

SOTW: (-)-Lingzhiol



Isolation:

- First isolated in 2013 from a mushroom *Ganoderma lucidum* commonly used in traditional East Asian medicine for various purposes (anticancer and antibacterial medicines)

Biological activity

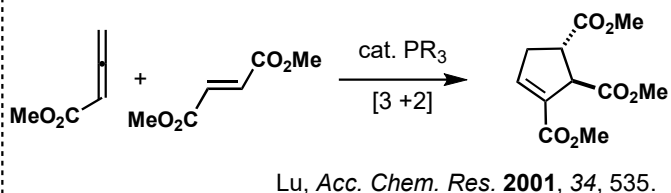
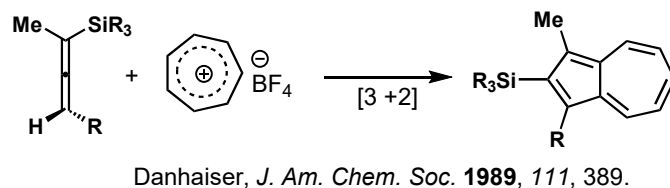
- Both enantiomers inhibit generation of collagen IV, fibronectin, and reactive oxygen species (ROS)
 - Shown to selectively inhibit the Smad3 pathway, which has been implicated in renal fibrosis and diabetic neuropathy, without inhibiting the renoprotective Smad2 pathway.

Structural features/syntheses

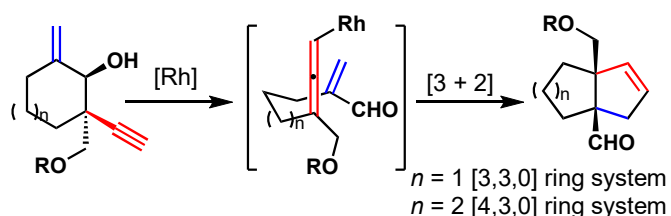
- [4,3,0] carbobicyclic ring systems and two vicinal stereogenic quaternary carbon centers at the ring junction
 - Seven total syntheses, including three enantioselective syntheses have been disclosed up to date.

Full paper: *Nature Commun.* **2014**, *5*, 5707. For the latest synthesis, *Org. Lett.* **2020**, *22*, 290.

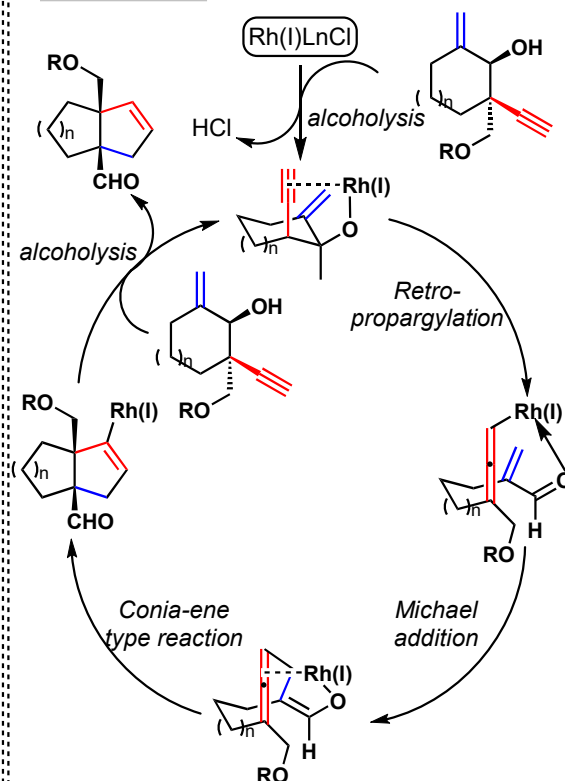
[3 + 2] Cycloadditions using allene motifs



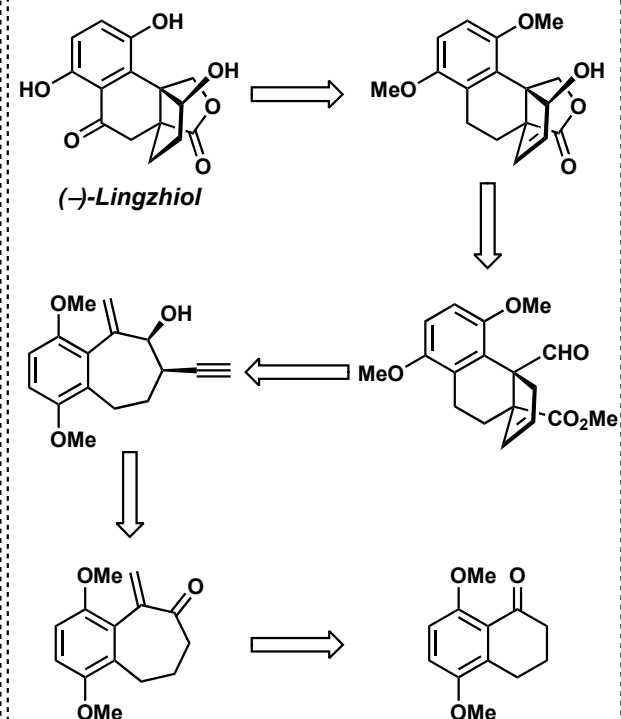
This work - Rh-catalyzed [3 + 2] cycloaddition



Catalytic cycle



Retrosynthetic analysis



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