Carbonyl-Catalyzed Biomimetic Asymmetric Mannich Reaction

**Significance:** The Zhao group reports the activation of primary amines by carbonyls. Using an N-quaternized pyridoxal catalyst for the direct asymmetric Mannich reaction of glycinate with aryl N-diphenylphosphinyl imines, α,β-diamino acid esters were obtained in good yields and excellent stereoselectivities.

**Comment:** Based on their recently developed chiral pyridoxal and pyridoxamine catalysts for transamination reactions (*J. Am. Chem. Soc.* 2016, 138, 10730), the authors developed a catalyst that activates primary amines through carbonyl catalysis. In contrast to other α-functionalizations of primary amines, this fascinating catalysis strategy does not require protecting-group manipulation.

**Selected examples:**

- 90% yield
  - dr = 20:1
  - er = 99:1

- 82% yield
  - dr = 20:1
  - er = 97:3

- 77% yield
  - dr > 20:1
  - er = 97:3

- 67% yield
  - dr > 20:1
  - er = 99:1

**Proposed reaction mechanism:**

**Key words**
- carbonyl catalysis
- Mannich reaction
- pyridoxal
- α,β-diamino acid esters

**Category**
- Organo- and Biocatalysis

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