Stereoselective Robinson Annulation Enables Access to Potent and Selective Salvinorin Analogs

**Significance:** Salvinorin A is the main psychotropic compound of *Salvia divinorum*, a hallucinogenic plant from traditional Mazatec shamanic origin. It exhibits potent and selective KOR (kappa-opioid receptor) agonism and has been subject of extensive synthetic and semisynthetic campaigns. O6C-20-nor-SalA is a Salvinorin A analog that was shown to be resistant to C8 epimerization and a promising scaffold. Here, the authors report an asymmetric synthesis to this scaffold and the synthesis of 29 other bioactive analogs from a common intermediate.

**Comment:** The synthesis of Salvinorin A analogs was started from a cobalt-catalyzed Diels–Alder reaction between two electronically matched partners. A stereoselective samarium iodide-promoted Reformatsky reaction allows for the installation of the key β-hydroxy aldehyde intermediate. Finally, a challenging Robinson annulation, effected from the enolization of an unactivated ketone in the presence of an unstable electrophile, furnished the desired scaffold. Diverse Salvinorin A analogs were synthesized, including some with picomolar activity.

**SAR studies:**

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<th>X</th>
<th>EC&lt;sub&gt;50&lt;/sub&gt; = 6.5 nM</th>
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<tr>
<td>Y</td>
<td>EC&lt;sub&gt;50&lt;/sub&gt; = 0.3 nM</td>
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<td>EC&lt;sub&gt;50&lt;/sub&gt; = 0.4 nM</td>
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**O6C-20-nor-SalA**

**Co-catalyzed Diels–Alder reaction**

**Shi epoxidation then Rubottom oxidation**

**Reformatsky reaction**

**Robinson annulation**

**Hayashi conjugate addition**