Synthesis of Gelsenicine

Significance: Gelsenicine is an oxindole alkaloid isolated from Gelsemium Elegans, a toxic plant widely distributed in Southeast Asia and used in traditional Chinese medicine. The structure features an oxabicyclo[3.3.2] system, an oxindole, and a pyrroline. Ferreira and co-workers disclose the first total synthesis of gelsenicine relying on a gold-mediated cycloisomerization followed by a Cope rearrangement that enabled the quick construction of the gelsenicine core.

Comment: Cycloisomerization precursor D was prepared from known aldehyde A using Horner–Wadsworth–Emmons olefination followed by Cadiot–Chodkiewicz coupling. Upon exposure to [Au(JohnPhos)(MeCN)SbF_{6}] (E), D underwent cycloisomerization to F. Heat-induced cis/trans isomerization and subsequent Cope rearrangement provided G. HgSO_{4}-mediated regioselective alkyne hydration followed by oxindole and radical pyrroline formation culminated in the synthesis of gelsenicine in 13 steps and 4.2% overall yield.