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Aspergillus triggers phenazine production in Pseudomonas aeruginosa

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Objectives:
Pseudomonas aeruginosa is an opportunistic human pathogen, commonly infecting cystic fibrosis (CF) patients. Aspergilli, especially Aspergillus fumigatus, are also frequently isolated from CF patients. Our aim was to examine the possible interaction between P. aeruginosa and different Aspergillus species.

Methods:
A suspension of fungal spores was streaked onto WATM agar plates. After 24 hours incubation at 37 °C, a P. aeruginosa overnight culture was streaked out perpendicular to the fungal streak. The plates were incubated at 37 °C for five days, examined and plugs were extracted for HPLC-DAD and HPLC-DAD-MS analysis.

Results:
P. aeruginosa PAO1 suppressed growth of A. fumigatus, A. niger, A. flavus, A. oryzae, A. terreus and Emericella nidulans. HPLC and HPLC-DAD-MS results showed an increase in phenazine-1-carboxylic acid and phenazine-1-carboxamide production by P. aeruginosa in the contact area of A. niger, A. flavus, A. oryzae, but not A. fumigatus. In addition, other metabolites with UV chromophores similar to the phenazines were only found in the contact zone between Aspergillus and Pseudomonas. No change in secondary metabolite profiles were seen for the Aspergilli, when comparing with or without the presence of Pseudomonas.

Conclusion:
All Aspergilli tested, with the exception of A. fumigatus, triggered the upregulation of phenazine-1-carboxamide and phenazine-1-carboxylic acid production by P. aeruginosa. Surprisingly no changes in secondary metabolite profiles were detected in any of the Aspergilli.