Genetics of Polyketide Metabolism in Aspergillus nidulans

Secondary metabolites are small molecules that show large structural diversity and a broad range of bioactivities. Some metabolites are attractive as drugs or pigments while others act as harmful mycotoxins. Filamentous fungi have the capacity to produce a wide array of secondary metabolites including polyketides. The majority of genes required for production of these metabolites are mostly organized in gene clusters, which often are silent or barely expressed under laboratory conditions, making discovery and analysis difficult. Fortunately, the genome sequences of several filamentous fungi are publicly available, greatly facilitating the establishment of links between genes and metabolites. This review covers the attempts being made to trigger the activation of polyketide metabolism in the fungal model organism Aspergillus nidulans. Moreover, it will provide an overview of the pathways where ten polyketide synthase genes have been coupled to polyketide products. Therefore, the proposed biosynthesis of the following metabolites will be presented; naphthopyrone, sterigmatocystin, aspyridones, emericellamides, asperthecin, asperfuranone, monodictyphenone/ emodin, orsellinic acid, and the austinols.

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