

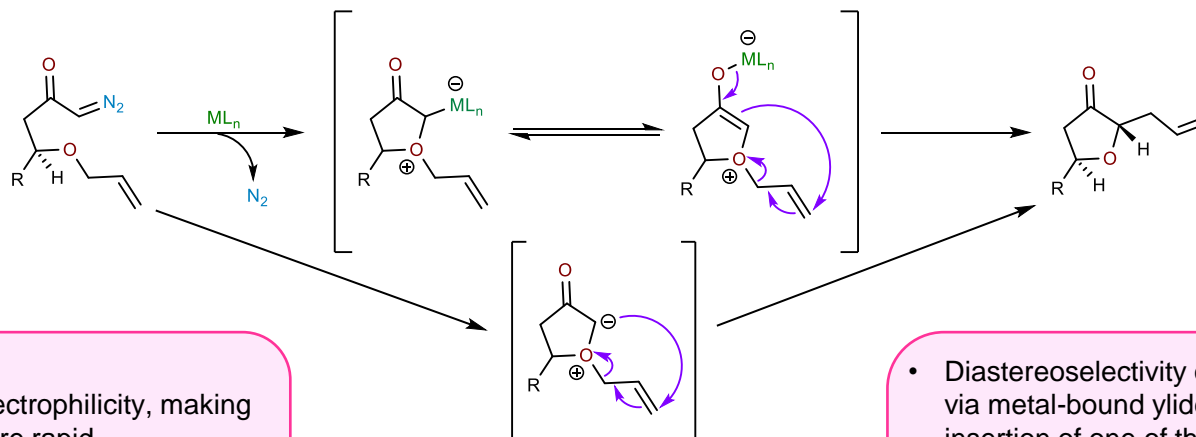
- Isolated by Sheu and co-workers off the coast of Taiwan
- Part of the cladiellins (eunicellin) family of marine natural products
 - Contains ether-bridged 2,11-cycle
- IC₅₀ = 18 nm against human-lung adeno-carcinoma
- Features first application of a tandem bicyclic oxonium ylide formation and rearrangement sequence for oxabicyclo[6.2.1]-undecane system
- Racemic synthesis that can be made enantioselective by using the enantiomerically enriched alcohol starting material
- Synthesized as a side product by Paquette and coworkers during synthetic studies on the sclerophytins A and B
- Has also been synthesized by Crimmins (2011) and Hoppe (2008)



Vigularia juncea



Metal Catalyzed Oxonium [2,3]-Rearrangement:



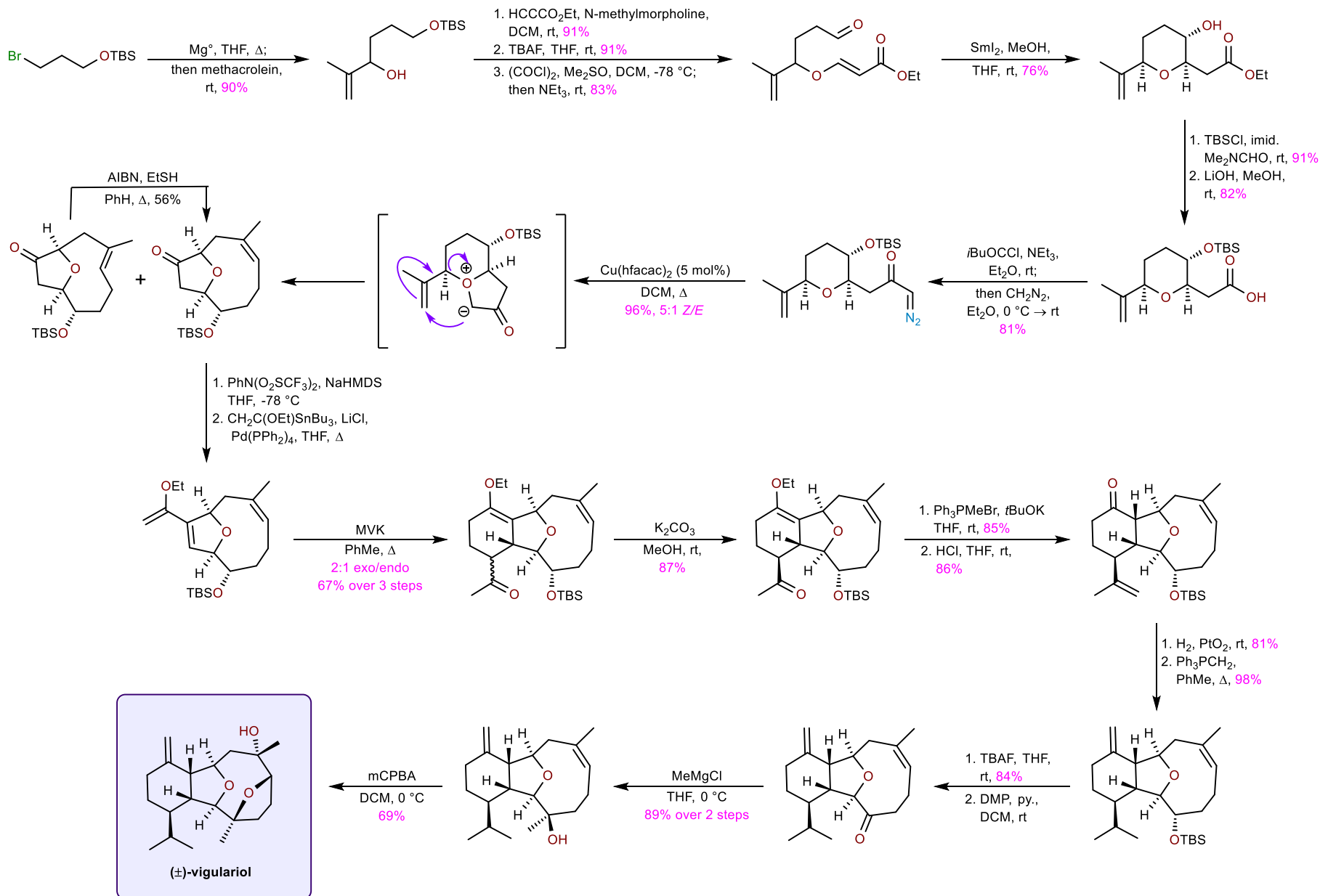
Role of Cu(hfacac)₂:

- Ligand increases electrophilicity, making oxygen insertion more rapid
- Stabilization of ylide intermediates to suppress reformation of carbenoid species
- Reduction transition state energy for rearrangement

- Diastereoselectivity of rearrangement occurs via metal-bound ylide-enolate or by selective insertion of one of the diastereotopic oxygen lone pairs coupled with efficient transfer of stereochemical information to the carbon during rearrangement
- For the latter to be operable, the rate of rearrangement must be rapid with respect to the rate of inversion of the oxonium center

For additional information see: *Tetrahedron Letters* **1992**, 33, 6193-6196. *Tetrahedron Letters* **1993**, 34, 4385-4388. *J. Am. Chem. Soc.* **1986**, 108, 6063-6065. *J. Am. Chem. Soc.* **1986**, 108, 6062-6063.

(±)-Vigulariol (Clark, 2007)



Clark, J. S.; Hayes, S.T.; Wilson, C.; Gobbi, L. *Angew. Chem. Int. Ed.* **2007**, *46*, 437–440. <https://doi-org/10.1002/anie.200603880>