Category

Synthesis of Natural Products and Potential Drugs

Key words

communesin F

indol-2-one

Diels–Alder cycloaddition

mercuric triflate

trimethyl aluminum

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Total Synthesis of (±)-Communesin F via a Cycloaddition with Indol-2-one
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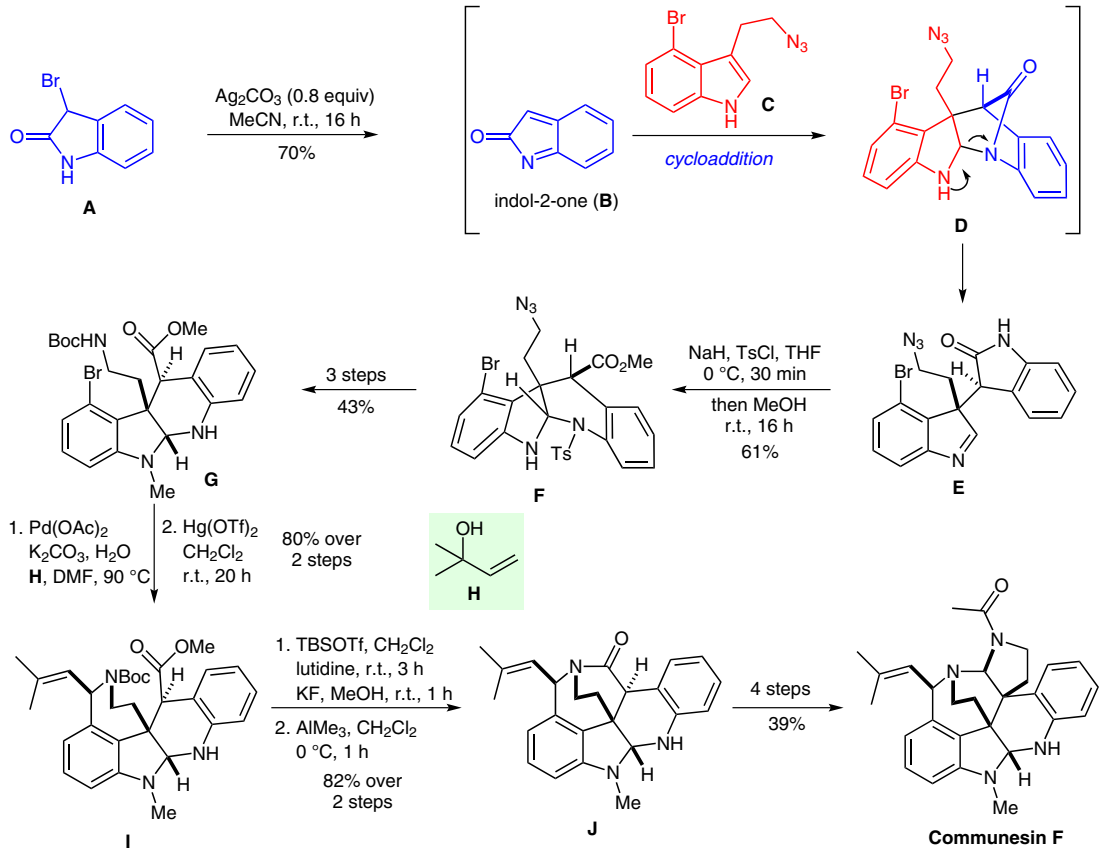
Total Synthesis of Communesin F



Significance: The stereochemically complex polycyclic structure of the communesins has attracted the interest of several researchers and led to the total syntheses of communesin A, B and F. Funk and co-worker now report an elegant and concise synthesis of the moderately cytotoxic communesin F that relies on an unusual Diels–Alder cycloaddition of indol-2-one, a reaction developed by the group. Its considerable synthetic utility has previously been demonstrated in the total synthesis of perophoramidine and is now further showcased by the synthesis of communesin F in only 15 steps and an overall yield of 6.7%.

Comment: Indol-2-one **B** was generated from bromooxindole **A** and underwent smooth cycloaddition with indole **C** to afford **E** via intermediate **D**. Tosylation of the amide followed by methanolysis led to formation of aminal **F**. Advanced tetracyclic intermediate **G** was obtained in three more steps. Heck reaction of **G** with alcohol **H**, followed by a high-yielding mercuric-triflate promoted cyclization to the benzazepine gave **I**. Cyclization to the bridged lactam **J** could not be achieved under thermal conditions, but exposure to trimethyl aluminum effected the desired transformation. Synthetic communesin F was obtained after four more steps.

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