Rapid Composition of Tricyclic Spiranoid Lactones: Access to Natural and Unexplored Frames

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Many important biochemical compounds and drugs of natural origin contain tricyclic spirofuranone ring structures. Analysis of their molecular frames shows a compacted carbon skeleton with angularly fused tricycles of different oxidation states in each of the rings, which together present a real synthetic challenge.

Based on the remarkable core structure similarities among the natural products, we designed a rapid and practical collective synthesis strategy of complex functionalized natural and never-before explored frames. We devised a general and common synthesis of phylogenetically and structurally different tricyclic angularly fused systems via controlled cyclizations of simple key precursors. The novel strategy is short, regio- and stereoselective, and offers the possibility to access a broad spectrum of quaternary carbon-centered spiranoid lactone-based structures. Readily accessible key molecules, which are of lesser complexity than the target natural products, were elaborated by simple synthetic sequences. These yield a broad spectrum of spiranoid lactones of varying complexity.