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Investigation of polyketide biosynthesis in agaricomycetes

It is well established that small molecules mediate organismal interactions among eu- or prokaryotic microbes, or between them, e.g., through quorum sensing, inhibition, or inducing effects on metabolism. Recent progress in basidiomycete genomics unveiled a remarkable number of genes dedicated to small molecule biosynthesis, e.g. polyketides or small peptides. In stark contrast, little is known about the structures (let alone their bioactivities) of these secondary products and their effects on other microbial cells in subinhibitory concentrations, i.e., those titers that typically occur in shared habitats under natural environmental conditions.

This ILRS project aims at research into the structural diversity of basidiomycete natural products and the effects they exert on other microbial cells. Specifically, parasitic species of the agaricomycotina (mushroom-type “higher fungi”) will be characterized for their secondary metabolome, with an emphasis on polyketides. In a higher level, we expect to gather information about the role of these microorganisms in the microbial community and evidences about polyketide biosynthesis in mushroom-type fungi. We combine chemical analytics with genetic methods, to identify biosynthesis genes and connect them with fungal natural products. Their interactive relevance on other microbes and microbial communities will be investigated by specifically engineered reporter strains and activity-guided assay procedures.

Publications

Braga D, Hoffmeister D, Nett M (2016) A non-canonical peptide synthetase adenylates 3-methyl-2-oxovaleric acid for auriculamide biosynthesis. *Beilstein J Org Chem* 12, 2766-2770. Details PubMed

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