

# CHEM 222 section 01

## LECTURE #26

Thurs., Nov.29, 2007

### Lecture topics & readings

#### Last class

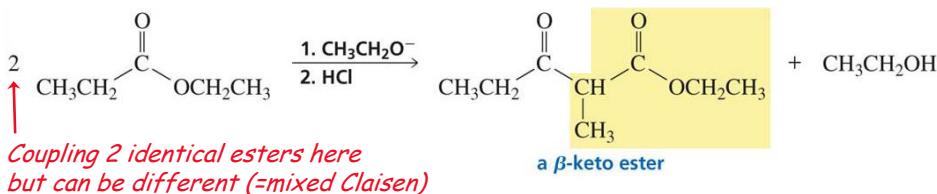
- last topics about carbonyl compounds (Ch. 18)

#### FINAL EXAM: Tues. Dec. 11<sup>th</sup>, 2-5pm, Loyola Gym

- covers entire course
- some multiple choice, true/false -- e.g., for "theory"
- predicting reaction products: "road-map" problems
- solving structures using spectroscopic data
- writing full mechanisms to explain certain products
- designing a multi-step synthesis (even if not efficiently...)

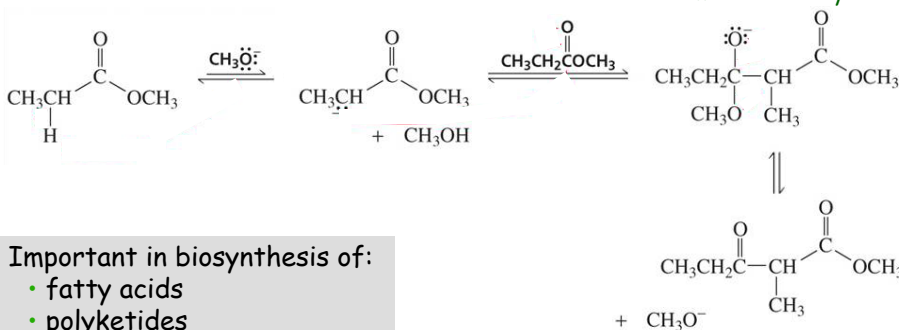
(1) Office hours: ~2h/day, see website (varies day-to-day)

### (18.15-16) Claisen condensations: coupling esters via enolate...



**Mechanism:** note base matches ester's -OR...

*Differs from aldol rxn here: Td intermediate collapses...*



▪ Important in biosynthesis of:

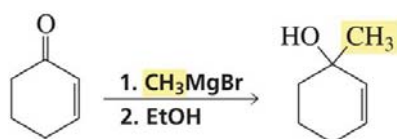
- fatty acids
- polyketides

## Synthesis examples

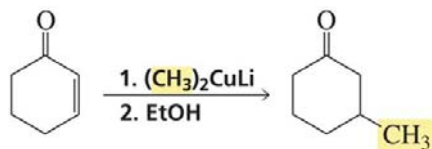
(3)

### (17.17-18) $\alpha,\beta$ -unsaturated ketones: conjugate additions

- Now either  $\alpha$  or  $\beta$  position MIGHT get attacked...



Direct **1,2 addition** to  $\text{C}=\text{O}$   
by hard nucleophiles  
(*i.e.*, strong bases)



**"Conjugate addition"**  
= 1,4 addition to  $\text{C}=\text{O}$   
by soft nucleophiles  
(*i.e.*, weaker bases)

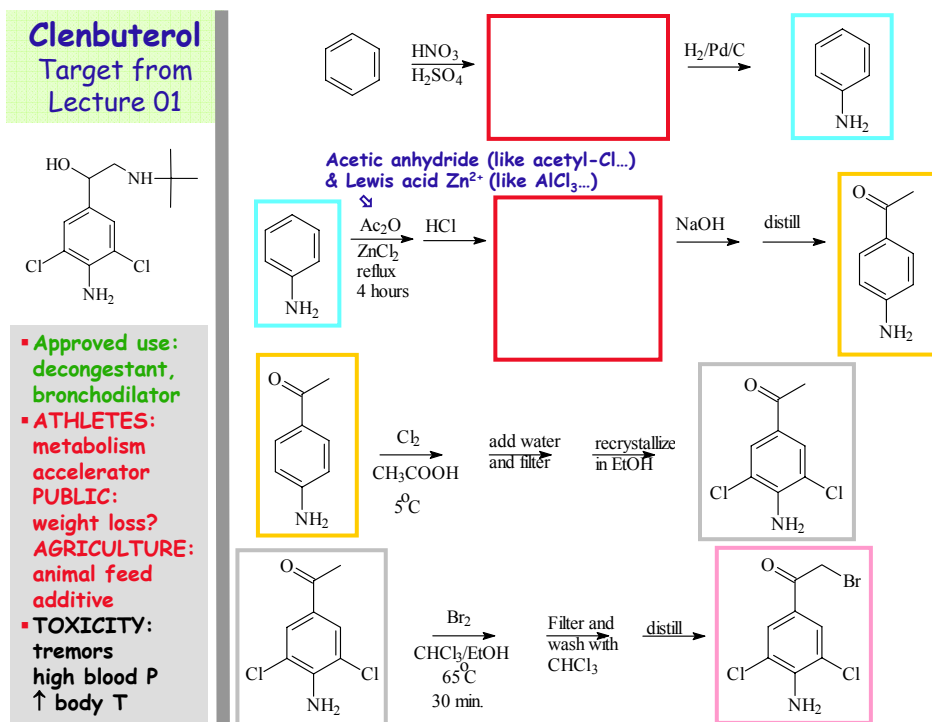
Also called "*Michael addition*"

(4)

## (18.11) Alkylation at the $\beta$ -carbon: the Michael addition

- $\alpha,\beta$ -unsaturated ketones react with enolates via conjugate-addition...

(5)



## Clenbuterol synthesis - final steps

