12.S: Reactions at the α-Carbon, Part I (Summary)

Before moving on to the next chapter, you should:

- Understand what is meant by 'a and b positions' relative to a carbonyl group.
- Understand how an enzyme can increase the acidity of an a-proton through the active site microenvironment
- Understand the 3D bonding arrangement of an enolate ion
- Be able to recognize and draw reasonable mechanisms for the following reaction types:
  - tautomerizations: keto-enol, imine-enamine
  - racemization/epimerization
  - carbonyl isomerization (changing position of a carbonyl group)
  - alkene isomerization (changing position of an alkene relative to carbonyl)
  - aldol addition, retro-aldol cleavage (both enolate intermediate and enamine intermediate mechanisms)
- Be able to draw a mechanism for a laboratory alkylation reaction at the a-carbon of a ketone or aldehyde. Understand the difference between kinetic and thermodynamic control of this reaction type, and be able to predict the regiochemical outcome of the reaction based on reaction conditions.
