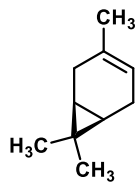
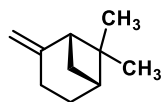
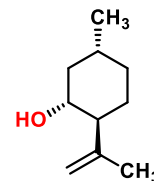
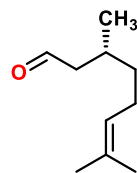
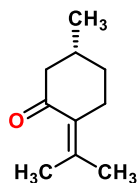
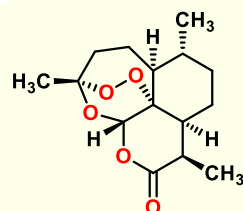
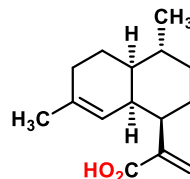
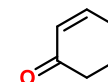
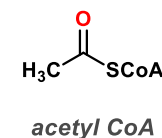
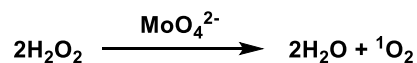
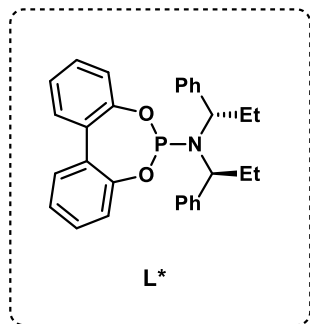
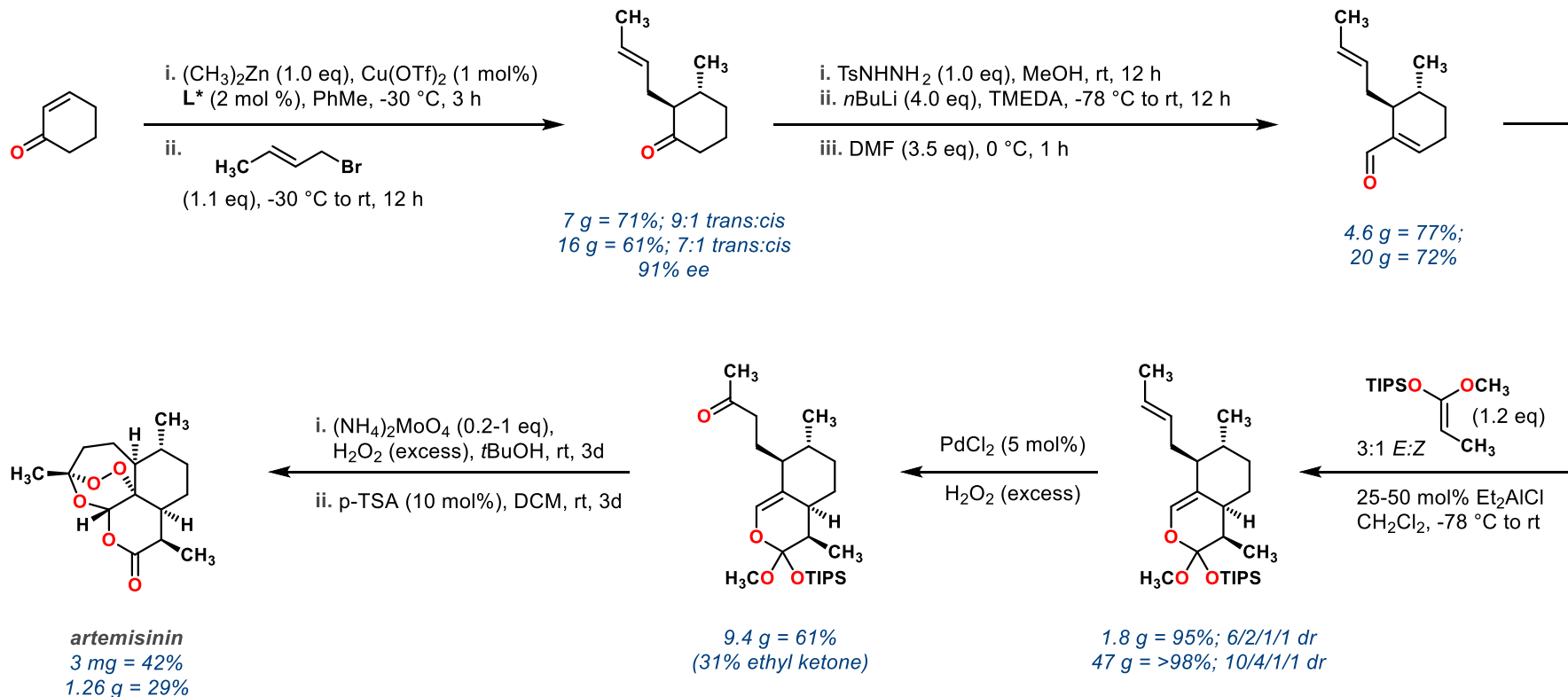


## Summary:

**(+)-car-3-ene**Ravindranathan, *Tet. Lett.* **1990**, 31, 755.**(-)-β-pinene**Liu, *Tet. Lett.* **1993**, 34, 4435.  
*Heterocycles*, **1996**, 42, 493.**(-)-isopulegol**Hofheinz, *J. Am. Chem. Soc.* **1983**, 105, 624.  
Constantino, *Synth. Comm.* **1996**, 26, 321.**Artemisia annua****(R)-(+)-citronellal**Zho, *Acc. Chem. Res.* **1994**, 27, 211.;  
*Tetrahedron* **1986**, 42, 819.  
Yadav, *Tetrahedron* **2010**, 66, 2005.**(R)-(+)-pulegone**Avery, *Tet. Lett.* **1987**, 40, 4629.;  
*J. Am. Chem. Soc.* **1992**, 114, 974.**artemisinin****artemisinic acid**U.S. Pat. Appl. 2011/0065933  
Seeberger, *Angew. Chem. Int. Ed.* **2012**, 51, 1706.Cook, *J. Am. Chem. Soc.* **2012**, 134, 13577.

- Malaria infects over 200 million people each year with nearly 1 million deaths
- The most effective treatment is artemisinin-based combination therapy (ACT) (see Yaroslav Boyko, 8/24/2018, Cipargamin)
- Many syntheses have been completed (most from chiral pool) (see Chris Huck, 5/26/2017, Artemisinin (Avery 1992))
- Current supply of artemisinin relies on semisynthesis (see below)

**acetyl CoA**Sarpong & Keasling, *Nature* **2008**, 440, 940.

**Synthesis:**

*Inorg. Chem.* **1995**, *34*, 4950.



Silas Cook