

Exercise 1: Methodology

Illustrated publications:

G. Li, M. N. Lavagnino, S. Z. Ali, S. Hu, A. T. Radosevich *J. Am. Chem. Soc.* **2023**, 145, 1, 41–46.

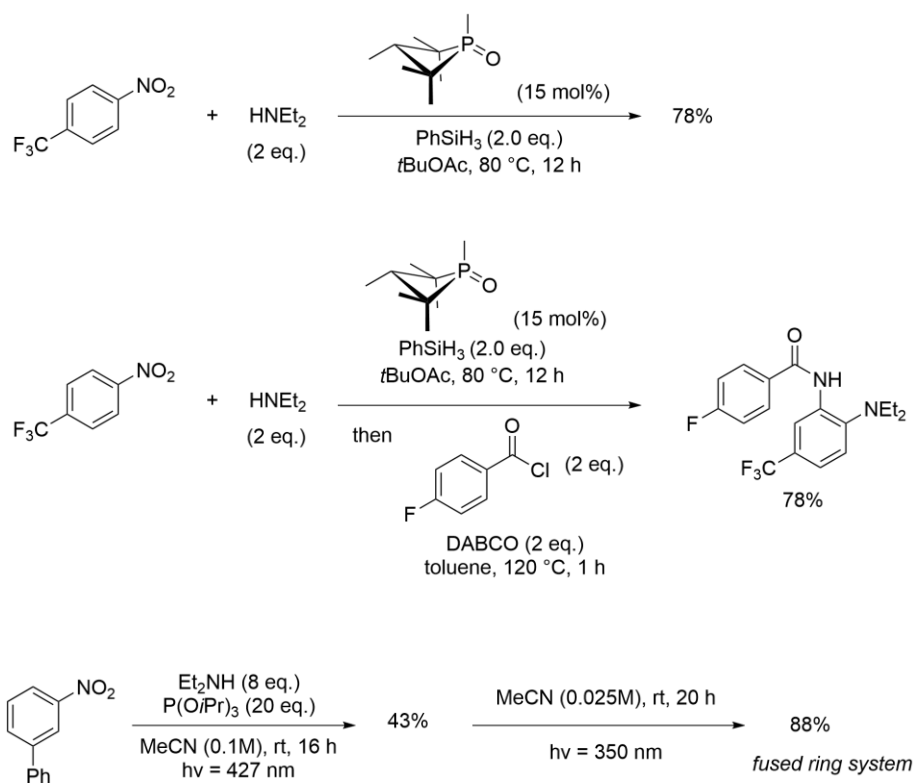
E. Matador, M. J. Tilby, I. Saridakis, M. Pedrón, D. Tomczak, J. Llaveria, I. Atodiresei, P. Merino, A. Ruffoni, D. Leonori *J. Am. Chem. Soc.* **2023**, 145, 50, 27810–27820.

Pioneering works:

R. Huisgen, D. Vossius, M. Appl *Chem. Ber.* **1958**, 91, 1–12.

F. R. Atherton, R. W. Lambert *J. Chem. Soc., Perkin Trans. 1*, **1973**, 1079–1084.

Propose a mechanism for the following transformations:

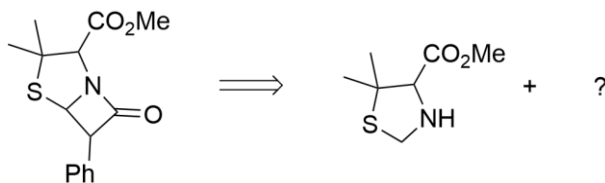


Exercise 2: Small molecules retrosynthesis

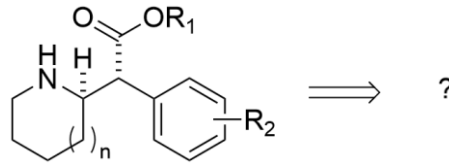
E. J. Corey and Arthur M. Felix *J. Am. Chem. Soc.* **1965**, 87, 11, 2518–2519

J. M. Axten, L. Krim, H. F. Kung, J. D. Winkler *J. Org. Chem.* **1998**, 63, 9628–9629

1) Find a short route to the penicillin analogue below:



2) Find a short and divergent synthesis to yield diverse methylphenidate analogues.



Exercise 3: (-)-Retigeranic acid total synthesis

