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A novel and highly specific phage endolysin cell wall binding domain for detection of *Bacillus cereus*

Taejoon Kang, Gayoung Eom, Ahreum Hwang and Jeong Moon
KRIBB, Korea

Rapid, specific and sensitive detection of pathogenic bacteria is crucial for public health and safety. *Bacillus cereus* is harmful as it causes foodborne illness and a number of systemic and local infections. We report a novel phage endolysin cell wall-binding domain (CBD) for *B. cereus* and the development of a highly specific and sensitive surface plasmon resonance (SPR)-based *B. cereus* detection method using the CBD. The newly discovered CBD from endolysin of PBC1, a *B. cereus*-specific bacteriophage, provides high specificity and binding capacity to *B. cereus*. By using the CBD-modified SPR chips, *B. cereus* can be detected at the range of 10^5–10^8 CFU/ml. More importantly, the detection limit can be improved to 10^2 CFU/ml by using a subtractive inhibition assay based on the pre-incubation of *B. cereus* and CBDs, removal of CBD-bound *B. cereus*, and SPR detection of the unbound CBDs. The present study suggests that the small and genetically engineered CBDs can be promising biological probes for *B. cereus*. We anticipate that the CBD based SPR-sensing methods will be useful for the sensitive, selective, and rapid detection of *B. cereus*.

Biography

Taejoon Kang received a BS degree in Chemistry from KAIST in 2004 and a PhD in Chemistry from KAIST in 2010. He did his Post-doctoral research at KAIST before joining in KRIBB as a Senior Researcher in 2012. He is currently working as Senior Researcher at BioNanotechnology Research Center and BioNano Health Guard Research Center in KRIBB and Associate Professor in major of Nanobiotechnology and Bioinformatics at UST.

kangtaejoon@gmail.com

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