Boronic Acid-Decorated Lysine Dendrimers as Carbohydrate Sensors

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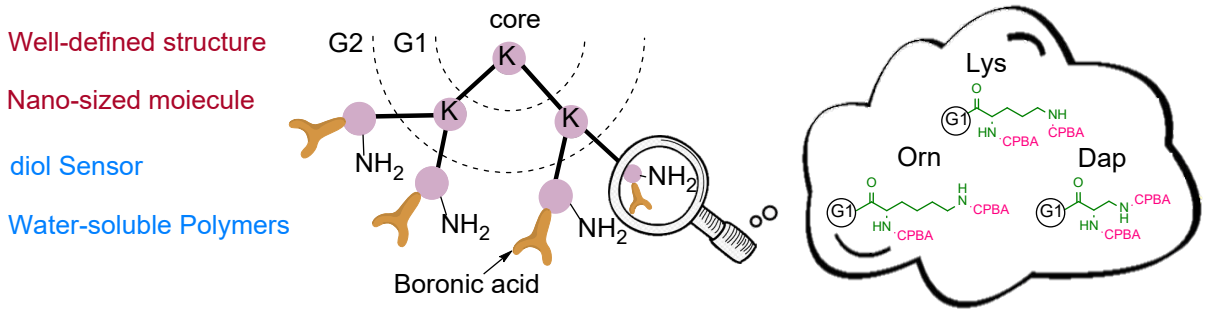
Boronic acid binds to compounds with diols through dynamic covalent chemistry, which makes it a potential tool for various biomedical applications. In a previous study, boronic acid-decorated PAMAM dendrimers demonstrated size-dependent carbohydrate binding selectivity. A similar investigation used lysine dendrimers to reveal the importance of the distribution of boronic acids. Two boronic acid-decorated lysine dendrimers possessed four different binding affinities to glucose. This result suggested that the distribution of peripheral functional groups determines the binding affinity. Accordingly, a family of lysine dendrimer derivatives was prepared through solid-phase dendrimer synthesis. Those dendrimers were subjected to binding experiments with various carbohydrates. One of the dendrimers demonstrated selective binding for sialic acid, with binding affinities up to 100-fold higher than for glucose or sorbitol, highlighting potential applications in biomarker detection and disease diagnostics.

Keyword: Carbohydrate binding, Boronic acid-decorated dendrimers, selective binding affinity.



Reference

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Prof. Chai-Lin Kao earned his Ph.D. from National Taiwan University. After three years of postdoctoral training, he became a member of the faculty in Medicinal and Applied Chemistry at Kaohsiung Medical University in 2005 and He was promoted to full professor in 2018. He developed an efficient solid-phase dendrimer synthesis (SPDS) to prepare pure dendrimers without chromatography. His recent research focuses on the application of dendrimers as a sensor of carbohydrates and a delivery vehicle.