Synthetic study of *N*-glycan from hyperthermophilic archaeon *Thermococcus kodakarensis*

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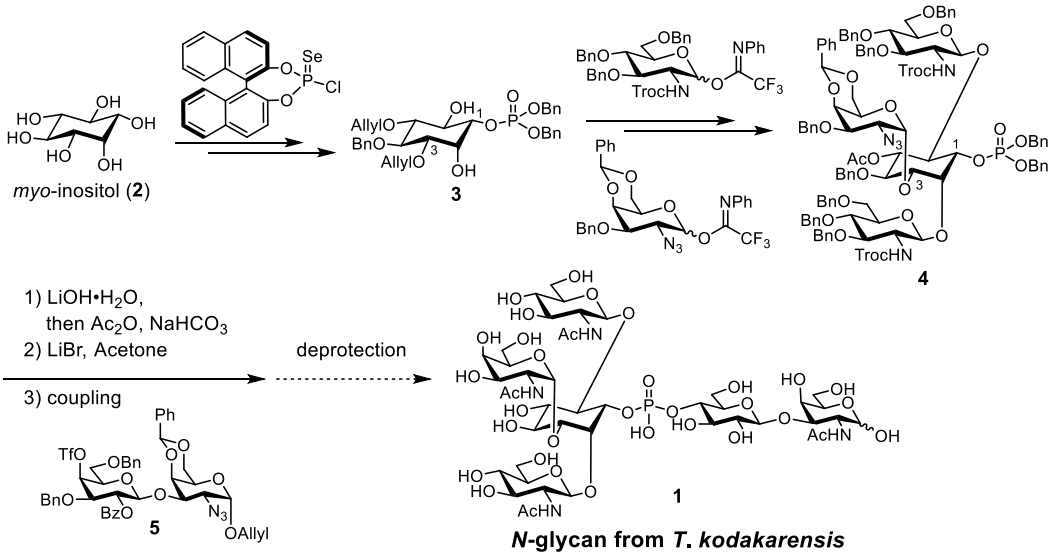
Archaea membrane proteins are glycosylated with asparagine linked oligosaccharides (*N*-glycans), like eukaryote's. However, their functions have not been elucidated. To address this issue, we first isolated *N*-glycan from the hyperthermophilic archaeon, *Thermococcus kodakarensis*, and determined the structure. *N*-Glycan **1** possesses quite unique structure consisting in highly glycosylated inositol linked with the disaccharide via phosphate. We next investigated the synthesis of **1** (Scheme 1). Compound **3** was synthesized via regioselective phosphorylation using an asymmetric phosphorylation reagent from *myo*-inositol (**2**) according to our previous report.[1] Introduction of two glucosamines followed by galactosamination afforded **4**. After the conversion of Troc to Ac, benzyl ester at the phosphate was cleaved using LiBr. Coupling between the resulting inositol phosphate and the disaccharide was then investigated. Conjugation reaction using various reagents, including CDI, DCC, and PyBOP, did not proceed due to the steric hinderance of both substrates. After the thorough investigation, S_N2 type reaction between the phosphoric acid salt and triflate **5** successfully gave the desired coupling product. In this reaction, formation of cesium salt and addition of 24-crown-8 ether were essential. Deprotection for the synthesis of **1** is under investigation.



Scheme 1. Synthesis of *N*-glycan **1**

1) Aiba, T. et al. *Chem. Eur. J.* **2017**, *23*, 8304.