P-018: VALC, A NEW C7-CYCLITOL KINASE INVOLVED IN THE BIOSYNTHESIS OF THE ANTIFUNGAL AGENT VALIDAMYCIN A

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The C7N aminocyclitol family of bacterial secondary metabolites, such as the antifungal antibiotic validamycin A (**1**) and the anti-diabetic agent acarbose (**2**), are widely used for the treatment of human and plant diseases. Their chemical structures normally contain an aminocyclitol moiety, valienamine. The biosynthetic gene cluster of **1** in *S. hygroscopicus* 5008 has recently been accomplished,[1] revealing a number of genes, among which is a gene encoding protein homologous to the C7-cyclitol kinase. Inactivation of the gene (valC) resulted in mutants that lack the ability of producing **1**. Complementation experiments with a replication plasmid harboring full-length valC restored the production of the antibiotic. In vitro characterization of ValC revealed a new type of C7-cyclitol kinase with distinct substrate recognition from that of AcbM, a homologous enzyme in the biosynthesis of **2**. The result also justifies the discrepancy of feeding experiment results reported previously for the biosynthesis of **1** and **2** and underscore the existence of two different pathways leading to the same end-product, the valienamine moiety of **1** and **2**.

1) Linquan Bai *et al.*, *Chem. Biol*. **2006**, *13*, 387-97.