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A Powerful Hydrogen-Bond-Donating Organocatalyst for the Enantioselective Intramolecular Oxa-Michael Reaction of α,β -Unsaturated Amides and Esters

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A Formal Synthesis of Atorvastatin

Significance: The key step in this formal synthesis of atorvastatin (Lipitor®) is the enantioselective intramolecular oxa-Michael reaction of **A** mediated by 10 mol% of benzothiadiazine catalyst **B**. Methods for converting **G** and its relatives into atorvastatin have been summarized by Y. Kawato et al. (*Chem. Eur. J.* **2013**, 19, 3802; see also references therein).

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Comment: For the conversion of *N*-nitrosamides into esters (e.g., **D** → **E**), see: D. T. Glatzhofer, R. R. Roy, K. N. Cossey *Org. Lett.* **2002**, 4, 2349. Phenolic nucleophiles (14 examples) also participate in the oxa-Michael reaction, and in the case of **H** only 1 mol% of catalyst **I** is required.