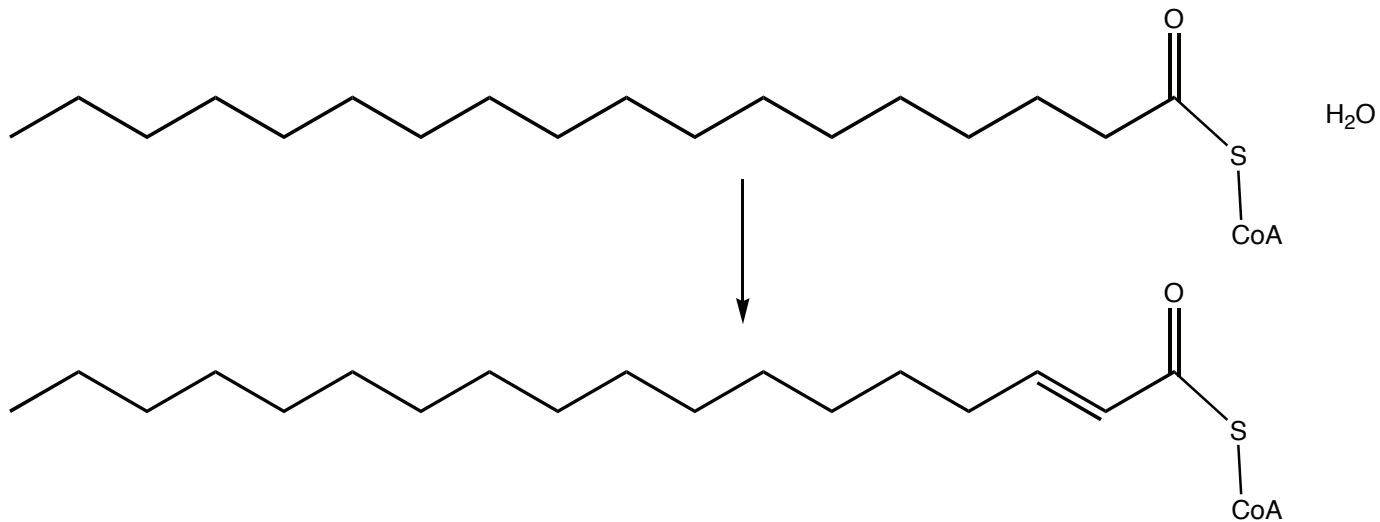
- 1) Oxidation
- 2) Reduction
- 3) Hydrolysis
- 4) Nucleophilic attack



# Catabolism of fatty acids

Which kind of enzyme would catalyze this?

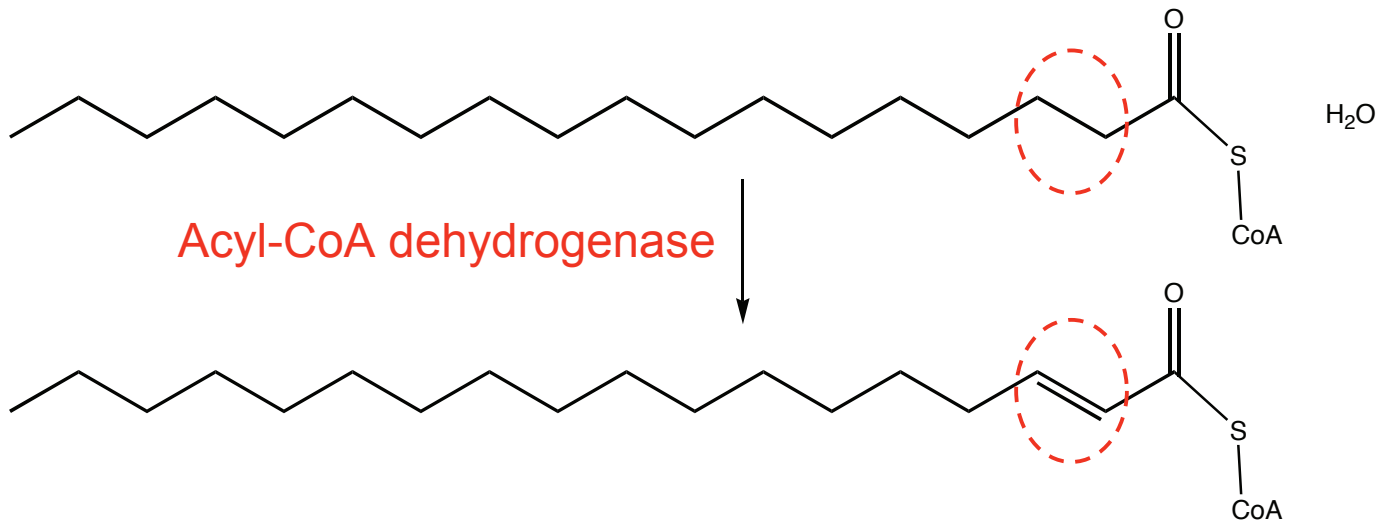
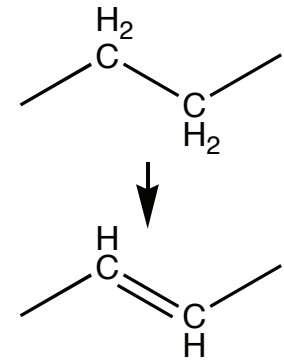
- 1) Mutase
- 2) Dehydrogenase
- 3) Kinase
- 4) Isomerase



# Catabolism of fatty acids

Which kind of enzyme would catalyze this?

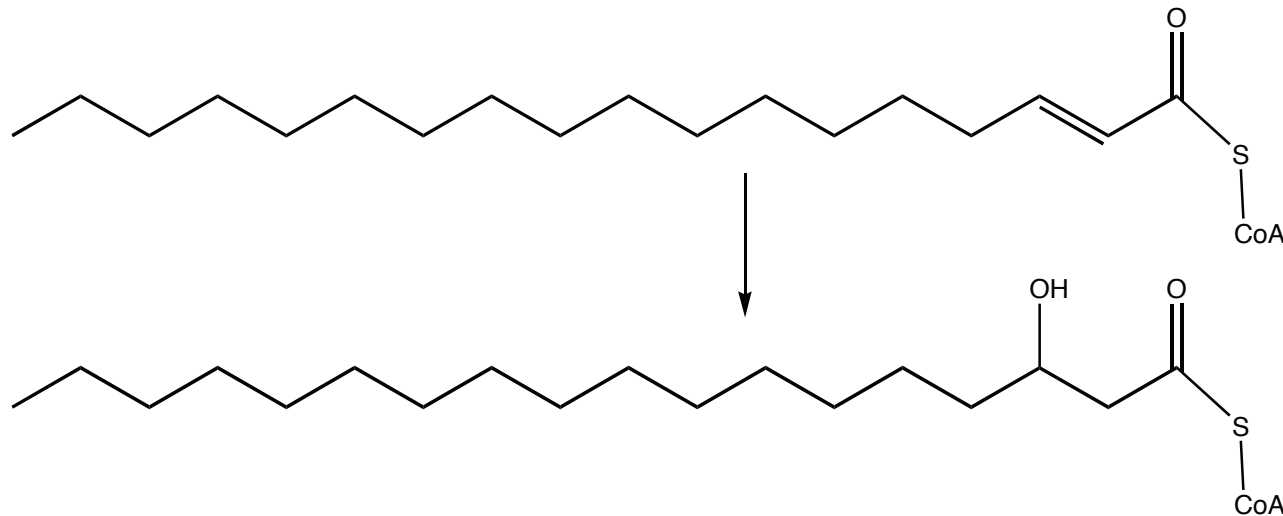
- 1) Mutase
- 2) Dehydrogenase
- 3) Kinase
- 4) Isomerase



# Catabolism of fatty acids

What kind of reaction is this?

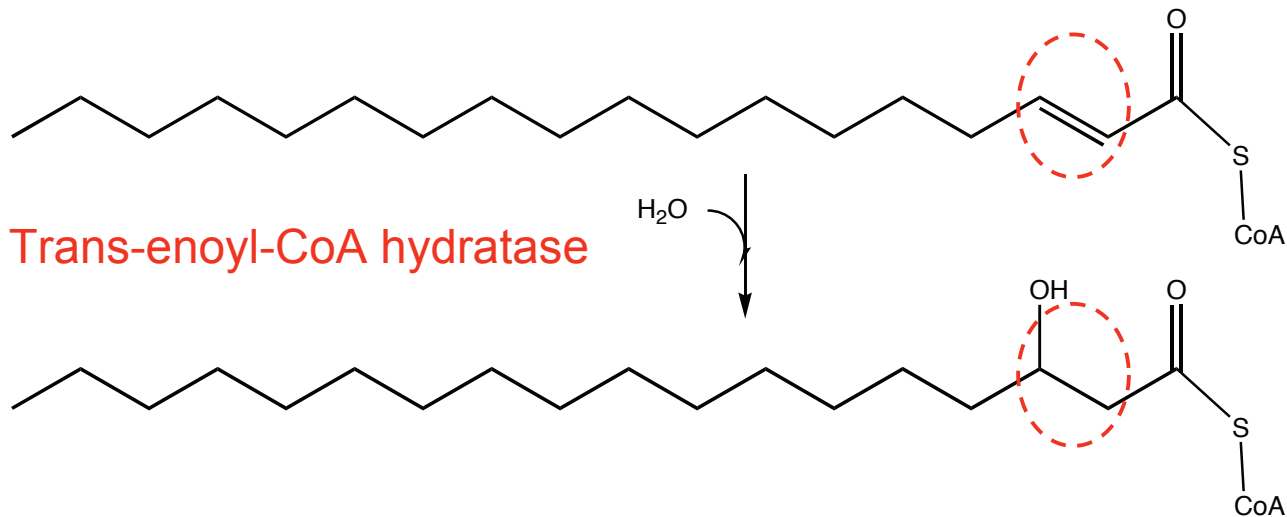
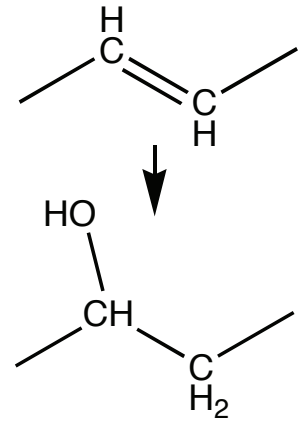
- 1) Oxidation
- 2) Reduction
- 3) Addition
- 4) Elimination



# Catabolism of fatty acids

What kind of reaction is this?

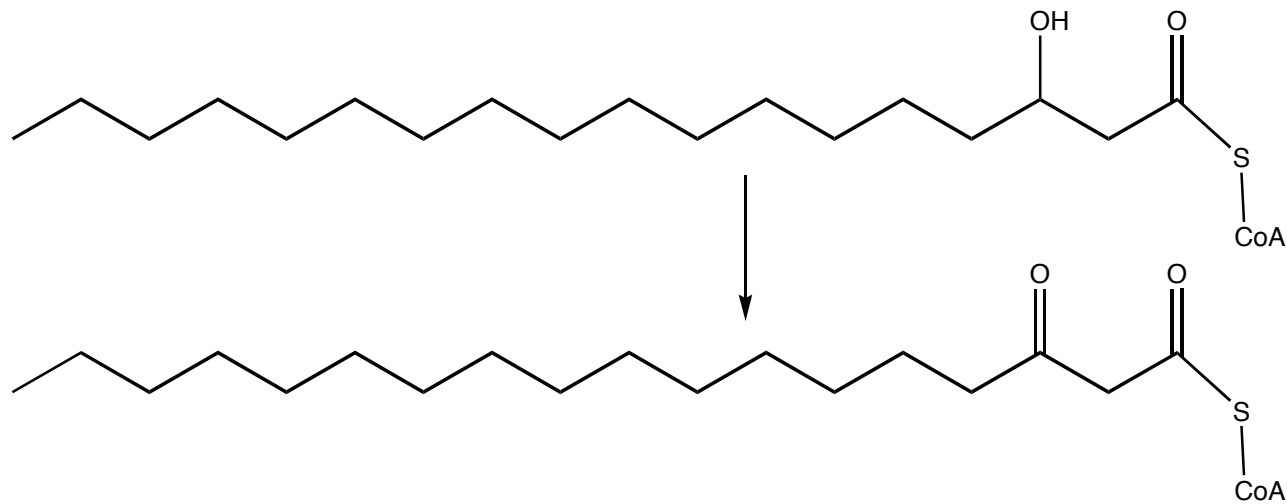
- 1) Oxidation
- 2) Reduction
- 3) Addition
- 4) Elimination



# Catabolism of fatty acids

What kind of reaction is this?

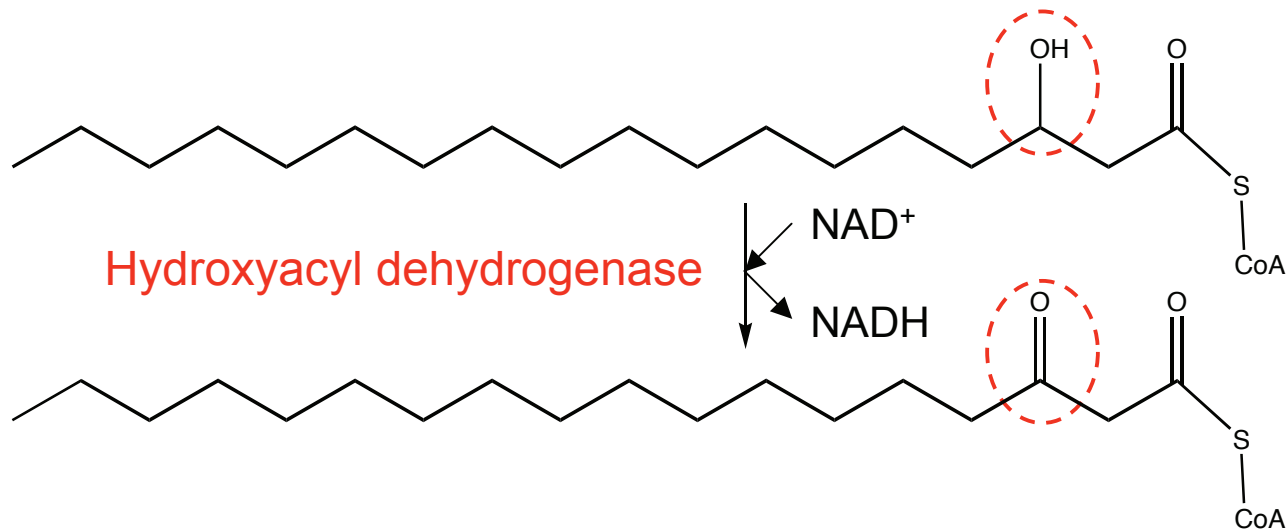
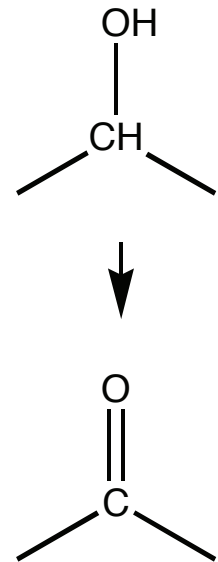
- 1) Oxidation
- 2) Reduction
- 3) Addition
- 4) Elimination



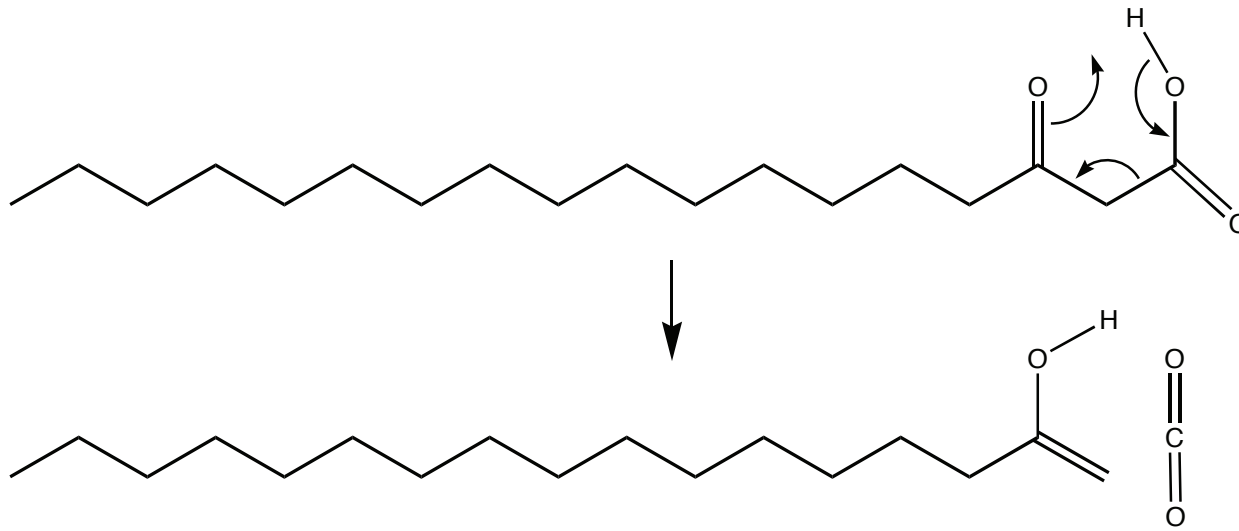
# Catabolism of fatty acids

What kind of reaction is this?

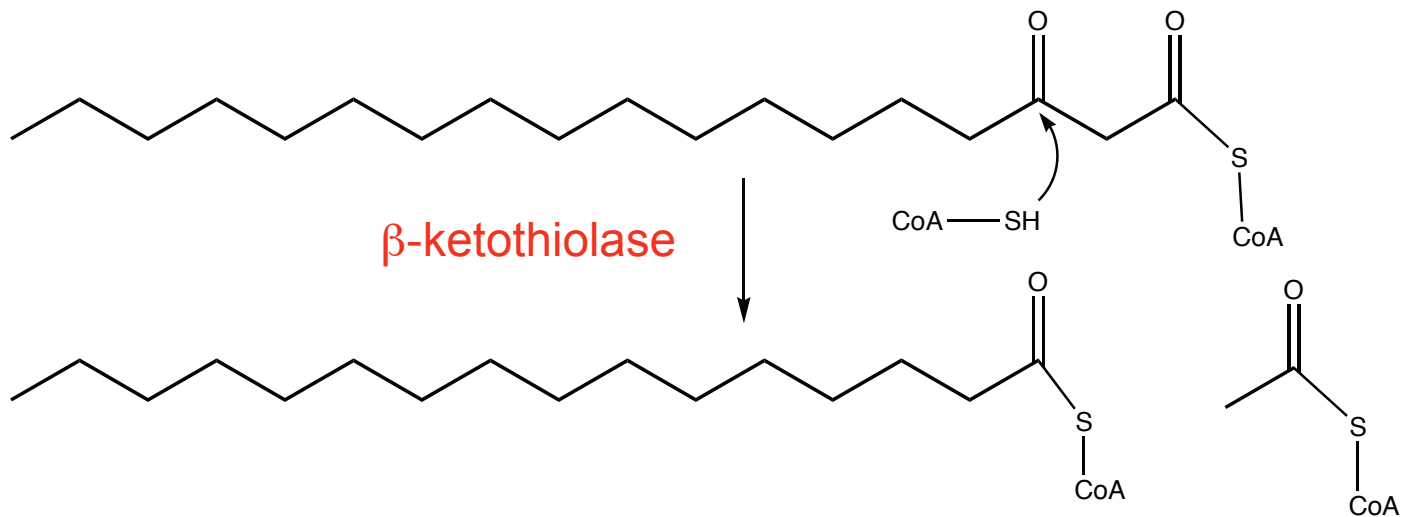
- 1) Oxidation
- 2) Reduction
- 3) Addition
- 4) Elimination



# Catabolism of fatty acids



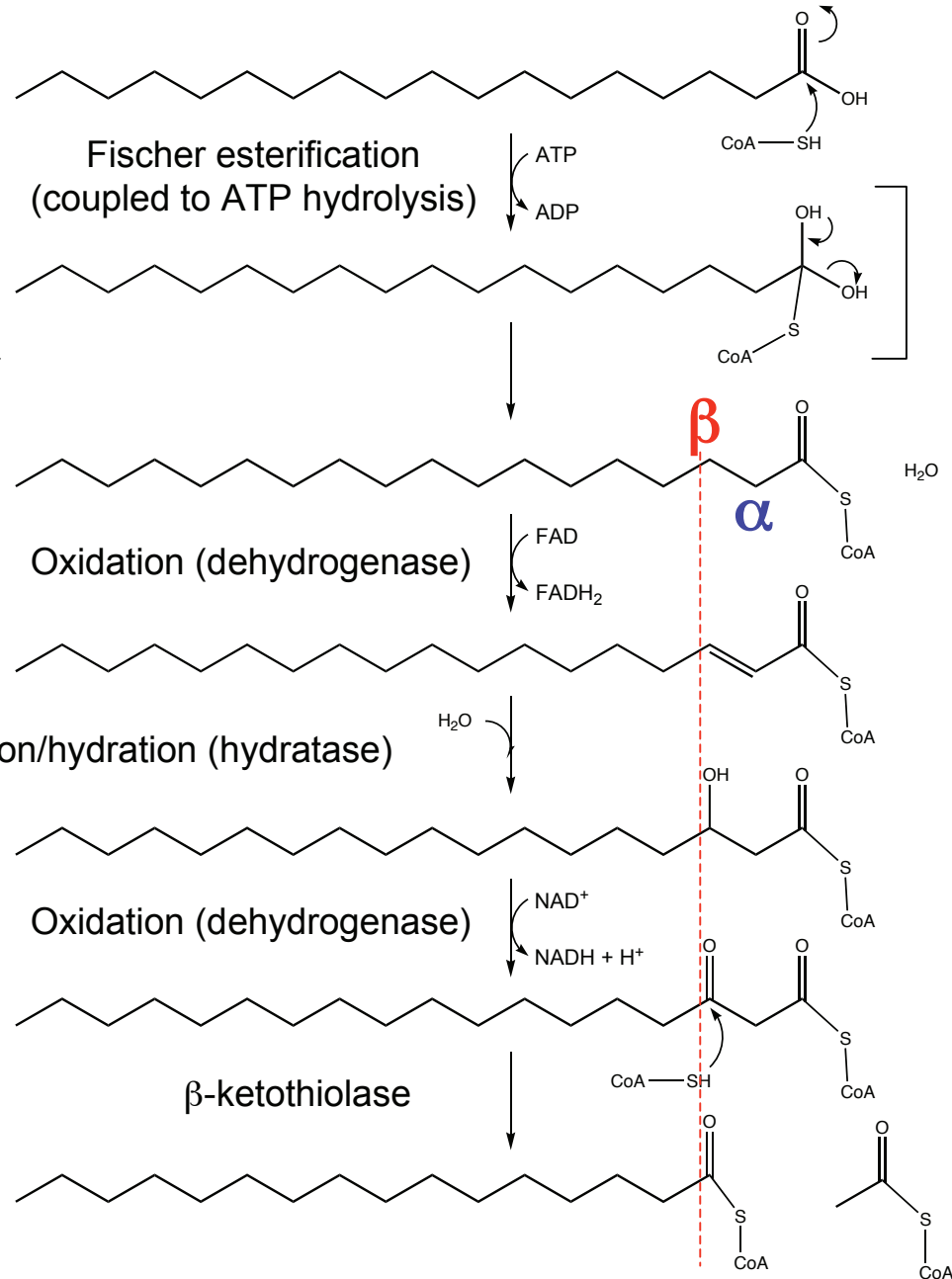
Not the same





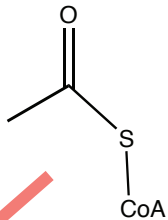
# Catabolism of fatty acids

C18 Fatty Acid



$\beta$  oxidation of  
fatty acids

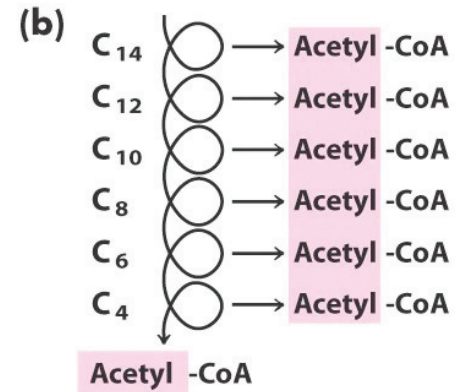
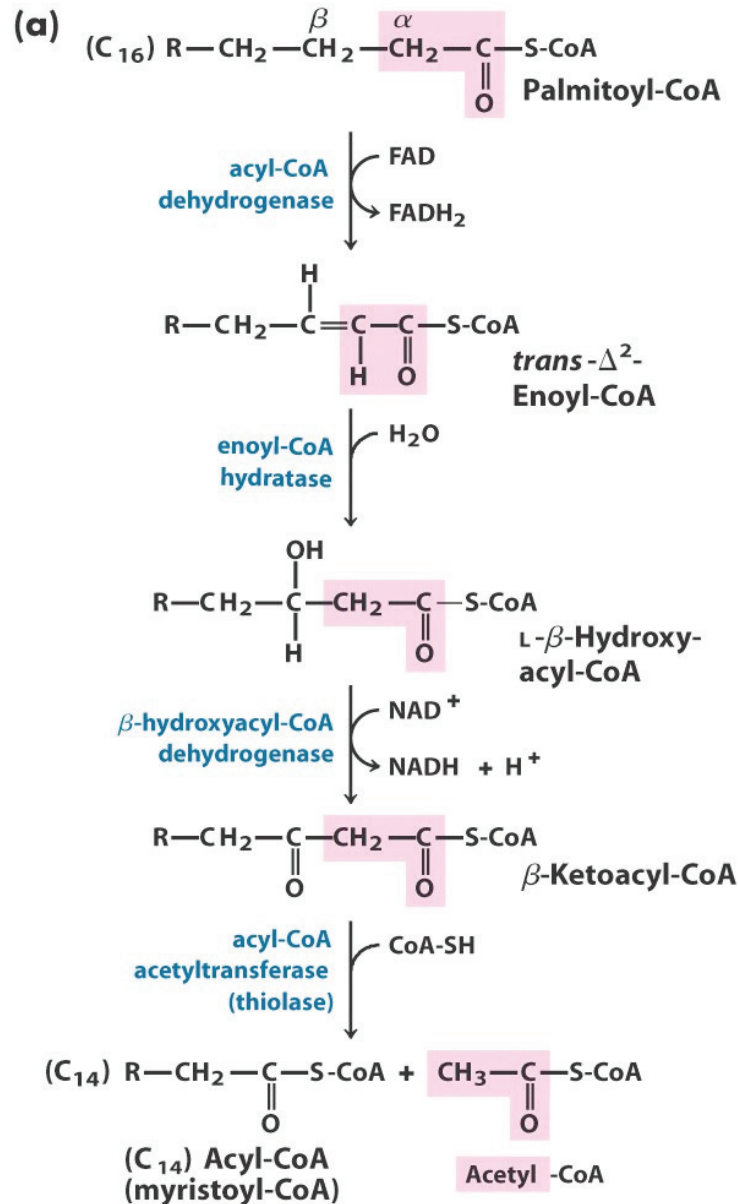
(taking apart fatty acids,  
two carbons at a time)



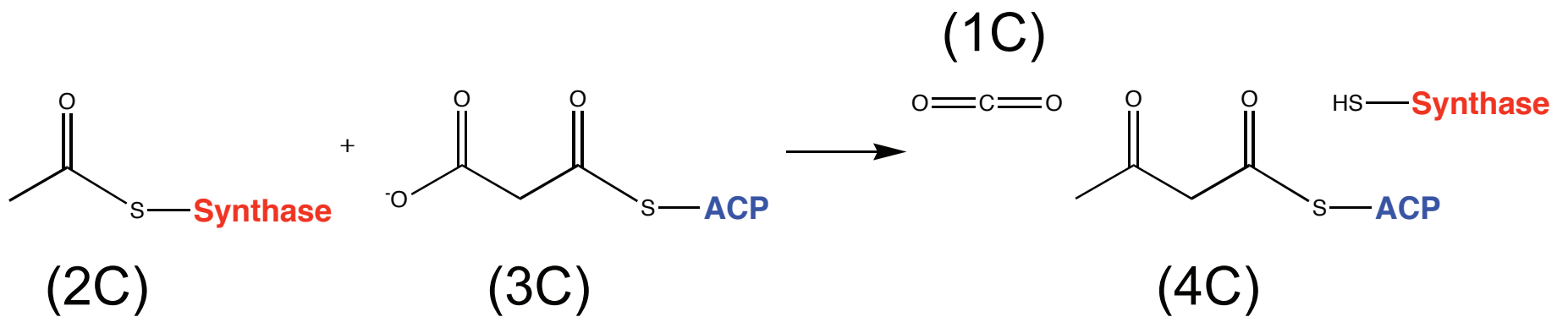
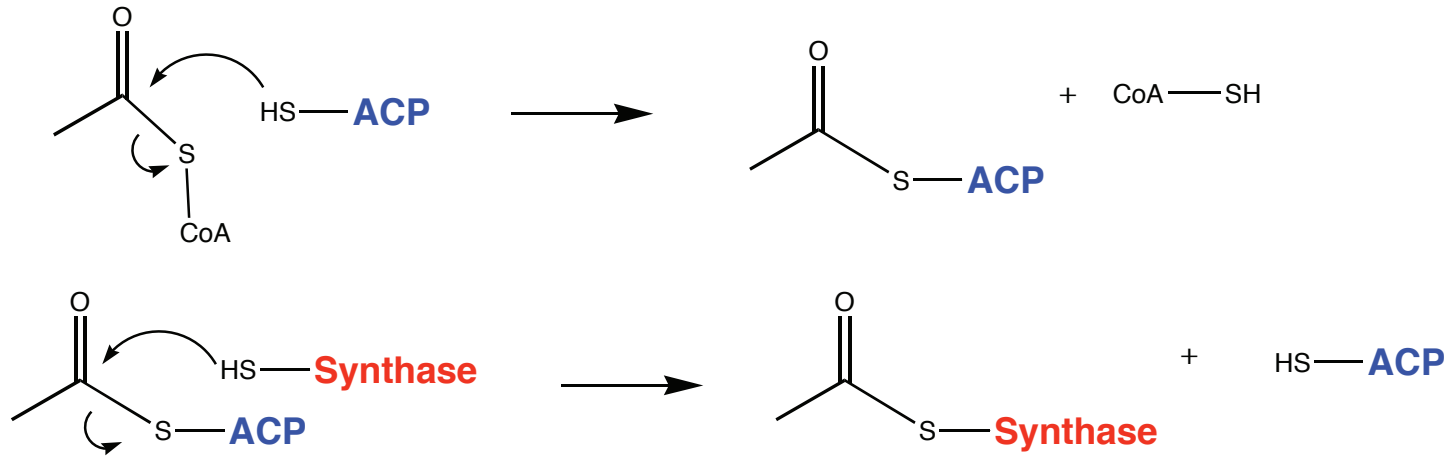
To Krebs Cycle

C16 Fatty Acyl-CoA

# Catabolism of fatty acids



# Biosynthesis of Fatty Acids



# Biosynthesis of Fatty Acids

