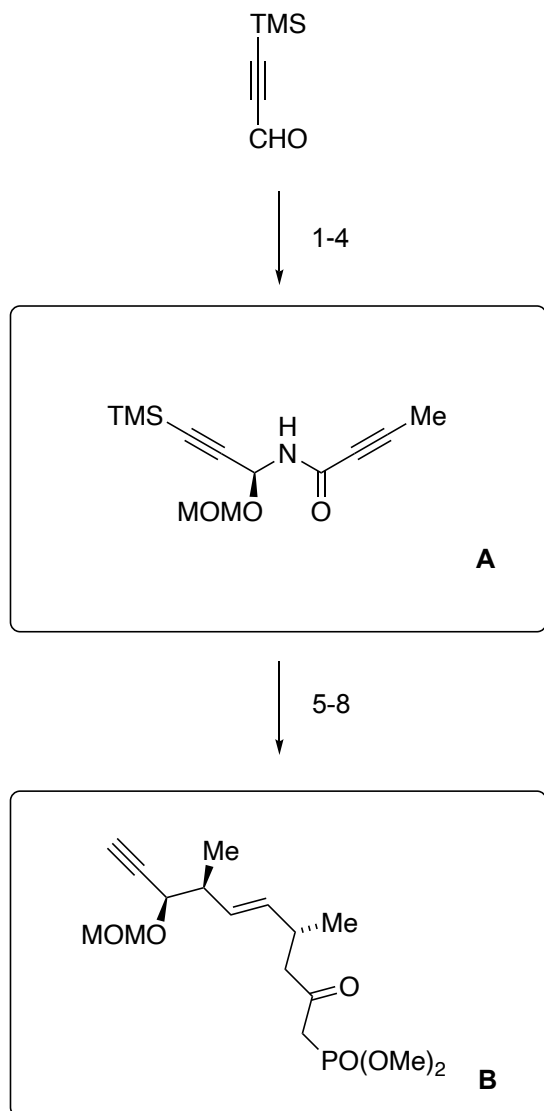
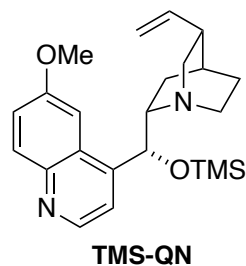


Catalytic Asymmetric Total Synthesis of Exiguolide

Oka K.; Fuchi S.; Komine, K.; Fukuda, H.; Hatakeyama, S.; Ishihara, J.
Chem. Eur. J. **2020**, *accepted manuscript*; doi:10.1002/chem.202001773.

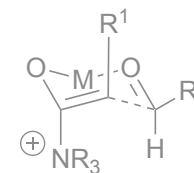


- 1) TMS-QN (12.5 mol%), EtCOCl, MgCl₂, *i*-Pr₂NEt, -78 °C
- 2) *i*-Pr₂NEt, MeONHMe·HCl
- 3) *i*-Pr₂NEt, MOMCl
- 4) Me—C≡C—MgBr, THF



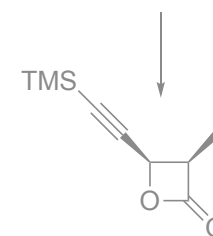
- 5) L-Selectride, THF, -78 °C
- 6) LiAlH₄, THF, reflux
- 7) MeC(OEt)₃, *t*-BuCOOH, 180 °C
- 8) MePO(OMe)₂, *n*-BuLi, THF

- 1) Provide mechanism.
hint: you form a cyclic product

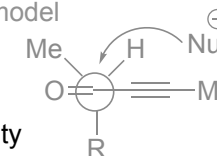


- 2) Name the amide.

Weinreb amide



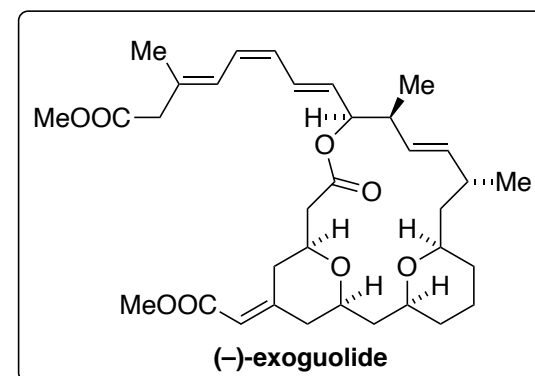
You get anti addition of hydride as explained by the Felkin-Anh model

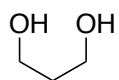


- 5) Rationalize the stereoselectivity

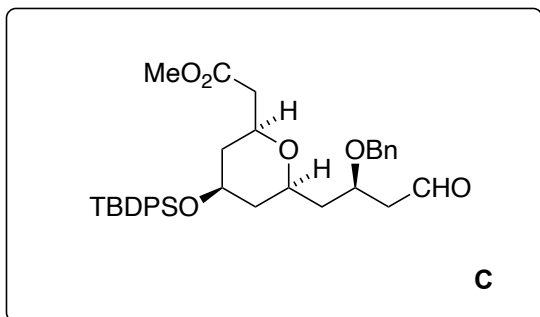
- 8) Name the reaction.

hint: rearrangement Johnson-Claisen rearrangement

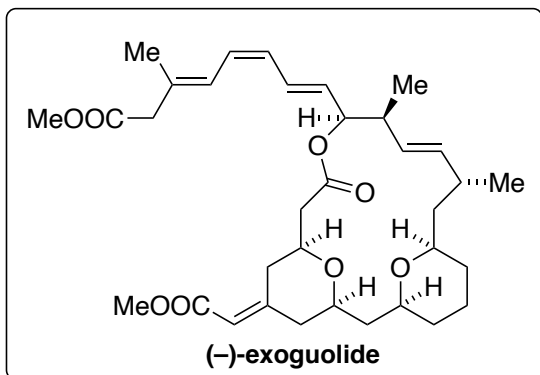




9-15



16-19



9) $[\text{Ir}(\text{cod})\text{Cl}]_2$ (5 mol%), (*S*)-BINAP (10 mol%)
4-chloro-3-nitrobenzoic acid (20 mol%)
 Cs_2CO_3 (40 mol%), allyl acetate (10 eq)

10) NaH, BnBr (1 eq.)

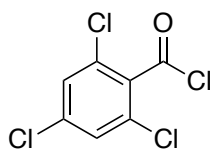
11) 4-nitrobenzoic acid, DEAD, Ph_3P ,
then K_2CO_3 , MeOH

12) $\text{H}_2\text{C}=\text{C}(\text{CO}_2\text{Me})_2$, *N*-methylmorpholine

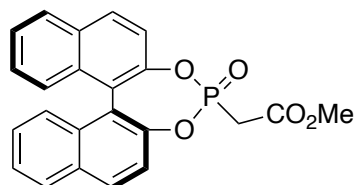
13) TFA, rt, then K_2CO_3 , MeOH

14) TBDPSCI, imidazole

15) OsO_4 , NaIO₄



1



2

16) NaH, B

17) $\text{Cu}(\text{OAc})_2 \cdot \text{H}_2\text{O}$ (10 mol%) BDPB (10 mol%), PMHS,
t-BuOH, toluene

18) TMSI, CH_2Cl_2

19) $\text{BF}_3 \cdot \text{OEt}_2$, Et_3SiH

20) $\text{LiOH} \cdot \text{H}_2\text{O}$, MeOH, H_2O

21) **1**, Et_3N , DMAP, toluene, 80 °C

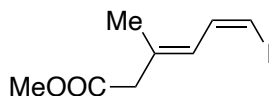
22) Bu_4NF , 40 °C

23) DMP

24) **2** (8 eq.), NaHMDS

25) Bu_3SnH , $\text{Pd}_2(\text{dpa})_3$ (3 mol%), $\text{Cy}_3\text{P} \cdot \text{HBF}_4$ (50 mol%),
i-Pr₂NEt, -78 °C to 0 °C

26) **3**, CuTC, NMP, 0 °C



3

9) *Hint*: A C_2 -symmetric product is formed with give a (*R,R*) product

11) Name the reaction.

Mitsunobu reaction

12) *Hint*: *O*-addition

13) Name the reaction. Prins reaction

15) Name the reaction. Lemieux-Johnson oxidation

16) Name the reaction.

HWE reaction

21) Name reagent **1**.

Yamaguchi reagent

26) Name the reaction.

Liebeskind coupling