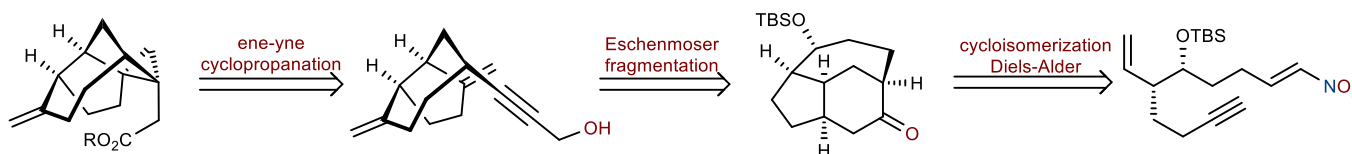
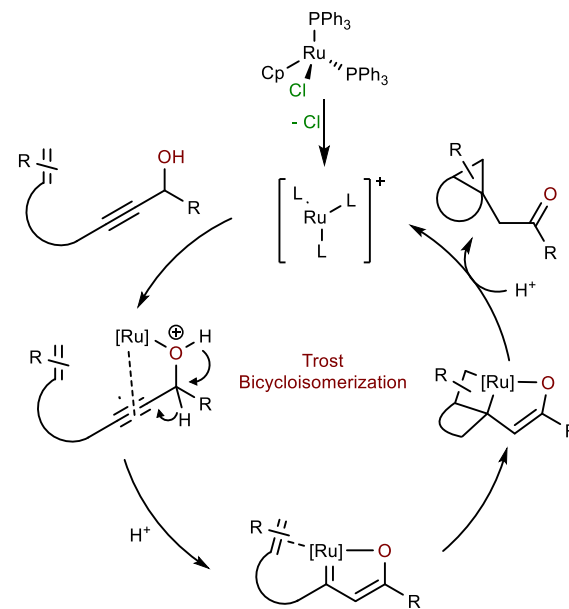
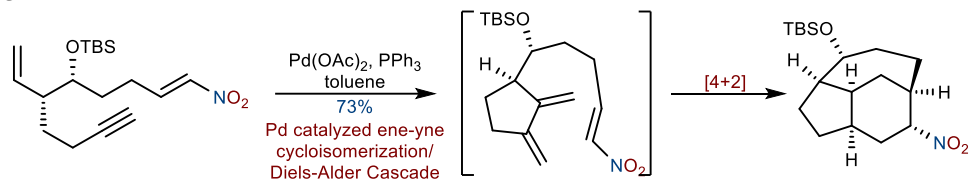


- Sesquiterpenoid isolated from the roots of *Echinops spinosus* in 2008 by Kiyota
- Features an unusual rearranged 3/5/5/7-ring system
- Biosynthetically derived from 5/7-guaiane skeleton through a number of C-C bond cleavage and formation events
- Tetrasubstituted cyclopropane, 5 contiguous stereocenters
- Synthesized by Nicolaou/Chen (2010), Chen (2011), Vanderwal (2012), Qin (2015)

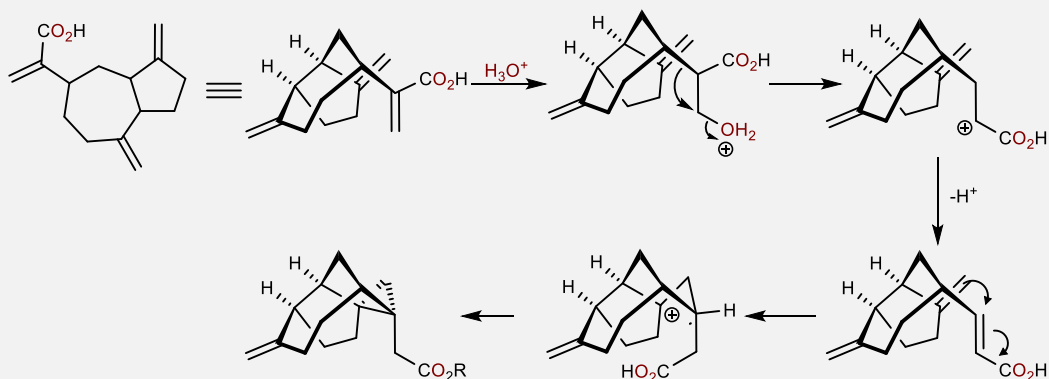
## Retrosynthesis

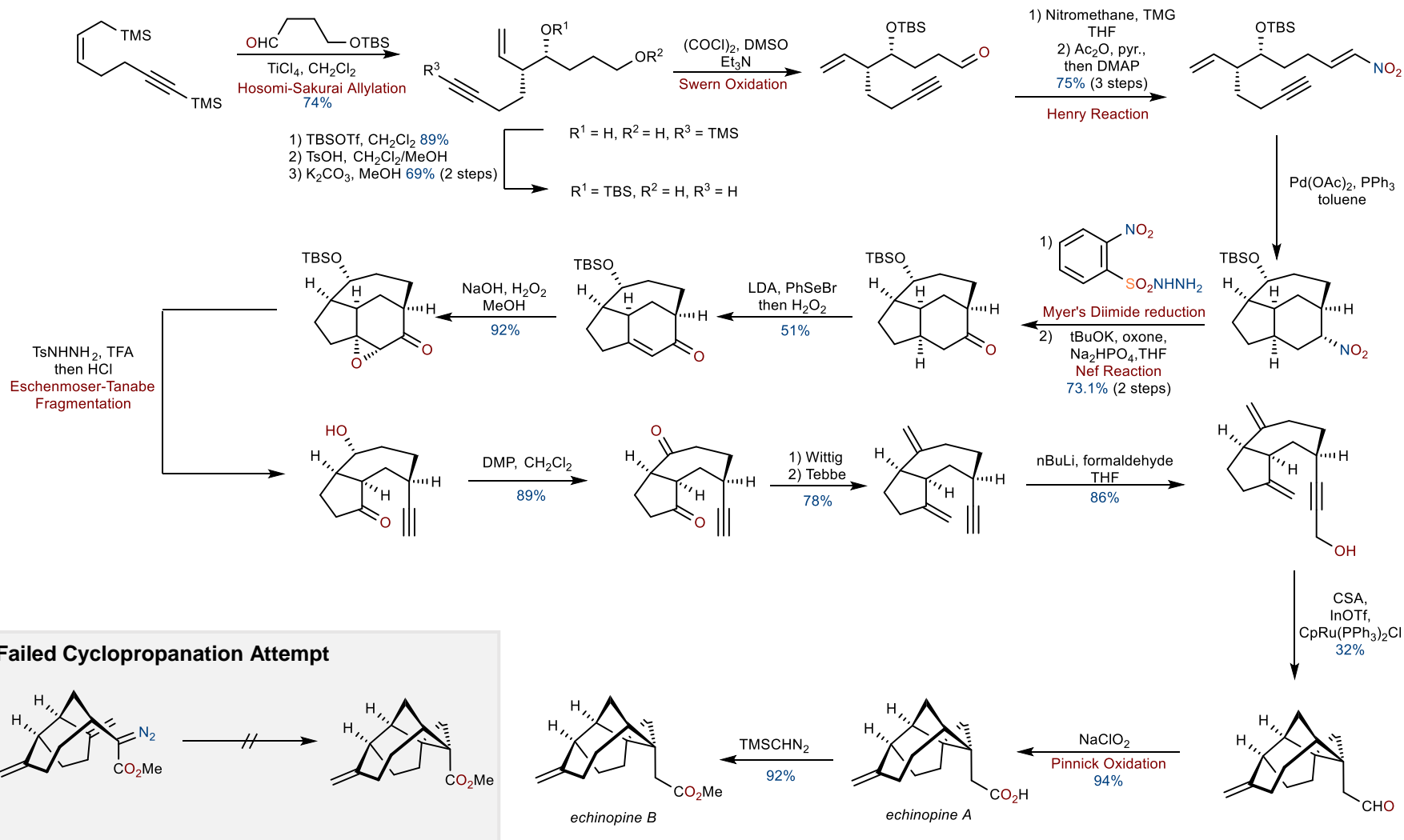


## Key steps



## Proposed Biosynthesis





## References

- Isolation -- *Org. Lett.* 2008, 10, 5, 701–704 <https://doi.org/10.1021/ol702629z>  
 Synthesis -- *Org. Lett.* 2011, 13, 21, 5724–5727 <https://doi.org/10.1021/ol202053m>  
 Trost bicycloisomerization -- *J. Am. Chem. Soc.* 2011, 133, 13, 4766–4769 <https://doi.org/10.1021/ja200971v>