Breaking the silence: protein stabilization uncovers silenced biosynthetic gene clusters in the fungus Aspergillus nidulans.

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Abstract

The genomes of filamentous fungi comprise numerous putative gene clusters coding for the biosynthesis of chemically and structurally diverse secondary metabolites (SMs), which are rarely expressed under laboratory conditions. Previous approaches to activate these genes were based primarily on artificially targeting the cellular protein synthesis apparatus. Here, we applied an alternative approach of genetically impairing the protein degradation apparatus of the model fungus Aspergillus nidulans by deleting the conserved eukaryotic csnE/CSN5 deneddylase subunit of the COP9 signalosome. This defect in protein degradation results in the activation of a previously silenced gene cluster comprising a polyketide synthase gene producing the antibiotic 2,4-dihydroxy-3-methyl-6-(2-oxopropyl)benzaldehyde (DHMBA). The csnE/CSN5 gene is highly conserved in fungi, and therefore, the deletion is a feasible approach for the identification of new SMs.

Beteiligte Forschungseinheiten

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Details

Themenfelder

Vorhersage genregulatorischer Elemente und Gencluster in Pilzen

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