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Estimate infectivity of human *Norovirus* in environmental water samples by in situ capture RT-qPCR method

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Human *Noroviruses* (HuNoVs) are highly infectious viruses for which water is an important medium of transmission. In this study, we explored a new *in situ* capture RT-qPCR (ISC-RT-qPCR) methodology to estimate the infectivity of HuNoV in environmental water samples. This assay was based on capturing encapsidated HuNoV by viral receptors, followed by *in situ* amplification of the captured viral genomes by RT-qPCR. We demonstrated that the ISC-RT-qPCR did not capture and enable signal amplification of heat-denatured Tulane Virus (TV) and HuNoVs. We further demonstrated that the sensitivity of ISC-RT-qPCR was equal or better than that of conventional RT-qPCR procedures for the detection of HuNoV GI and GII. We then utilized the ISC-RT-qPCR to detect HuNoV in environmental water samples for comparison against that from a conventional RT-qPCR procedure. TV was used as a process control virus. While complete inhibition of TV genomic signal was observed in 27% of samples tested by RT-qPCR, no inhibition of TV genomic signal was observed by ISC-RT-qPCR. From 72 samples tested positive for HuNoV GI signal by RT-qPCR, only 20 (27.8%) of these samples tested positive by ISC-RT-qPCR, suggesting that 72.2% of RT-qPCR-positive samples were unlikely to be infectious. From 16 samples tested positive for HuNoV GII signal by RT-qPCR, only one of these samples tested positive by ISC-RT-qPCR. Five samples that had initially tested negative for HuNoV GII signal by RT-qPCR, was tested as positive by ISC-RT-qPCR. Overall, ISC-RT-qPCR method provided an alternative assay to estimate infectivity of HuNoV in environmental samples.

Biography

Peng Tian has his expertise in human *Norovirus* and food safety. He has developed several methods to concentrate and detect human norovirus from environmental and food samples. These approaches are available to all stakeholders interested in viral contamination in food.

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