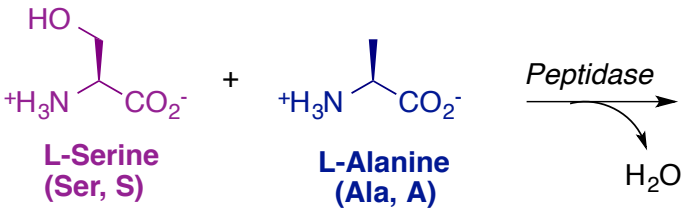
CHEM 109, Lecture 7

Peptides

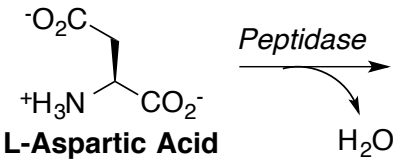
Enzymes – Nature's Reaction Factories!

PEPTIDES



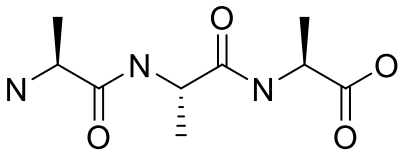
Ser-Ala Dipeptide

Ser-Ala Dipeptide +



Ser-Ala-Asp Tripeptide

Tripeptide template: [(Nitrogen) – (Carbon w Side Chain) – (Carbonyl)]…



Primary (1°) Structure →

Secondary (2°) Structure →

Tertiary (3°) Structure →

Quaternary (4°) Structure →

Enzymes

E or **Enz** = Enzyme; **S** = Substrate (Reactant); **P** = Product

Reactions Mechanisms & the Active Site

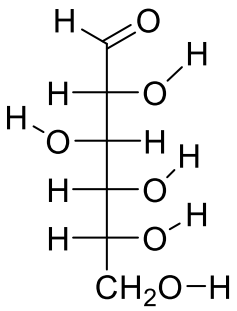
- Reactants = **Substrates**

- Reagents = **Cofactors** - small organic molecules; not catalysts / not regenerated
  - Ex. Glycolysis requires NAD^+

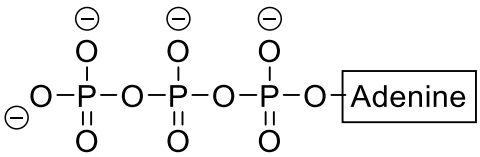
- **Amino acid residues** = side chains off enzyme's peptide backbone
  - Acids
  - Bases
  - Covalently bind substrate

- **Stabilizing Factors** hold substrates and cofactors in place *via* IMF's!!

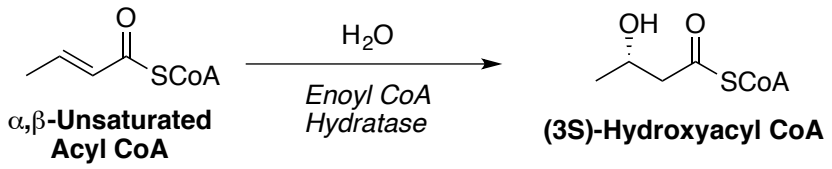
H-bonding

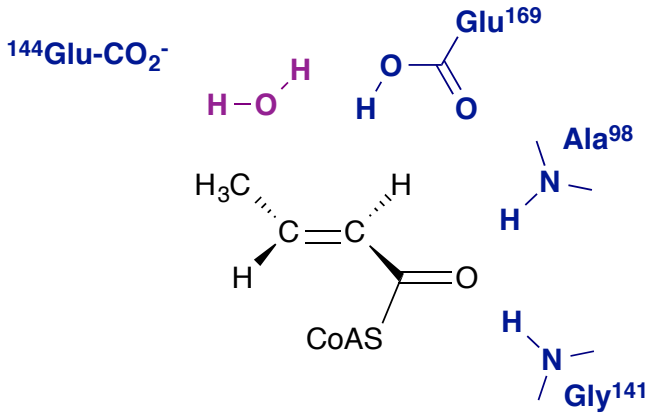


Ion-Dipole

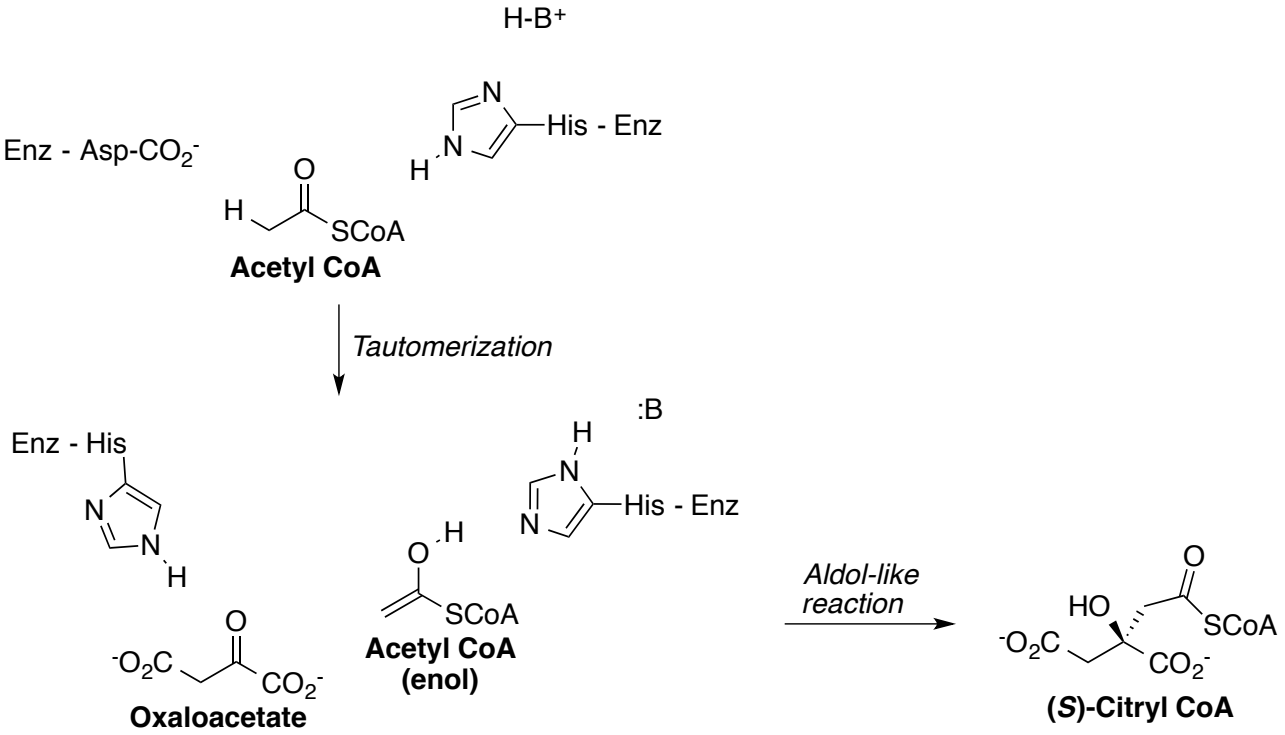


Active Site Example: Conjugate Addition of Water

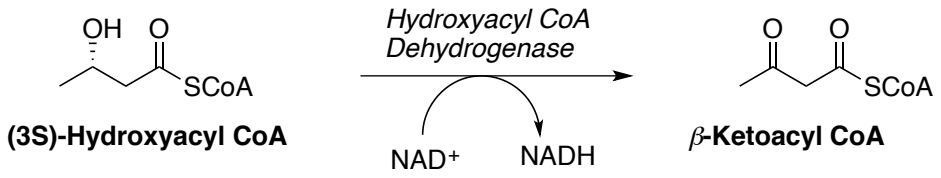


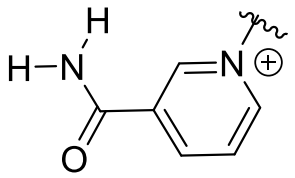


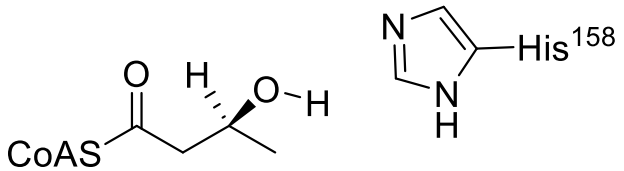
Active Site Example: Citrate Synthase (Citric Acid Cycle)



Active Site Example: Oxidation of an Alcohol







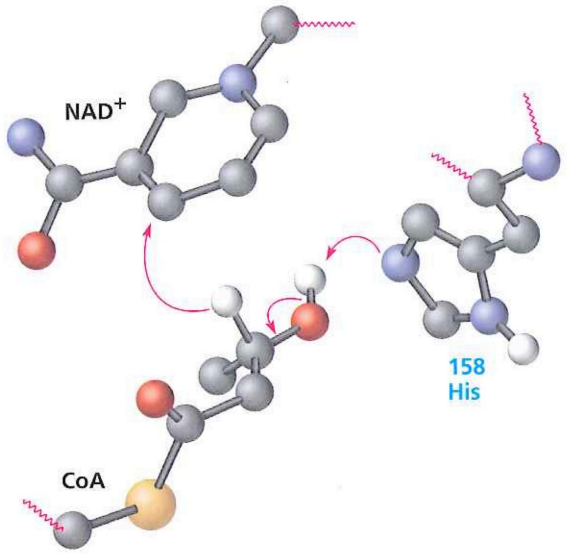


FIGURE 3.9 X-ray crystal structure of the enzyme–substrate complex from hydroxyacyl CoA dehydrogenase. His-158 deprotonates the hydroxyl group, and the adjacent hydride ion is transferred to NAD^+.

Next time…Carbohydrates & Polysaccharides