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ViPuri

Reliable Detection Starting from RNAs

ViPuri Viral RNA Purification Kit From Swab Sample in 20 Min For RT-PCR Detection

Excellent Choice for Corona Virus RT-PCR Detection

Here, we have simulated the most challenging viral RNA extraction case by various concentrations of virus particles which represent different stages of viral infection in cell-free or non-cell free conditions using ViPuri Viral RNA Purification Kit and acuri 1-Step RT-qPCR Master Mix (Fig. 1).

ViPuri Viral RNA Purification Kit

Reliable & Fast

Viral RNA Purification from Swab sample in 20 minutes

In general, genomes of RNA viruses are protected by outer layers of lipid membranes or protein capsids. The outer layer of coronavirus is composed of the lipid membrane and spike proteins. Coronavirus also has inner capsids, also called nucleocapsid however, do not hold integrity comparable to outer protein capsid. Therefore, any condition that can break an eukaryotic cell membrane can also break the coronavirus outer layer in contrast to the protein capsids. For example, the protein capsids from norovirus are much more rigid therefore harder to break compares to the enveloped virus, the lipid membraned virus. So, it is used as a test virus to test the overall performance of the Vipuri Viral RNA purification kits in cell-fee or non-cell free condition.

Practically, most of nasopharyngeal (NP)/oropharyngeal (OP) swabs from coronavirus infected patient contains highly keratinized epithelial cells, mucus, many different enzymes, and immune cells, not only free virus particles and viral genomes inside the infected cells. Therefore, the kit should be able to lysis the lipid membranes including cell membrane and viral membrane but also tough protein viral capsid as well. It is often the case that viral RNA extraction kits were not able to handle various sample composition and clocked the column giving false-negative results.

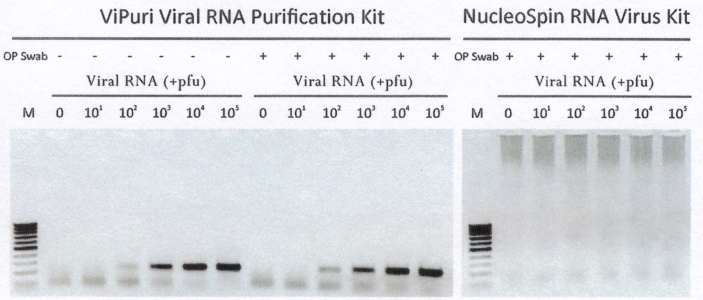

Fig. 1. Various amounts of a +ssRNA virus protected by a rigid protein capsid (Norovirus) were mixed with OP swap samples to stimulate various virus particle amounts. As little as 7 virus particle can be detected from 2 mL of OP swab sample. In contrast, MN kit failed in non-cell free condition.

Single OP swabs using Q-tip from healthy volunteers were dropped into 2 mL of PBS buffers with various virus particles. 150 µL of the samples was processed with either ViPuri Viral RNA Purification Kit or NucleoSpin, RNA virus Mini Kit (Machery-Nagel). 1 µL of final viral RNA elution was used for RT-PCR detection. The one-step RT-PCR was performed using the acuri 1-Step qRT-PCR Master Mix with following conditions: reverse transcription at 50°C for 15 min; RT inactivation at 95°C for 2 min; 35 cycles of the following steps: 95°C for 15 sec, and 60°C for 30 sec.

100 virus particles in 2ml of PBS buffer was the LoD (Limit of Detection, 7 virus particles) in ViPuri Viral RNA Purification Kit. However, NucleoSpin, RNA virus Mini Kit (Machery-Nagel) cannot detect the viral signal in non-cell free condition. The most probable cause of the NucleoSpin failure would be oropharyngeal cells which derived the capacities of the kit to the limit.

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E-mail: drjay@gentribio.com