

Robinson Annulation (Annelation) Comprised of A, B, and C below

A. Michael Addition. Addition of an enolate to an enone (an α, β -unsaturated aldehyde or ketone); works best with enolates from $1,3$ -dicarbonyl compounds (= $1,3$ -dicarbonyl compounds). It is a $1,4$ addition, but the enolate ion is the nucleophile.

Overall: *the α -Carbon of the enolate attacks the β -Carbon of the enone and forms a $1,5$ dicarbonyl compound (a Michael product).*

1. enolize with CH_3O^- or $\text{CH}_3\text{CH}_2\text{O}^-$ (yields thermodynamic product) (LDA or KH would do a complete enolization and yield a kinetic product, which is not wanted for this equilibrium process)
2. nucleophilic attack ($1,4$ addition): the α -Carbon of the enolate attacks the β -Carbon of the enone
3. protonation/tautomerization (via keto-enol); get $1,5$ dicarbonyl compound.

(some instructors combine items B and C below and call it)

Intramolecular Aldol Condensation

B. Aldol Adduct Formation [need a carbonyl group and an α -Carbon (not necessarily the most stable β -Carbon)].

1. enolize (with $^-\text{OH}/\text{H}_2\text{O}$ or $^-\text{OCH}_2\text{CH}_3/\text{HOCH}_2\text{CH}_3$)
2. nucleophilic attack to the electrophilic carbonyl carbon (a $1,2$ addition)
3. protonation (get aldol adduct: a β -hydroxy ketone)

C. Dehydration, often with heat; ^-OH catalyst is regenerated (get α, β -enone)

