

One-Pot Chemical Synthesis of Glycoproteins and Their Specific Glycan-Hydration Effect

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The glycosylation of proteins is the ubiquitous posttranslational modification of proteins. The functional study of structurally-defined glycoproteins prepared by chemical synthesis is a powerful approach to elucidate the function of oligosaccharides on glycoproteins at a molecular level. Recently, we proposed that the hydration of oligosaccharides potentially influences the function of glycoproteins¹⁾. However, the character of hydration shell of oligosaccharides on glycoproteins was still unclear. To address this issue, we carried out the chemical synthesis of the glycoforms of chemokine CCL1 and evaluated the hydration volume of various oligosaccharides on glycoproteins.

For the efficient synthesis of CCL1 glycoforms, we developed one-pot peptide coupling reaction using peptidyl-2-aminothiazoline²⁾. After extensive optimization, this synthetic method allowed us to efficiently couple two peptides and one glycopeptide followed by folding in one-pot manner. To evaluate the hydration property of CCL1 glycoforms, we carried out the hydrogen deuterium exchange mass spectrometry (HDX-MS). This revealed the unique correlation of the structures of oligosaccharides and their hydration regions that influences the hydration of protein moiety. In this presentation, we would like to present the detail of the results of HDX-MS and discuss the hydration of glycoproteins.

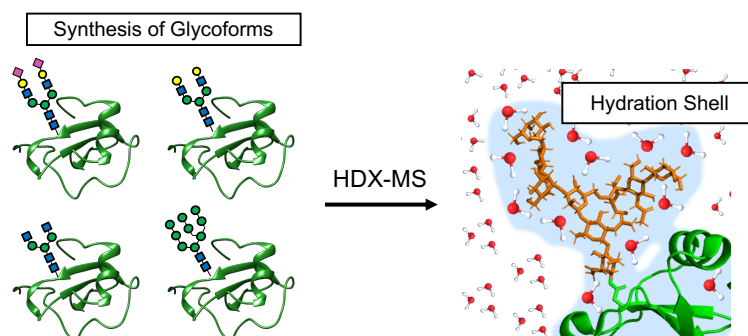


Fig. 1 Scheme of the experiment

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2) H. Shibata, et. al, *The 101st CSJ Annual Meeting*, **2021**, A22-4am