21T-am06

ボロンジピロメテン（BODIPY）に基づくレシオメトリック炭水化物センサーの開発 .

○ Nusaiba MADAPPURAM CHERUTHU[1,1], Komatsu TORU[1,1], Urano YASUTERU[1,1]（[1]東大院薬）

In this study, we have designed a ratiometric fluorescence saccharide indicator based on the fluorophore boron dipyrromethene (BODIPY). The detection of biologically important sugars are vital as they are involved in the metabolic pathways of living organisms. Boronic acids serves as the useful chelator groups for sugar recognition, where they can bind with compounds containing diols with high affinity through reversible ester formation.

We designed a ratiometric carbohydrate sensor consisting of BODIPY substituted with boronic acid at the 2-position (figure 1), based upon the strong substituent dependency of the absorbance/fluorescence wavelengths of BODIPY. The substituent is in equilibrium between the boronic acid $B(OH)_2$ and boronate ($B(OH)_3^-$) forms, which results in different fluorescence wavelengths of BODIPY fluorophore in the visible region. Reaction of the boronic acid moiety with *syn*-periplanar hydroxy groups of carbohydrate affords a cyclic ester, and shifts the equilibrium in favor of the boronate ($B(OR)_3^-$) form, resulting in a carbohydrate-concentration-dependent change of the fluorescence ratio FL490 nm/FL510 nm. Thus, the sensor, BA-BODIPY, can ratiometrically detect carbohydrate at a pH near the pK_a of cyclic ester formation.

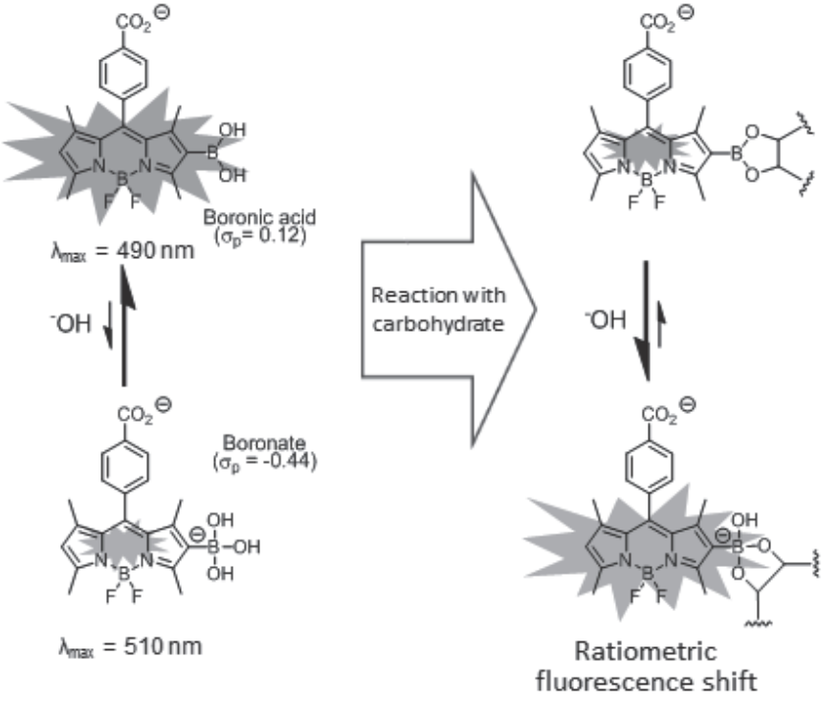

Figure 1: Design principle for a ratiometric carbohydrate sensor (BA-BODIPY) based on reaction of carbohydrate diol moiety with monoboronic acid-substituted BODIPY.