Synthetic study of myriocin derivative

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Myriocin (**1**) is an α-disubstituted-α-amino acid isolated from *Isalia sinclairii* in 1994. This compound exhibits 10- to 100-fold more potent immunosuppressive activity than cyclosporine A. Recently, Kiuchi *et al*. have developed a novel immunosuppressive drug, FTY720 (**2**), utilizing **1** as a lead compound. However, it is proposed that the mechanism of the action of **2** differs from that of **1**. Therefore, **1** has attracted much attention due to its significance in biological investigations. In our laboratory, the total synthesis of (–)-**1** was achieved recently. This synthetic route is expected to be applicable to the synthesis of various derivatives of **1** for the structure-activity relationship study. In this work, we planned to investigated the total synthesis of sphingofungin E (**3**) containing an additional hydroxyl group at the C-5 position.

Mn(III)-catalyzed allylic *C-H* oxidation of epoxide **6** proceeded smoothly, and the following stereoselective 1,2-reduction gave allylic alcohol **7**. The four continuous stereogenic centers of **3** were constructed via inversion at the C-5 position by Mitsunobu reaction, followed by regioselective epoxide-opening reaction. After the conversion of cyclic carbonate **9** to amide **10**, the double bond was cleaved by ozonolysis. Subsequent treatment with $NaBH_4$, followed by Hofmann rearrangement using $PhI(OAc)_2$ gave oxazolidinone **11**. We are currently investigating a coupling reaction of sulfone **12** with aldehyde **13**.