Asymmetric Synthesis of Akt Kinase Inhibitor Ipatasertib

Significance: Ipatasertib (GDC-0068) is an Akt kinase inhibitor that is of interest for the treatment of cancer. The stereogenic centers in fragment F were installed using a nitrilase-catalyzed resolution of nitrile (rac)-A and a ketoreductase-catalyzed reduction of ketone D. For a related large-scale synthesis of Ipatasertib, see: T. Remarchuk et al. Org. Process Res. Dev. 2014, 18, 1652.

Comment: The stereogenic center in fragment L was installed by asymmetric hydrogenation. Using [Ru(TFA)2((S)-BINAP)] with catalyst activation by NaBr as an additive, allowed for S/C = 10,000. The optimal ratio to ensure reaction robustness was Ru/NaBr = 1:20 and thus afforded >99% conversion and 98.8:1.2 er.