

Simultaneous production of psilocybin and a cocktail of β -carboline monoamine oxidase inhibitors in 'magic' mushrooms.

Blei F, Dörner S, Fricke J, Baldeweg F, Trottmann F, Komor AJ, Meyer F, Hertweck C, Hoffmeister D (2020) Simultaneous production of psilocybin and a cocktail of β -carboline monoamine oxidase inhibitors in 'magic' mushrooms. *Chem Eur J* 26(3), 729-734.

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Abstract

The psychotropic effects of *Psilocybe* "magic" mushrooms are caused by the l-tryptophan-derived alkaloid psilocybin. Despite their significance, the secondary metabolome of these fungi is poorly understood in general. Our analysis of four *Psilocybe* species identified harmane, harmine, and a range of other l-tryptophan-derived β -carbolines as their natural products, which was confirmed by 1D and 2D NMR spectroscopy. Stable-isotope labeling with $^{13}\text{C}_{11}$ -l-tryptophan verified the β -carbolines as biosynthetic products of these fungi. In addition, MALDI-MS imaging showed that β -carbolines accumulate toward the hyphal apices. As potent inhibitors of monoamine oxidases, β -carbolines are neuroactive compounds and interfere with psilocybin degradation. Therefore, our findings represent an unprecedented scenario of natural product pathways that diverge from the

same building block and produce dissimilar compounds, yet contribute directly or indirectly to the same pharmacological effects.

Involved units

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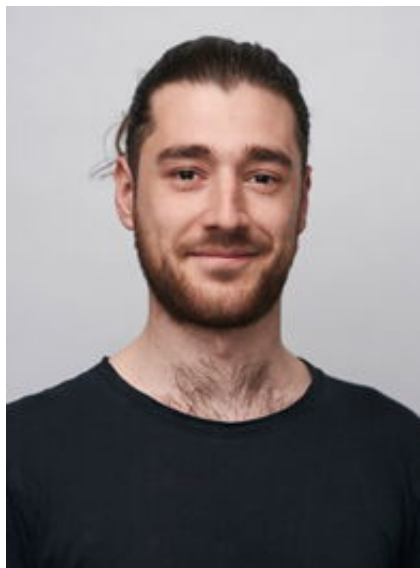
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