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A facile biosensor system for separation and detection of *Norovirus* using specific binding affinity probes

Tae Jung Park
Chung-Ang University, South Korea

Norovirus is one of the worldwide infectious diseases caused by eating raw foods which were infected. It is a major cause of foodborne and nosocomial outbreaks. In this study, thorough and highly sensitive biosensors for detecting *Norovirus* by applying a recognized affinity peptide as a platform were described. These electrochemical and optical methods are cost-effective, fast responsive and easy to integrate information into miniaturized micro-devices like a portable biosensor device. The performance of the peptides has been studied with fluorescent optical assay and gold-immobilized synthetic peptides have been studying cyclic voltammetry, impedance spectroscopy and colorimetry analysis. We found that several kinds of peptides (Noro-BP, nonFoul, (FelxL)2, nonFoul(FlexL)2) are the efficient recognizers for *Norovirus* screened by using the M13 phage display method. These peptides were effectively applied to the analytical methods to detect the real *Norovirus* sample with Rotavirus as a negative control. Among them, nonFoul (FlexL)2 shows the best performance as the lowest detection limit value of 1.7 copies/mL. In addition, the result could be expected to be useful to peptide-based detection sensor for the *Norovirus* by using nano-flowers with large surface area. These results suggest that the biosensor consists of specific binding peptide, has affinity to *Norovirus* as a molecular binder and will be used as a diagnostic tool. Moreover, the biosensor could help as a new bio-sensing platform for point-of-care testing by applying much more fields.

tjpark@cau.ac.kr