Fungal Secondary Metabolism

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Contributor: Javier Avalos , M Carmen Limon

Fungal secondary metabolites (SMs) comprise a vast collection of compounds expendable for these organisms under laboratory conditions. They exhibit enormous chemical diversity, and usually belong to four major families: terpenoids, polyketides, non-ribosomal peptides, or a combination of the last two. Their functions are very diverse and are normally associated with a greater fitness of the producing fungi in their environment, which often compete with other microorganisms or interact with host plants. Many SMs have beneficial applications, e.g., as antibiotics or medical drugs, but others, known as mycotoxins, are harmful to health.

polyketides PKS terpenoids non-ribosomal peptides NRP PKS–NRPS hybrid genes gene clusters pigments antibiotics mycotoxins

The production of metabolites by fungi began to receive attention in the first half of the last century [1], and acquired special relevance after the discovery of penicillin, a metabolite produced by the fungus *Penicillium*, which started the era of antibiotics [2]. Today, one of the most characteristic traits of fungi is their enormous metabolic versatility, which is reflected in the richness of secondary metabolism in many species [3]. Secondary metabolites (SMs) can be defined as chemical compounds resulting from specific biosynthetic pathways, whose production is not necessary for normal growth and development of the fungus in the laboratory. However, they are present in numerous species, and therefore their persistence in evolution implies a competitive benefit in nature. This entry reviews the major SM families, summarizes the genetic basis and regulatory mechanisms involved in their production, and provides with selected examples a general overview of their chemical diversity, possible roles in fungal life, and biological effects and applications in human life.

References

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