Synthesis of α-Amino Acid Derivatives by Biomimetic Transamination

**Significance:** Shi and co-workers have developed a methodology to synthesize α-amino acid derivatives 3 from α-keto esters 2, catalyzed by cinchona alkaloid derivative 1. This is the first catalytic highly enantioselective synthesis of α-amino acid derivatives 3 via biomimetic transamination. The proton of the ammonium ion in the transition state is delivered to the si-face of the substrate, affording the (R)-α-amino ester as the major enantiomer.

**Comment:** Optically active α-amino acids and their derivatives are an important class of molecules in biology and in organic synthesis. However, it remains a challenge to develop highly enantioselective syntheses of them to date. Here, a very efficient method for the synthesis of α-amino acid derivatives via biomimetic transamination has been reported, which also illustrates the synthetic potential of organocatalytic biomimetic transamination.

**Plausible mechanism of the biomimetic transamination and proposed transition state:**

1. **ArCH₂NH₂** + **1** (chiral base) → **4**
2. **H₃O⁺** → **5**
3. **H₂O** → **6**
4. **NH₂** → **3**
5. **ArCH₂NH₂** + **1** (chiral base) → **4**
6. **H₃O⁺** → **5**
7. **H₂O** → **6**
8. **NH₂** → **3**

**R = Ar, Alk**

22 examples
47–71% yield
er = 94:6 to 96:4