Total Synthesis of Isomalabaricane Triterpenoids

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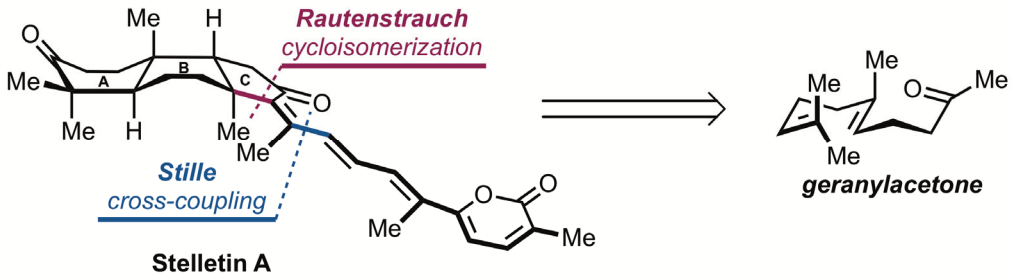
The Isomalabaricanes make up a large family of tricyclic marine triterpenoid natural products with immense promise for application in cancer treatment, yet have stood as an unmet challenge for the synthetic community since their first isolation in the 1980s. Here we disclose a concise synthetic route towards isomalabaricane triterpenoids such as Stelletin A. The main challenges that were successfully addressed in the synthesis include the introduction of a highly conjugated Michael acceptor containing pyrone moiety and the construction of an exceptionally strained *trans-syn-trans* fused tricyclic core that forces the A and B rings into twist-boat conformations. The synthesis features a stereospecific gold-catalyzed Rautenstrauch cycloisomerization and allylic-diazine rearrangement that allows facile assembly of the core and installation of all required stereocenters. Convergent Stille cross-coupling with various polyene side chains will furnish these natural products in only 12 steps from commercial materials.



Development of predictive guidelines for small-molecule accumulation in *Pseudomonas aeruginosa*

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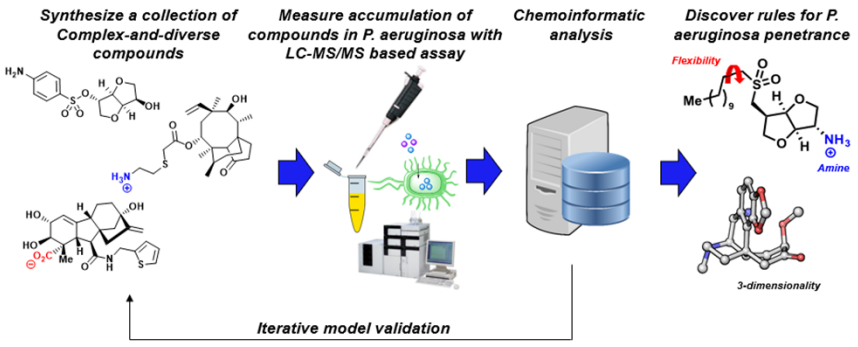
Multi-drug resistant (MDR) Gram-negative infections have become a significant global health concern. A major obstacle towards discovering novel antibacterials to treat these serious infections is that a large percentage of small-molecules are unable to accumulate within these cells. Presented herein, we seek to elucidate physicochemical properties of compounds that readily accumulate within the Gram-negative bacterium *Pseudomonas aeruginosa*. Guidelines that describe small-molecule accumulation trends in *P. aeruginosa* will greatly aid in the design of antibiotics efficacious against this pathogen.



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