OS23-2 **Redesigning Complex Natural Products Biosynthesis**

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Meroterpenoids are hybrid natural products that are partially derived from terpenoid origin, and those from fungi exhibit an extremely wide range of structural diversity and biological activities. Recent advances in genome sequencing technologies and development of tools for biosynthetic studies have allowed the discovery of many biosynthetic gene clusters for fungal meroterpenoids and intensive researches at genetic and enzymatic level. We have been working on the meroterpenoids derived from a simple aromatic precursor, 3,5-dimethylorsellinic acid (DMOA), and discovered several fascinating enzymes that catalyze drastic structural rearrangement which dramatically increase structural complexity of the molecules. For example, multifunctional, nonheme iron-dependent dioxygenases are the key components in the austinol and the anditomin pathway, in which the enzymes are responsible for the construction of the spiro-lactone and the bicyclo[2.2.2]octane core, respectively. On the other hand, the terretonin biosynthesis involves a cytochrome P450 and an isomerase, which work collaboratively to perform the unprecedented ring expansion reaction to afford the terretonin scaffold. This presentation will focus on our recent advances in redesigning complex natural products biosynthesis.