Smelling the difference: Transcriptome, proteome and volatilome changes after mating.

Freihorst D, Brunsch M, Wirth S, Krause K, Kniemeyer O, Linde J, Kunert M, Boland W, Kothe E (2016) Smelling the difference: Transcriptome, proteome and volatilome changes after mating. *Fungal Genet Biol* 112, 2-11.

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Abstract

Mushrooms, such as Schizophyllum commune, have a specific odor. Whether this is linked to mating, prerequisite for mushroom formation, or also found in monokaryotic, unmated strains, was investigated with a comprehensive study on the transcriptome and proteome of this model organism. Mating interactions were investigated using a complete, cytosolic proteome map for unmated, monokaryotic, as well as for mated, dikaryotic mycelia. The regulations of the proteome were compared to transcriptional changes upon mating and to changes in smell by volatilome studies. We could show a good overlap between proteome and transcriptome data, but extensive posttranslational regulation was identified for more than 80% of transcripts. This suggests down-stream regulation upon interaction of mating partners and formation of the dikaryon that is competent to form fruiting bodies. The volatilome was shown to respond to mating by a broader spectrum of volatiles and increased emission of the mushroom smell molecules 3-octanone and 1-octen-3-ol, as well as ethanol and β-bisabolol in the dikaryon. Putatively involved biosynthetic proteins like alcohol dehydrogenases, Ppo-like oxygenases, or sesquiterpene synthases showed

correlating transcriptional regulation depending on either mono- or dikaryotic stages.

Involved units

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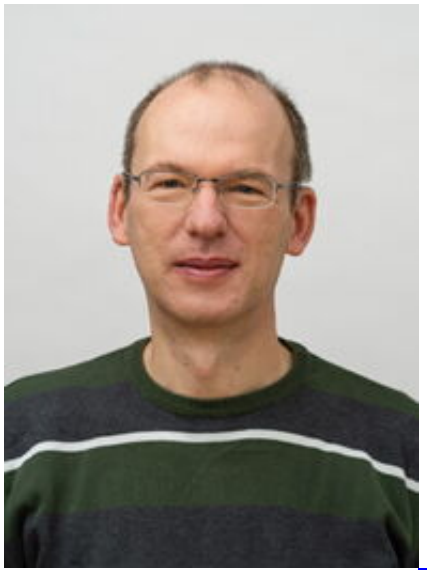

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doi: 10.1016/j.fgb.2016.08.007

PMID: 27593501