Polypyridine Host Molecules for Binding Saccharides by Helical Structures

○Hajime Abe, Minoru Waki and Masahiko Inouye
(Graduate School of Pharmaceutical Sciences, University of Toyama; PRESTO, JST)

Molecular recognition for a certain guest requires a host suitably designed to capture the guest by non-covalent interactions. With techniques of organic and supramolecular chemistry, our group have developed artificial host molecules "*meta*-ethynylpyridine polymer" **1** to recognize mono- and polysaccharides. Polymer **1** is consisted of pyridine rings linked their 2,6-positions by acetylene bridges, and it recognizes the guest saccharide with the multipoint hydrogen-bondings between pyridine-*N* and saccharide-*OH*. . At this host-guest recognition, the complex of **1** and saccharide forms helical structure to encompass the guest, and the chilarity of the saccharide biasses the helical sense of the complex to induce circular dichromism (CD). This is detection of saccharides by CD measurement with **1**. Each pyridine ring in **1** has functional group (R) at its 4-position, and the characteristics of polymer **1** can be tuned at will by proper choice of R group. In this symposium we would like to report our development of **1a** which have amphiphilic groups, octa(ethylene glycol) side chains. Starting from 2,6-dibromopyridine, **1a** could be obtained by repeating Sonogashira reactions. Amphiphilicity of **1a** allows it to dissolve into not only usual organic solvents but also distilled water. When **1a** was treated in the aqueous methanol solution of hexoses, such as D-glucose, D-mannose, D-fructose, and so on, induced CDs were observed at the absorptive region of **1a**. These CDs indicated that **1a** actually recognized hexoses, and by the further analyses about thermodynamical parameters, the recognition was revealed to be driven by enthalpic factor, hydrogen bondings. Polymer **1b** was induced additional chiral centers on side chains, and observed to recognize mono- and polysaccharides even in 100% water.