Supporting Information

Colorimetric Detection of Norovirus in Oyster Samples through DNAzyme as a Signaling Probe

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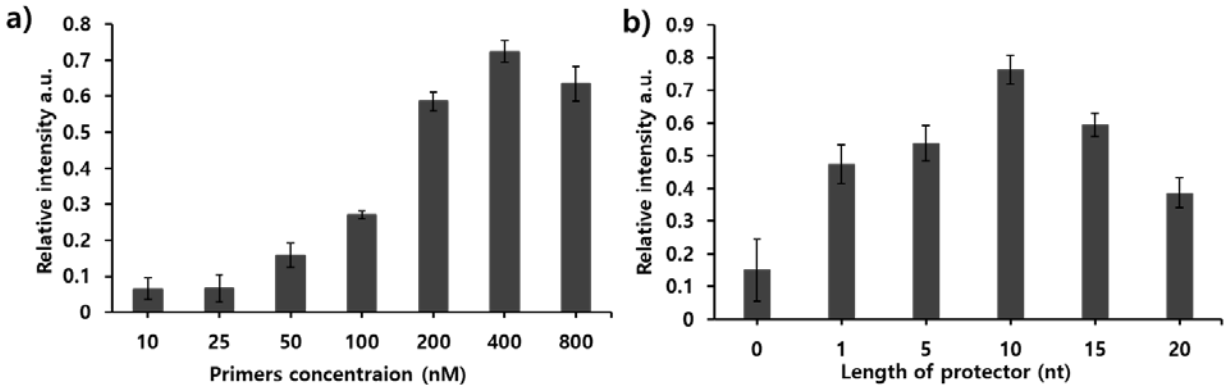

Figure S1. Optimization of colorimetric detection of noroviruses. (a) Primer concentration; (b) Protector sequence length.

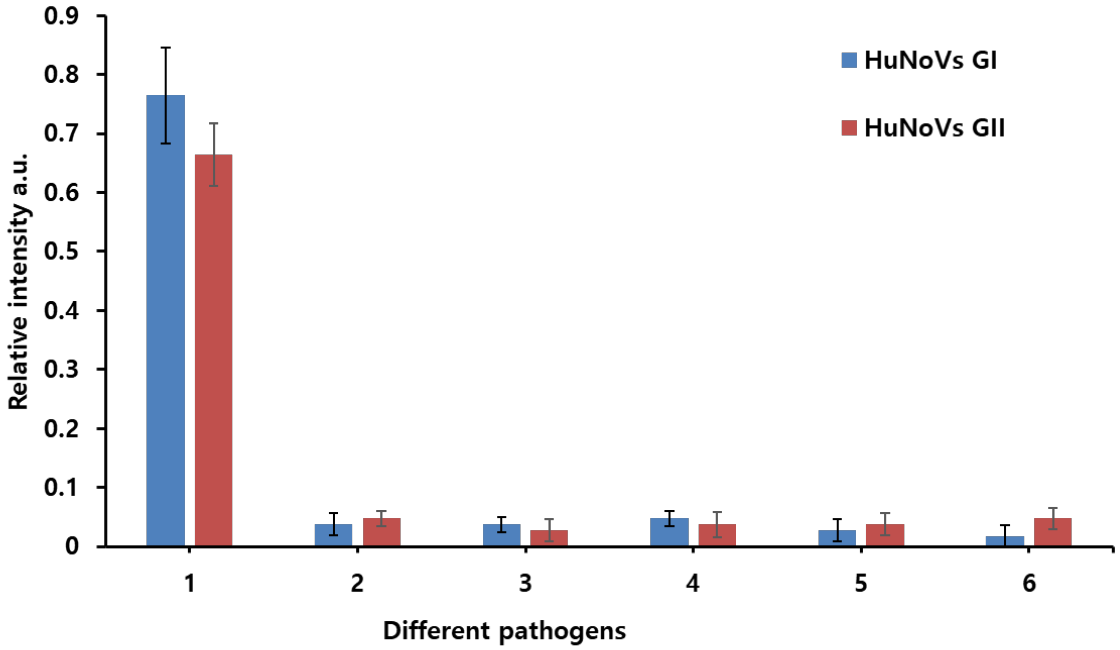

Figure S2. Specificity of proposed strategy towards HuNoVs GI and GII. 1, HuNoVs; 2, *E. coli* O157:H7; 3, *Listeria monocytogenes*; 4, *Vibrio parahaemolyticus*; 5, *Salmonella* Typhimurium; 6, *Bacillus cereus*. The concentration of HuNoVs GI, HuNoVs GII, and all bacteria were 10^3, 10^3, and 10^4 cfu mL^{-1}, respectively. Error bars are represent the standard deviations from three representative experiments (n = 3).

Table S1. The comparison of proposed strategy with other reported methods for the detection of HuNoV

Detection methods	Detection limit	Sample tested	Detection time (min)	Reference
Turbidimeter detection (RT-LAMP)	10^2 and 10^3 copies/tube, HuNoV GI and GII	Buffer	90	1
Colorimetric detection (RT-LAMP) hydroxynaphthol blue dye (HNB)	10^3 copies per reaction, HuNoV GII	Buffer	60	2
Fluorescence detection (RT-LAMP)	10 copies/reaction, Murine norovirus GI	Stool	45	3
Electrochemical detection (gold-immobilized synthetic peptide)	7.8 copies/mL, HuNoV GI	Buffer	120	4
Electrochemical detection (graphene-gold nano-composite aptasensor)	100 pM, HuNoV GII	Biological fluid	50	5
Fluorescence detection (FAM-labeled aptamer)	3.3 ng/mL, HuNoV GII	Mussel tissue	50	6
Colorimetric detection (split G-quadruplex)	4 nM, HuNoV GII	Buffer	160	7
Colorimetric (HRPzyme-integrated PCR)	Single copy/tube, HuNoV GI and GII	Oyster	60	This study

References:

1. Fukuda, S.; Takao, S.; Kuwayama, M.; Shimazu, Y.; Miyazaki, K., Rapid detection of norovirus from fecal specimens by real-time reverse transcription-loop-mediated isothermal amplification assay. *J. Clin. Microbiol.* **2006,** *44,* 1376-1381.

2. Luo, J.; Xu, Z.; Nie, K.; Ding, X.; Guan, L.; Wang, J.; Xian, Y.; Wu, X.; Ma, X., Visual Detection of norovirus genogroup II by reverse transcription loop-mediated isothermal amplification with hydroxynaphthol blue dye. *Food Environ. Virol.* **2014,** *6,* 196-201.

3. Yaren, O.; Bradley, K. M.; Moussatche, P.; Hoshika, S.; Yang, Z.; Zhu, S.; Karst, S. M.; Benner, S. A., A norovirus detection architecture based on isothermal amplification and expanded genetic systems. *J. Virol. Methods,* **2016,** *237,* 64-71.

4. Hwang, H. J.; Ryu, M. Y.; Park, C. Y.; Ahn, J.; Park, H. G.; Choi, C.; Ha, S.-D.; Park, T. J.; Park, J. P., High sensitive and selective electrochemical biosensor: Label-free detection of human norovirus using affinity peptide as molecular binder. *Biosens. Bioelectron.* **2017,** *87,* 164-170.

5. Chand, R.; Neethirajan, S., Microfluidic platform integrated with graphene-gold nano-composite aptasensor for one-step detection of norovirus. *Biosens. Bioelectron.* **2017,** *98,* 47-53.

6. Weng, X.; Neethirajan, S., Aptamer-based fluorometric determination of norovirus using a paper-based microfluidic device. *Microchim. Acta,* **2017**, 1-8.

7. Nakatsuka, K.; Shigeto, H.; Kuroda, A.; Funabashi, H., A split G-quadruplex-based DNA nano-tweezers structure as a signal-transducing molecule for the homogeneous detection of specific nucleic acids. *Biosens. Bioelectron.* **2015,** *74*, 222-226.