Exporing the chemistry of the anti-cancer drug cycopamine with LC-MS and NMR.

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Abstract:

Cyclopamine shuts down a critical cell-signaling pathway (Hedgehog signaling pathway). Through this trait, it can successfully kill cancer stem cells thought to fuel tumor growth.

Cyclopamine is isolated from the corn lily (Veratrum Californicum), and this plant has previously been believed to be the only one containing cyclopamine.

In our studies, we have found evidence that the compound is present in other plants, including one that grows here in Norway, namely Veratrum Album. However, there is a catch; although the MS^n spectra match that of "regular" cyclopamine, the LC retention time is different, suggesting that Veratrum Album contains a previously unknown cyclopamine isomer. Further studies have confirmed the that cyclopamine undergoes isomerization in the presence of e.g. hydrochloric acid, and that the isomerization has serious implications regarding the use of cyclopamine when treating e.g. stomach cancer.