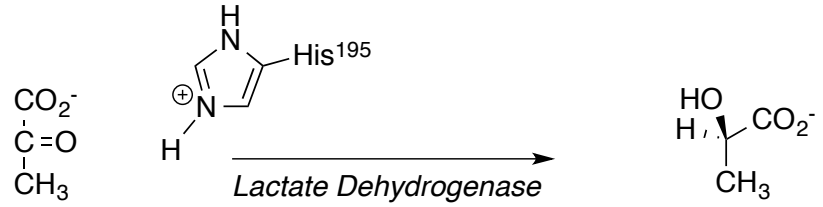
Fates of Pyruvate

- Anaerobic metabolism
  1. Lactate – enantioselective NADH reduction
  2. Ethanol & CO_2 (yeast) – TPP ylide binding
- Aerobic metabolism (mammals)
  3. Acetyl CoA – TPP ylide binding & lipoamide transfer

Why aerobic vs. anaerobic?

Glucose → Pyruvate
2 ADP → 2 ATP
2 NAD^+ → 2 NADH

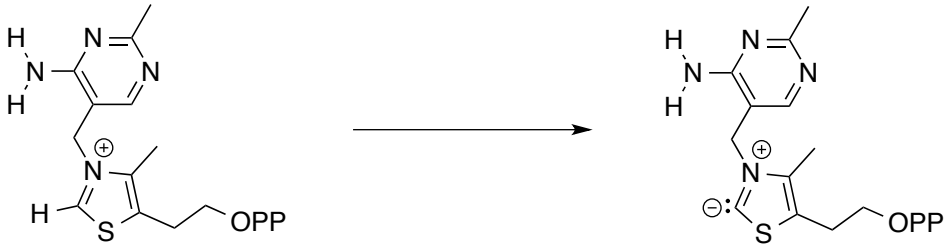
1. Anaerobic Metabolism in Mammals



Pyruvate **(*S*)-Lactate**

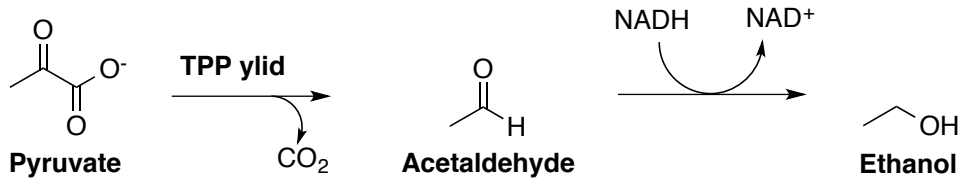
Other fates of pyruvate (#2-3) involve decarboxylation (-CO_2)

TPP – the decarboxylation cofactor



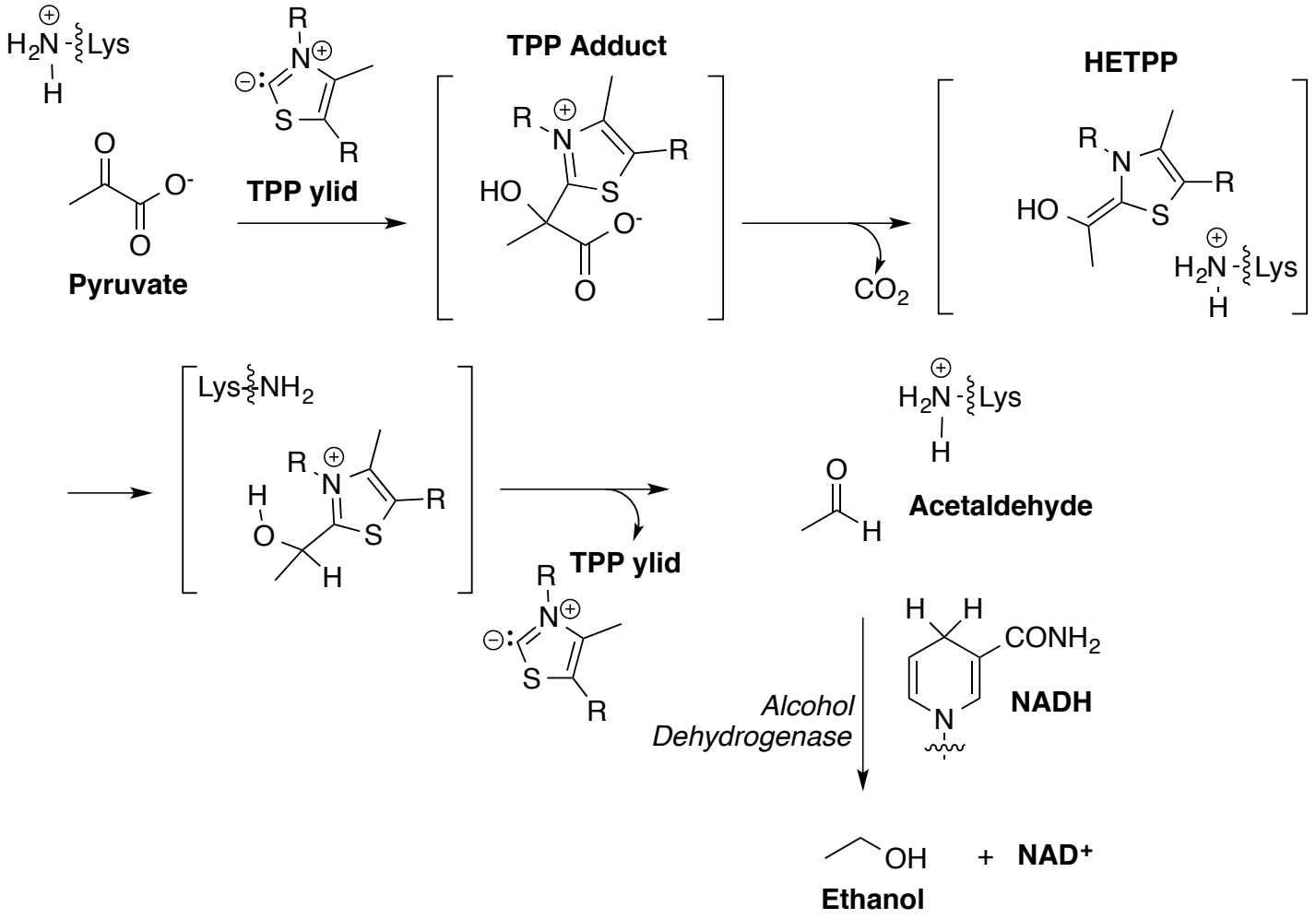
Thiamin diphosphate (TPP) **TPP ylide**

2. Yeast anaerobic metabolism (fermentation)

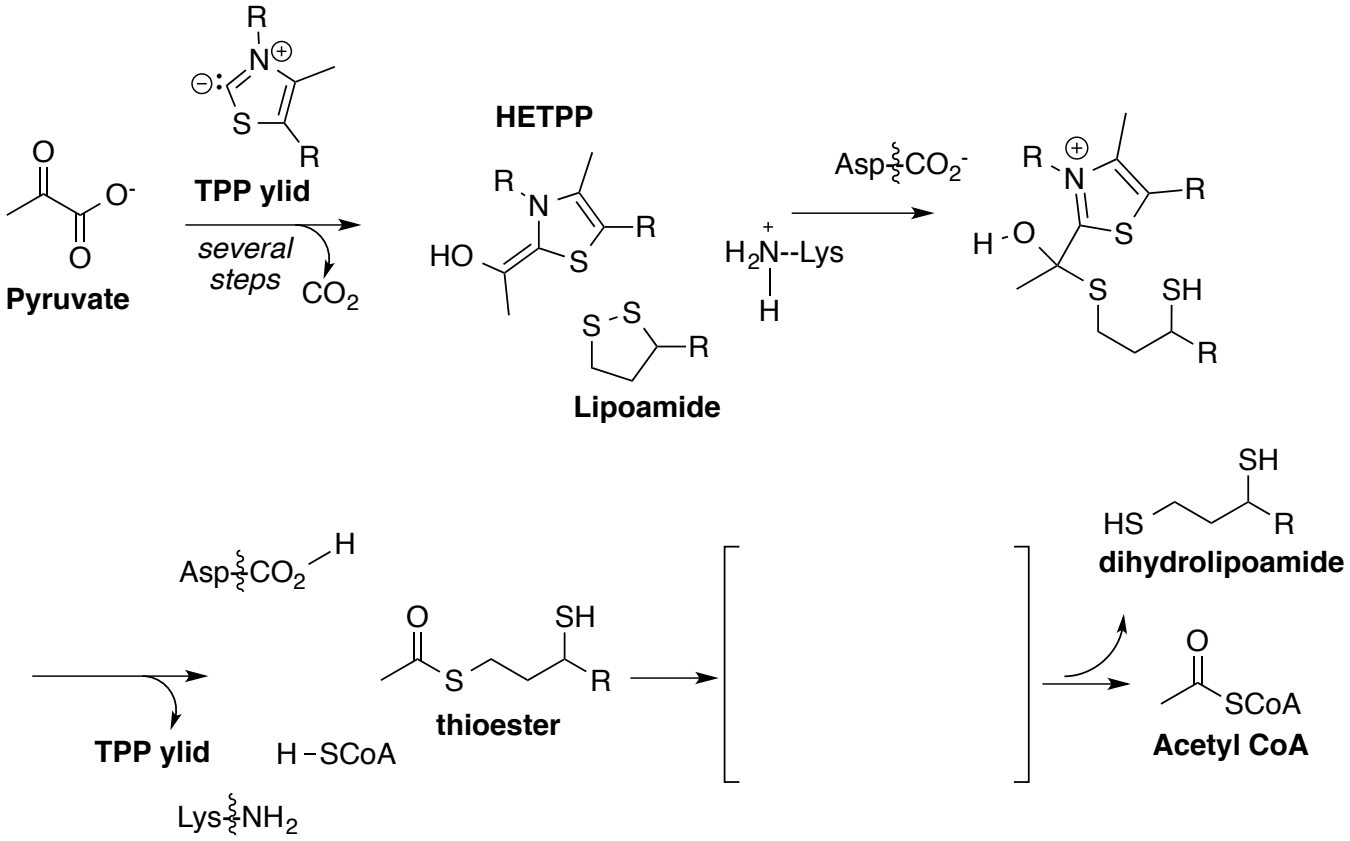


a. Addition of **TPP ylid** to ketone
b. Decarboxylation
c. Protonation of **enaminol**
d. **Acetaldehyde** formation & release of **TPP ylid**
e. Reduction with **NADH**

Fermentation, add the arrows…



3. Aerobic Metabolism (mammals) – Pyruvate Dehydrogenase Complex



Reaction Overview

Lecture	Process / Chemistry	Mechanism
7 – Peptides & Carbohydrate Nomenclature		
8 – Disaccharides		
9 – Glycolysis #1		
10 – Glycolysis #2		
11 – Fates of Pyruvate		
12 - Lipids		

Active Site Recap

Acids

Bases

Reducing Agent

Oxidizing Agent

Decarboxylation

Phosphate Transfer

Acyl Transfer

Covalent Binding to Enzyme

Stabilizing Factors (Place-Holders)