SHENTEK

PCV-1 Detection Kit

User Guide

Version: A/0
For Research Use Only
Product No.: 1506744
Reagents for 50 Reactions

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(IMPORTANT: Please read this document carefully before experiment.)

1. Product information

■ Product description

The SHENTEK® PCV-1 Detection Kit is designed for qualitative detection of Porcine Circovirus Type 1 (PCV-1) contamination in cell banks and trypsin. The kit works together with SHENTEK® Virus DNA & RNA Extraction Kit (Product No.1506730).

The detection assay could reach a sensitivity of 10 copies per reaction, and shows high specificity without cross-amplification with bovine, porcine, and engineering cell lines (CHO, Vero, 293T, MDCK, NS0, and Sf9) or engineering bacteria (*E. coli, Pichia pastoris*) genomes. Combined with SHENTEK® Virus DNA & RNA Extraction Kit, these kits can efficiently recover and detect PCV-1 DNA from complex sample matrix such as cells and serum.

■ Kit contents and storage

WARNING: Please read the Material Safety Data Sheets (MSDSs) and follow the handling instructions. Wear appropriate protective eyewear, clothing, mask and gloves.

Table 1. Kit components and storage

Reagent	Part No.	Quantity	Storage
PCV-1 Primer&Probe MIX	NNC121	120 µL × 1 tube	-20°C, protect from light
qPCR Master MIX	NNB023	850 µL × 1 tube	
VIR IPC MIX	NNC107	100 µL × 1 tube	
DNA Dilution Buffer (DDB)	NND001	1.5 mL × 1 tube	-20°C
VIR Internal Control (IC)	NNA057	600 µL × 1 tube	

The kit components can be stored at appropriate conditions for up to 24 months. Please check the expiration date on the labels.

■ Applicable instruments, including but not limited to the following

- SHENTEK-96S Real-time PCR System
- LightCycler 480 II Real-Time PCR System
- ABI 7500 Real-Time PCR System

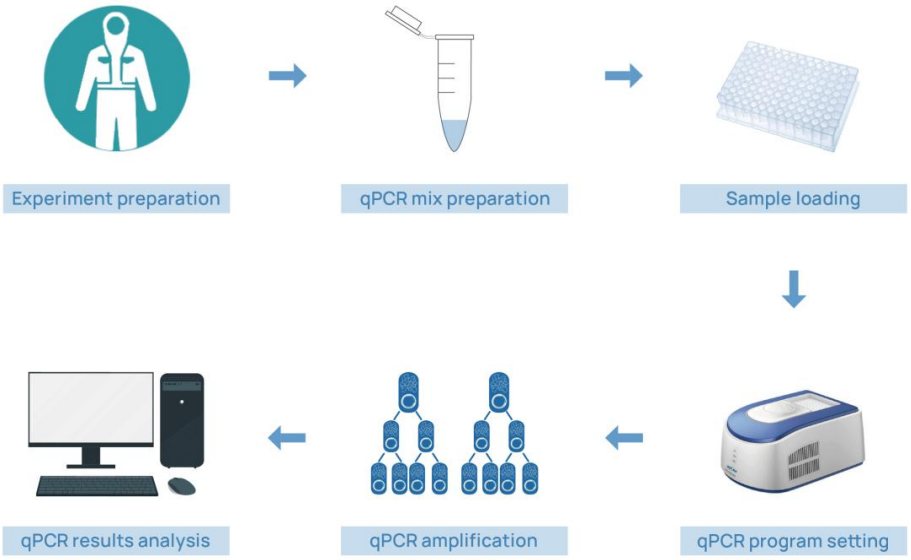
■ Required materials not included in the kit

- Low retention, RNase/DNase-free, sterile microcentrifuge tubes: 1.5 mL or 2.0 mL
- PCR 8-well strip tubes with caps or 96-well plates with sealing films
- Low retention, RNase/DNase-free, sterile filter tips: 1000 μL, 200 μL, 100 μL, 10 μL
- SHENTEK® Virus DNA & RNA Extraction Kit (Product No. 1506730)
- SHENTEK® PCV-1 Positive Control (Product No. 1506744-R01)
- Pretreatment buffer (NND002), Proteinase K Buffer (NND025), Proteinase K (NND023) and 5M NaCl (NND040), components of the Virus DNA & RNA Extraction Kit (Product No. 1506730)

■ Related equipment

- Benchtop microcentrifuge
- Biosafety cabinet
- Microplate and microtube shaker
- Vortex mixer
- Real-time PCR System
- Pipettes: 1000 μL, 200 μL, 100 μL and 10 μL

■ Workflow



2. Methods

■ Experiment preparation

1. Wear appropriate protective eyewear, mask, clothing and gloves.
2. Please handle the positive control and the extraction procedure in a biosafety cabinet and follow the BSL-2 laboratory safety guidelines.
3. Use consumables and reagents that are certified as nuclease-free.
4. Thaw the kit completely at 2-8°C or melt on ice, vortex and centrifuge briefly.

■ Sample pretreatment

Use the Virus DNA & RNA Extraction Kit for the sample preparation and extraction, with the reagents used being sourced from the extraction kit. Here is an introduction to the sample preparation. For the rest of the detailed steps, please refer to the extraction user guide (Product No. 1506730).

1. Preparation of control samples

Positive Control Samples (PCS)

Take a PCV-1 Positive Control and follow the same extraction procedure used for the test samples.

Negative Control Samples (NCS)

Take an equal volume of DDB or 1×PBS, and follow the same extraction

procedure used for the test samples.

2. Preparation of test samples

For cell culture sample

(1) Collect 100-200 μL of cell culture (≤10^7 cells) sample and add to a new 1.5 mL microcentrifuge tube.

(2) Add Pretreatment buffer (NND002) to the sample at the ratio of 1:10, and vortex to mix well. Incubate at room temperature (RT) for 5 minutes (min).

(3) Centrifuge at 450×g for 30 min at 4℃, and carefully transfer the supernatant to a new microcentrifuge tube.

NOTE: Other types of samples can be directly processed for sample digestion. For special type matrix samples, please consult our technical support!

3. Samples digestion

(1) Add 100 μL Proteinase K Buffer (NND025), 50 μL Proteinase K (NND023) and 10 μL VIR Internal Control (IC) to each sample.

(2) Incubate the samples at 55℃ for 30 min.

(3) Add 10 μL 5M NaCl (NND040) and 10 μL diluted Precipitation solution I (Please see Before each use of the kit - Precipitation solution I dilution of Virus DNA & RNA Extraction Kit User Guide)

(4) Vortex thoroughly and centrifuge briefly for 3-5 seconds.

4. Extraction of viral nucleic acid

Automated extraction is recommended using rHCDpurify system for viral nucleic acid extraction, and follow the user guide of SHENTEK® Virus DNA & RNA Extraction Kit.

■ qPCR MIX preparation

1. Determine the number of reaction wells according to the number of test samples and control samples with 2 replicates for each sample generally.

   Number of reaction wells = (1 No Template Control (NTC) + 1 Negative Control Sample (NCS) + 1 Positive Control Sample (PCS) + test samples) × 2

2. Prepare qPCR MIX according to the following table.

Table 2. qPCR MIX preparation

Reagents	Volume/reaction		Volume for 30 reaction (includes 10% overage) e.g. Test samples
	Test samples	NTC	
qPCR Master MIX	15.9 µL	15.9 µL	524.7 µL
PCV-1 Primer&Probe MIX	2.4 µL	2.4 µL	79.2 µL
VIR IPC MIX	1.7 µL	1.7 µL	56.1 µL
VIR Internal Control (IC) *	/	0.5 µL	/
Total volume	20 µL	20.5 µL	660 µL

** If VIR Internal Control (IC) has not been added during sample extraction, 0.5 µL VIR Internal Control (IC) should be added to the qPCR MIX.*

■ qPCR Reaction MIX preparation

1. Vortex each solution and mix well. Then add the solution to each well according to Table 3, and the plate layout of 96-well is shown in Table 4.

Table 3. qPCR Reaction MIX preparation in each well

NTC (No Template Control)	20 µL qPCR MIX + 10 µL DDB
NCS (Negative Control Sample)	20 µL qPCR MIX + 10 µL extracted NCS
PCS (Positive Control Sample)	20 µL qPCR MIX + 10 µL extracted PCS
Test Sample	20 µL qPCR MIX + 10 µL extracted test sample

Table 4. Example of 96-well plate layout

NCS	NCS				S1	S1				PCS	PCS	A
					S2	S2						B
					S3	S3						C
					S4	S4						D
					S5	S5						E
												F
												G
NTC	NTC											H
1	2	3	4	5	6	7	8	9	10	11	12	

- *This example shows 1 NTC, 1 NCS, 1 PCS, and five test samples, with duplicate wells for each sample.*
- *In specific testing, the plate layout can be adjusted based on the sample quantity.*

2. Seal the PCR 8-well strip tubes with caps or the 96-well plate with sealing film. Mix thoroughly using a microplate shaker, then spin down the reagents for 10 seconds in microcentrifuge and place into the qPCR instrument.

■ qPCR program setting

Take the SHENTEK-96S Real-time PCR System (software version 8.2.2) as an example, and set the qPCR program as follows:

1. Click on the **Experiment Wizard**.
2. Select Step 1 on the Well Plate Edit page: Select the reaction wells.
3. Select Step 2: Select the **PCV-1 Detection** program in the project.
4. Click **Start** to run the program on the Experimental Run page.

If you have alternative qPCR system, set up the instruments as follows:

1. Run a new method program and select the quantitative PCR assay template.
2. Run a new Probe template, and type the name **PCV-1**. Select **FAM** in the Reporter Dye drop-down list and select **none** in the Quencher Dye drop-down list, then click **OK**. Select **VIC** in the Reporter Dye drop-down list and select **none** in the Quencher Dye drop-down list, then click **OK**. Select the detection reference fluorescence as ROX (optional).
3. Set thermal-cycling conditions:
   a. Set the cycling reaction volume to 30 μL.
   b. Set the temperature and time as follows:

Table 5. qPCR cycling temperature and time

Step	Temp.	Time(mm:sec)	Cycles
Activation	95℃	10:00	1
Denaturation	95℃	00:15	40
Annealing/extension	60℃*	01:00	

* Instrument will read the fluorescence signal during this step.

■ Result analysis

Take the SHENTEK-96S Real-time PCR System (software version 8.2.2) as an example.

1. Select **step 3** on the Well Plate Edit page: define the reaction wells, set the sample type for the NTC well as no template control, the PCS well as the positive control, the NCS well as the negative control, and the test sample well as unknown.
2. Click **Analysis** on the Experimental Analysis page, and the detection values of NTC, NCS, PCS and test samples can be presented in the Reaction well Information Table.

For 7500 Real-Time PCR System instrument (SDS v1.4), please follow the steps below:

1. Select the Results tab, then click **Amplification Plot**. In the Analysis Settings window, enter the following settings:
   a. Select **Manual Ct**.
   b. In the Threshold field, enter 0.02.
   c. Click **Analyze**, and check whether it is a specific amplification curve.
2. Select the **Results** tab, and click **Plate** tab, then set tasks for each sample type by clicking on the Task Column drop-down list and then click :
   a. NTC wells: target DNA detector task = NTC.
   b. NCS, PCS, unknown samples wells: target DNA detector task = Unknown.
3. Select **File > > Export > > Results**. In the Save as type drop-down list, select **Results Export Files**, then click **Save**.

NOTE: If you use a different instrument or software, refer to the applicable instrument or software documentation. Usually real-time PCR instrument software automatically exports the data report.

■ Acceptance Criteria

1. Guidance for the control samples as in the following table.

Table 6. Control sample result analysis

Quality control samples	FAM	VIC
NTC	Undetected or absence of specific amplification for duplicate runs	Ct<35.00 and specific amplification for duplicate runs
NCS	Undetected or absence of specific amplification for duplicate runs	Ct<35.00 and specific amplification for duplicate runs
PCS	Ct<35.00 and specific amplification for duplicate runs	Ct<35.00 and specific amplification for duplicate runs

The criteria for control sample shall be based on your method validation, and considered to satisfy the requirement of LOD (Limit of Detection).

2. Guidance for test samples as in the following table.

Table 7. Test sample result analysis

FAM	VIC	Conclusion
Ct<40.00 (at least one well) and specific amplification	Ct<35.00 and specific amplification for duplicate runs	Positive
Undetected or absence of specific amplification for duplicate runs	$Ct_{sample} - Ct_{NCS} < 2$	Negative
	$Ct_{sample} - Ct_{NCS} \geq 2$	Not conclusive, and Presence of PCR inhibitors*

** If the VIC signal is inhibited, it is necessary to repeat the sample preparation or appropriately remove the inhibitors during the sample preparation and repeat the assay.*

NOTE: In an event that the sample is special, or some abnormalities occur, and results difficult to determine, please contact us for technical support.

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Support & Contact

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