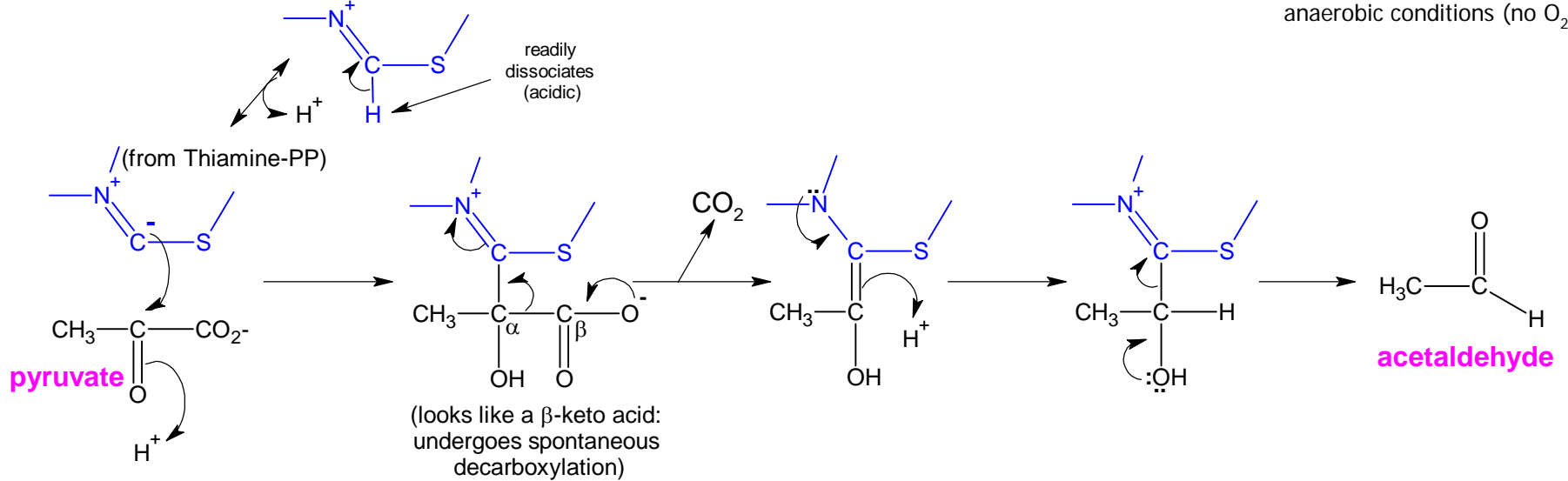


# The Many Enzymes of Pyruvate

## Pyruvate Decarboxylase

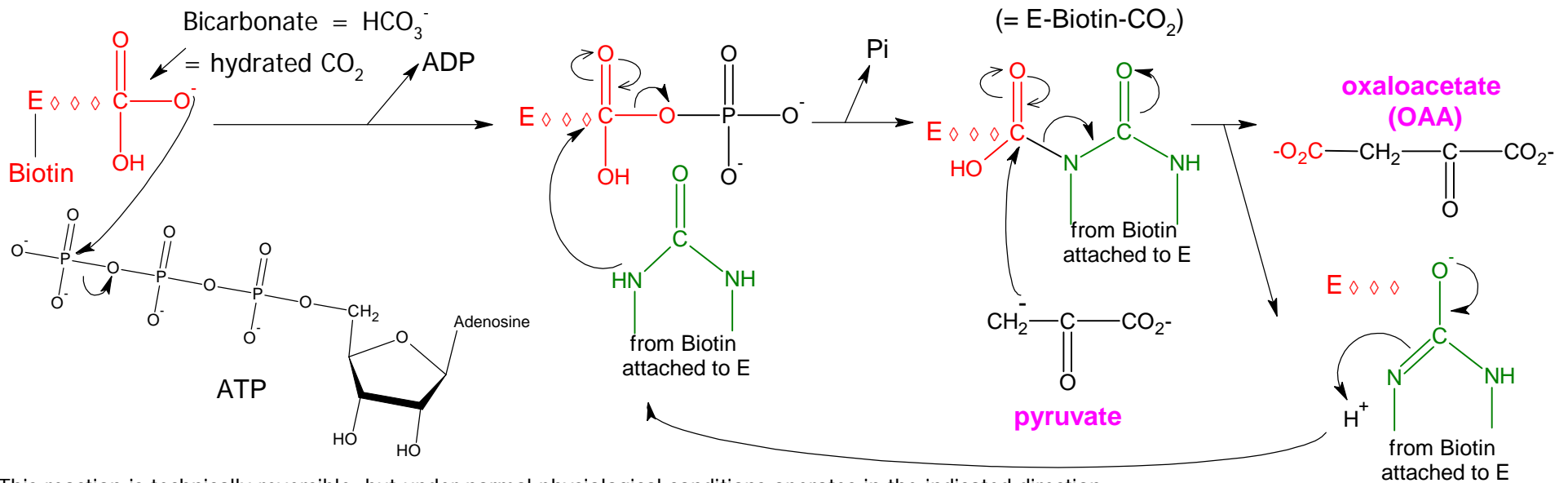
(from Thiamine-PP)

operates only under anaerobic conditions (no O<sub>2</sub>)



## Pyruvate Carboxylase

(Biotin-dependent carboxylation)

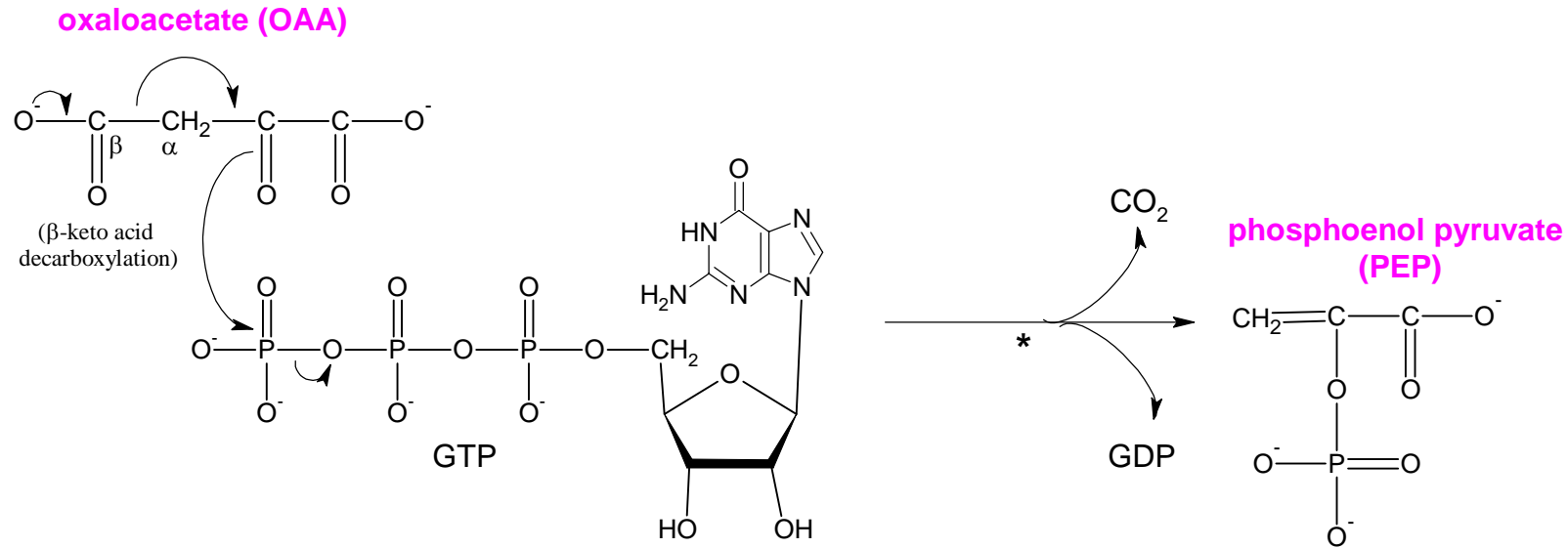


This reaction is technically reversible, but under normal physiological conditions operates in the indicated direction.

# The Many Enzymes of Pyruvate

## PEP Carboxykinase (Biotin-independent decarboxylation)

occurs only in liver, not in muscle



\* This reaction is technically reversible, but under normal physiological conditions operates in the indicated direction.