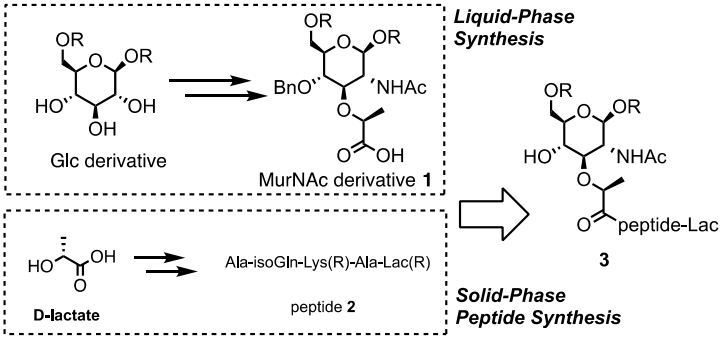
Synthetic study of D-Lac-terminated peptidoglycan fragment structures

(*Faculty of Science and Technology, Keio University*) ○Yu Saito, Takanori Matsumaru, Yukari Fujimoto

Keywords : Peptidoglycan; Lactate; Glycopeptide; Solid-Phase Peptide Synthesis

Peptidoglycan (PGN) is a bacterial cell wall component and known to be recognized by various receptors or enzymes to lead the activation immune system. The general structure of PGN consists of sugar chain including *N*-acetylglutamine (GlcNAc), *N*-acetylmuramic acid (MurNAc) and cross-linked peptide chains. PGN fragment having D-Lac terminus peptides have been found,[1] but the chemically synthesized PGN fragment having D-Lac terminus peptide has not been examined in detail. We thus focused on the synthesis of PGN fragment structures that include D-Ala-D-Lac residue at the terminal part of the peptide chain. In order to synthesize these fragment structures, we planned to combinate solid-phase peptide synthesis (for peptide- Lac part) and liquid-phase synthesis (for glycan preparation and the condensation).[2] This approach is advantageous for the preparation of peptidoglycan fragments having complex branched peptide moiety. We firstly prepared the sugar moiety MurNAc derivative **1** in liquid-phase synthesis from a glucose derivative. While, the Lac-containing peptide **2** was prepared with solid-phase peptide synthesis using 2-chlorotrityl chloride resin. Having these compound **1** and **2**, the condensation of these compounds **1** and **2** gave the desired D-Lac-terminated peptidoglycan fragment **3**.



1) Handwerger, S.; Pucci, M. J.; Volk, K. J.; Liu, J.; Lee, M. S. *J. Bacteriol.* **1992**, *174,* 5982.
2) Wang, K.; Hasegawa, H.; Huang, C. Y.; Fukase, K.; Fujimoto, Y. *Chem. Asian. J.* **2017**, *12*, 27.