
PLENARY PRESENTATIONS

**INSIGHTS INTO REGULATORY MECHANISMS AND ACTIVATION
STRATEGIES OF SILENT GENE CLUSTERS IN FUNGI**

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Fungal biosynthetic gene clusters (BGCs) represent a treasure trove of bioactive secondary metabolites with profound biomedical and agricultural implications. Notably, the majority of BGCs are transcriptionally silent under laboratory conditions, severely impeding the discovery of novel bioactive compounds. Our research pioneers an integrative platform for awakening these cryptic biosynthetic pathways. By combining in vivo epigenetic regulation, co-cultivation with microbial partners, and heterologous expression systems, we have successfully reactivated silent BGCs in various fungal species. This has led to the identification of structurally novel antimicrobial and anticancer agents such as epidithiodiketopiperazines and fungal naringenin synthase. We have uncovered multiple complex regulatory mechanisms governing secondary metabolism. These include the modulation of secondary metabolites by the partially loss - of - function VeA1 protein during fungal - fungal interactions, as well as the post - transcriptional regulation of secondary metabolism by the CsdA/RsdA complex.