Synthesis Challenge #75

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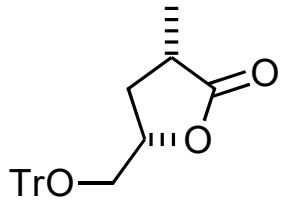
L-glutamic acid

↓ 1-5

A

1) $NaNO_2$, HCl, H_2O, 0 °C to RT
2) BH_3*SMe_2, THF, 0 °C to RT
3) TrCl, pyridine
4) LDA, MeI, THF, −78 °C to −30 °C
5) LDA, −78 °C, then H_2O

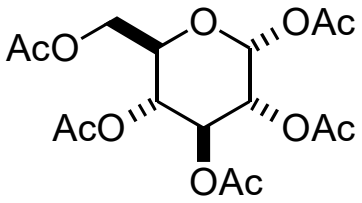


B

↓ 6-13

6) Dibal-H, CH_2Cl_2, −78 °C
7) Ph_3P=CHCOOEt, toluene, 80 °C
8) TBAF*$3H_2O$, THF, 0 °C
9) $LiAlH_4$, THF, −20 °C to RT
10) 1-phenyl-1H-tetrazolyl-5-thiol, DIAD, PPh_3, THF, 0 °C to RT
11) $(NH_4)_6Mo_7O_{24}$*4 H_2O, aq. H_2O_2, EtOH
12) TFA, CH_2Cl_2, 0 °C
13) $(COCl)_2$, DMSO, DIPEA, CH_2Cl_2

C



D

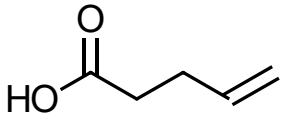
↓ 14-24

14) allyl(trimethyl)silane, BF_3*OEt_2, MeCN
15) NaOEt, MeOH
16) TBSOTf, 2,6-lutidine, CH_2Cl_2
17) HF*pyridine, THF/pyridine
18) $(COCl_2)$, DMSO, DIPEA, CH_2Cl_2
19) $[MeOCH_2PPh_3]Cl$, KOtBu, THF, MS 5Å, −50 °C, then −78 °C to RT
20) PCC, CH_2Cl_2
21) $KMnO_4$, HOAc, aq. acetone
22) CBr_4, PPh_3, CH_2Cl_2
23) PPh_3, benzene, −20 °C
24) DIPEA, benzene;

E

25-28

F



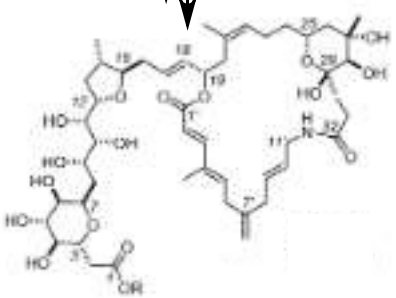
29-33

G

34-37

H

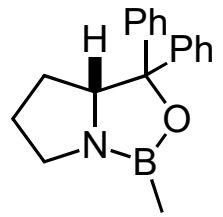
18 more steps



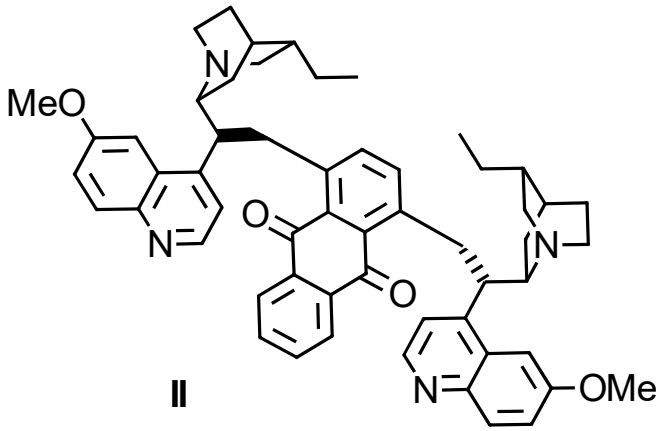
25) **C**, benzene,
26) **I**, BH_3*SMe_2, CH_2Cl_2, −20 °C
27) K_2OsO_4 (20 mol%), **II** (25 mol%), $MeSO_2NH_2$, $K_3[Fe(CN)_6]$, K_2CO_3, *t*BuOH/H_2O
28) TESOTf, 2,6-lutidine, CH_2Cl_2

29) $(COCl)_2$, then TMBOH, DMAP, K_2CO_3, CH_2Cl_2
30) 3-buten-2-one, HGII (0.1 mol%), CH_2Cl_2, reflux
31) TESOTf, Et_3N, Et_2O, 0 °C
32) **IV**, **III** (9 mol%), MS 4Å
33) O_2, $Pd(OAc)_2$ (10 mol%), DMSO,

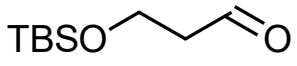
34) MeMgCl, THF, −65°C
35) AD-mix-beta, tBuOH/H_2O
36) TESCl, $AgNO_3$, DMAP, DMF, pyridine
37) Ph_3PBr_2, CH_2Cl_2, 0 °C



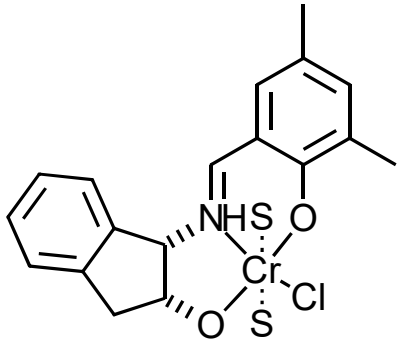
I



II



IV



III

S = H_2O