FCoV Reagent Set

For Feline Coronavirus

User Manual

For Research Use Only

Manufacturer:
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Content

INTENDED USE

POCKIT™ FCoV Reagent Set uses insulated isothermal polymerase chain reaction (iiPCR) technology (Chang *et al.*, 2012; Tsai *et al.*, 2012) to detect the specific nucleic acid sequence of feline coronavirus (FCoV). This set is designed specially to be used with an iiPCR-compatible instrument, **POCKIT™** Nucleic Acid Analyzer. The assay is intended for use by veterinarians or technicians with basic laboratory skills.

This set is intended for research purpose and *in vitro* use only.

SCIENTIFIC BACKGROUND

Antibody induced by vaccine or obtained from maternal immunity could lead to false positive interpretation in antibody-based diagnostic procedures. Detecting pathogen's nucleic acids, not antibody, PCR-based methods can avoid the false positive results described above.

Furthermore, with higher analytical sensitivity, PCR can detect lower levels of pathogen signals than most if not all diagnostic methods. It can reduce the chance of false negative results at early infection stage and shorten the window period between time of infection and detection.

SUMMARY AND EXPLANATION

FCoV is an important feline pathogen world-wide. The enteric form of infection is limited to the gastrointestinal tract, leading to asymptomatic infections, mild enteritis, or fatal infectious peritonitis in cats (Pedersen *et al.*, 1981). FCoV, an enveloped positive-sense single-stranded RNA virus (Lai *et. al*., 2007), is highly contagious among cats by the fecal-oral route. The virus is typically shed in feces by healthy recovered cats and can survive in the environment for up to 7 weeks (Hartmann, 2005).

PCR is one of the most commonly accepted methods that provide high sensitivity and specificity for FCoV detection. However, conventional PCR assays could take three to four hours and require sophisticated thermocyclers and well-trained technicians to perform. GeneReach has developed **POCKIT™** FCoV Reagent Set based on iiPCR technology, which significantly reduces reaction time and offers sensitivity and specificity comparable to those of conventional nested PCR (Tsai, 2012; Chang, 2012). Furthermore, this simple and easy assay is completed rapidly in a portable **POCKIT™** Nucleic Acid Analyzer.

PRINCIPLES OF THE PROCEDURE

In iiPCR, hydrolysis probe-based chemistry is used to generate fluorescent signal during amplification of target RNA. The primers and probe target the M gene and do not cross-react with nucleic acid from host and other feline pathogens.

PRODUCT DESCRIPTION

A. Materials Provided

1) **POCKIT™** FCoV Reagent Set, 48 tests/set

Component	Contents or Purpose	Amount
Premix Pack	■ FCoV Premix (lyophilized pellet) containing dNTPs, primers, probe, and enzyme for amplification. ■ Desiccating agent pack.	6 bags (8 FCoV Premix vials and 1 desiccating agent/bag)
Premix Buffer B	■ Reaction buffer to re-dissolve the lyophilized pellet.	2 vials (1.3 ml/vial)
P(+) Control	■ Dried plasmid containing FCoV partial sequence as positive control.	1 vial
P(+) Control Buffer	■ Reaction buffer to re-dissolve P(+) Control.	1 vial (110 µl/vial)
User Manual		1 copy

2) **R-tube**, 48 tubes/box

B. Materials and Equipment Required, but Not Provided

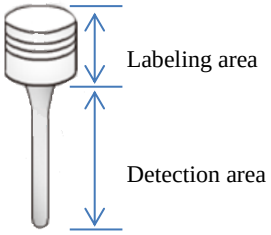
1) **PetNAD™** Nucleic Acid Co-prep Kit or **taco™ mini** Automatic Nucleic Acid Extraction System.
2) **POCKIT™** Nucleic Acid Analyzer (**POCKIT™**): **POCKIT™-**compatible instrument.
3) **cubee™** Mini-Centrifuge (**cubee™**).
4) Micropipette and filter tips.

C. Storage and Stability

1) The set should be stored at 4°C and is stable until the expiration date stated on the label.
2) Store Premix vials in sealed Premix Pack to avoid hydration of lyophilized components.
3) Reconstituted P(+) Control is stable for 6 months at 4°C. Aliquot reconstituted P(+) Control to avoid degradation of nucleic acid.

PRECAUTIONS

A. Do not open R-tube(s) after reaction to prevent any carryover contamination.
B. Perform extraction and amplification in two independent spaces to minimize contamination.
C. Do not reuse R-tube and Premix.
D. Include the P(+) Control to:
   1) Ensure **POCKIT™** is working normally.
   2) Ensure reagent set performance after storage.
E. To get optimal fluorescence detection.
   1) Wear powder-free gloves to handle R-tubes.
   2) Do not label in the detection area of R-tube.



LIMITATIONS

A. The test should be used only for testing nucleic acid extracted from animal specimens. Do not add specimens (*e.g.* whole blood) directly into Premix.
B. **PetNAD™** Nucleic Acid Co-prep Kit and **taco™ mini** Automatic Nucleic Acid Extraction System are recommended for nucleic acid extraction.
C. Any deviations from the recommended procedure may lead to suboptimal results. Quality of the extracts should be validated by the users.
D. It is strongly recommended to use freshly prepared nucleic acids (within 1 hour after extraction) to achieve optimal results with the **POCKIT™** FCoV Reagent Set.

SAMPLE TYPE

This reagent set is intended for analyzing nucleic acids extracted from whole blood, rectal swab, pleural or abdominal effusion. The following sample size is recommended:

Sample Type	**Sample Size**
Whole blood	200 μl
Rectal swab	1 swab
Pleural or abdominal effusion	200 μl

Note: Please follow the instruction of PetNAD™ Nucleic Acid Co-prep Kit for operation protocol.

PROCEDURE

A. Using POCKIT™ FCoV Reagent Set

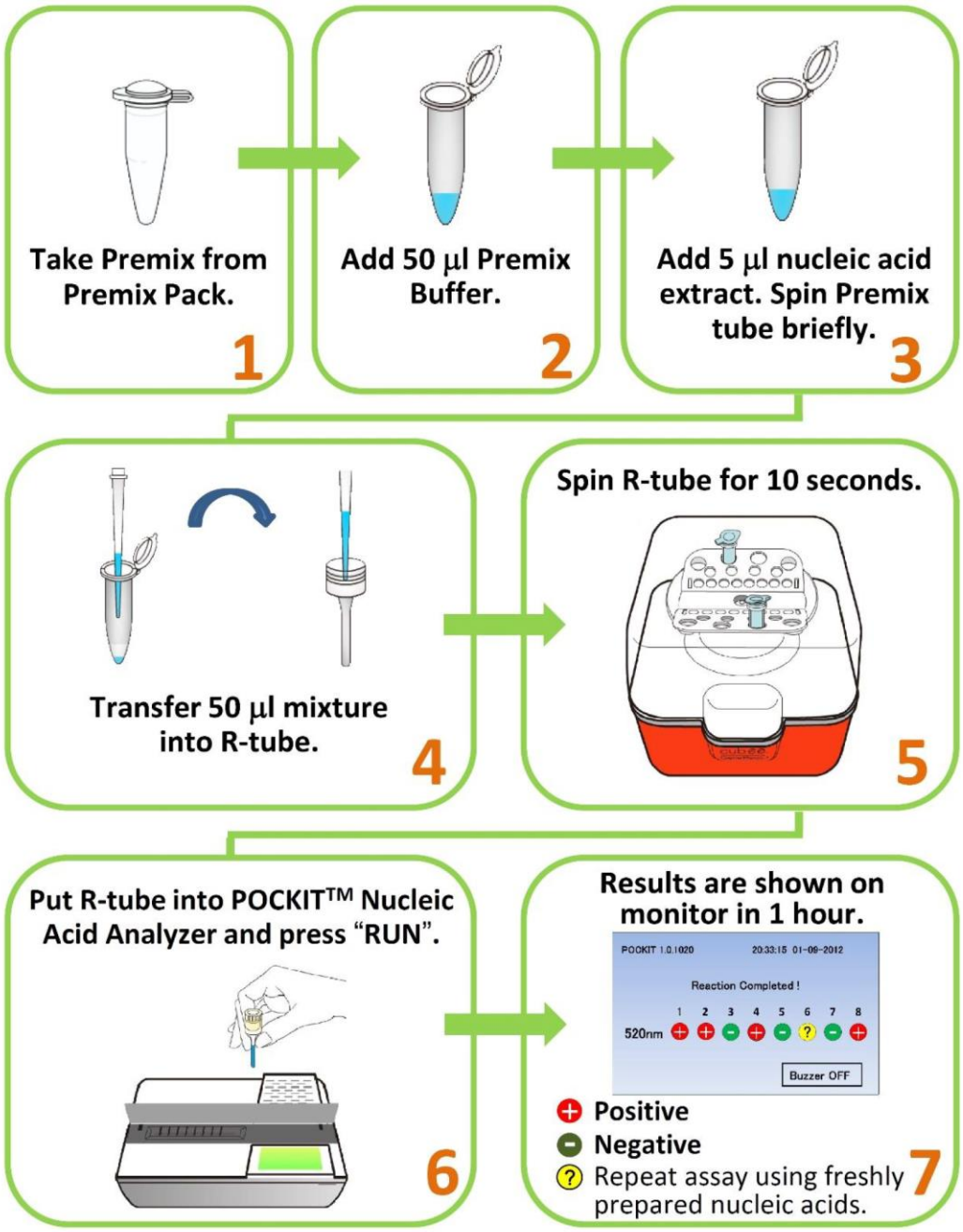
- **Note: Before preparing the reactions for iiPCR testing, turn on POCKIT™ to initiate the calibration for the instrument. The device will complete self-test within 5 minutes. Please refer to the user manual of POCKIT™ for further details.**
- **Note: Before using for the first time, add 100 µl P(+) Control Buffer to P(+) Control. Store reconstituted P(+) Control at 4°C.**

1) Label R-tube(s) in the label area.
2) Prepare one Premix for each sample. (Premix tube is in Premix Pack. Each Premix Pack contains eight Premix tubes.)
   - **Note: When the pellet is not found at the bottom of the tube, spin tube briefly to bring it down.**
3) Add 50 µl Premix Buffer B to each Premix tube.
4) Add 5 µl nucleic acid extract or P(+) Control to each Premix tube. Spin Premix tube for 10 seconds in a mini centrifuge (such as **cubee™**).
5) Transfer 50 µl Premix/sample mixture into R-tube.
6) Seal top of each R-tube with a cap. Make sure R-tube is capped tightly.
7) Place R-tube into the holder of **POCKIT™**.
8) Spin tube briefly in **cubee™** to make sure all solution is collected at the bottom of R-tube.
   - **Note: Make sure there are no bubbles in the solution.**
   - **Note: Start reaction within 1 hour to reduce the risk of nucleic acid degradation and non-specific reaction.**
9) **POCKIT™** reaction:
   a) Select ″520 nm″.

b) When ″System READY″ is displayed, place the holder with R-tube(s) into the reaction chamber.
c) Tap cap of each R-tube to make sure the tube is positioned properly.

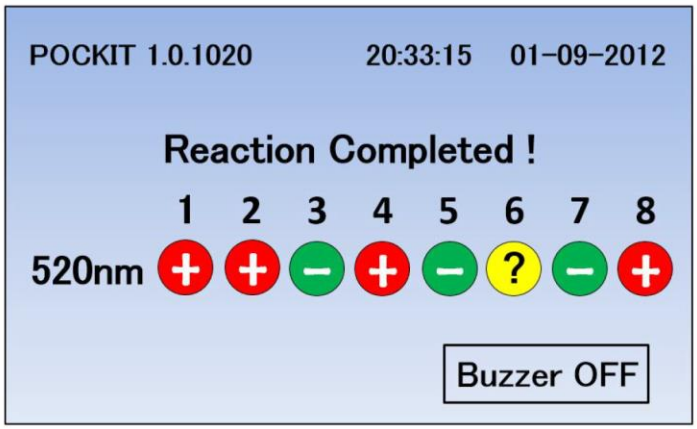
10) Close lid and press ″Run″ to start reaction program.
11) Test results are shown on the monitor after reaction is completed.

B. Quick Guide



DATA INTERPRETATION

* One example of results shown on the monitor.



520 nm	Interpretation
⊕	FCoV positive.
⊖	FCoV negative.
?	Repeat reaction with freshly prepared nucleic acid.

ANYLYTICAL SENSITIVITY

The detection limit of **POCKIT™** FCoV Reagent Set is about 10 copies/reaction.

TROUBLESHOOTING

Problems	Possible causes	Solutions
False Positive	**1)** Reuse of micro- centrifuge tubes, tips, R-tubes and Premix.	■ Micro-centrifuge tubes, tips, R-tubes and Premix are for single-use only. Reusing these accessories would cause cross-contamination, and therefore false positive results. ■ Used micro-centrifuge tubes, tips, R-tubes and Premix should be collected and discarded according to local regulation. Do not place the waste close to the working area to prevent cross-contamination.
	2) Contaminated micropipette	■ Use aerosol-free tips.
	3) Contaminated reagent	■ Consult with a **GeneReach** technical support representative or local distributor.
	4) Leakage or spill of reaction from R-tube into reaction chamber of **POCKIT™** Nucleic Acid Analyzer.	■ Consult with a **GeneReach** technical support representative or local distributor.
	5) Contaminated working area	■ Consult with a **GeneReach** technical support representative on how to clean up working area.

Problems	**Possible causes**	**Solutions**
False Negative	**1)** Nucleic acid extraction failed.	■ Consult manual of nucleic acid extraction kit.
	2) Poor nucleic acid quality.	■ Check sample storage condition. ■ Please refer to Troubleshooting section of nucleic acid extraction kit.
	3) PCR inhibition	■ Do not overload PCR with too much nucleic acid. ■ Spike 5 μl nucleic acid sample into a positive control reaction for a parallel PCR reaction. Negative results indicate the presence of inhibitors in the nucleic acid. In that case, prepare another nucleic acid extract.

REFERENCE

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3. Lai MMC., Perlman S., Anderson L.J., (2007). Coronaviridae. In: Knipe DM, Howley PM, Griffin DE, Lamb RA, Martin MA, Roizman B, Straus SE, eds. Fields virology. Lippincott Williams & Wilkins, Philadelphia, PA, 1305-1335.
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5. Tsai Y.L., Wang H.T.T., Chang H.F.G., Tsai C.F., Lin C.K., Teng P.H., Su C. and Jeng C.C., (2012) Development of TaqMan probe-based insulated isothermal PCR (iiPCR) for sensitive and specific on-site pathogen detection. *PLoS ONE* 7(9): e45278. doi: 10.1371/ journal. pone. 0045278