

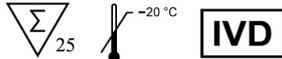


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Enterovirus 71 & Coxsackie Virus A16 Real Time RT-PCR Kit

User Manual
For In Vitro Diagnostic Use Only

REF QR-0234-02



For use with ABI Prism® 7000/7300/7500/7900/Step One Plus; iCycler iQ™4/iQ™5;
Smart Cycler II; Bio-Rad CFX 96; Rotor Gene™ 6000; Mx3000P/3005P; MJ-Option2/Chromo4;
LightCycler® 480 Instrument

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1. Intended Use

By using real time PCR systems, Enterovirus 71 & Coxsackie Virus A16 Real Time RT-PCR Kit is used for the detection of Enterovirus 71 and Coxsackie Virus A16 in samples like nasal and pharyngeal secretions, sputum, provoked sputum, stool, C.S.F., serum and etc.

2. Principle of Real-Time PCR

The principle of the real-time detection is based on the fluorogenic 5' nuclease assay. During the PCR reaction, the DNA polymerase cleaves the probe at the 5' end and separates the reporter dye from the quencher dye only when the probe hybridizes to the target DNA. This cleavage results in the fluorescent signal generated by the cleaved reporter dye, which is monitored real-time by the PCR detection system. The PCR cycle at which an increase in the fluorescence signal is detected initially is proportional to the amount of the specific PCR product. Monitoring the fluorescence intensities in real-time allows the detection of the accumulating product without having to re-open the reaction tube after the amplification.

3. Product Description

Enterovirus 71 (EV71) and Coxsackie Virus A16 is the major causative agents for hand, foot and mouth disease (HFMD), is sometimes associated with severe central nervous system diseases. In 1997, in Malaysia and Japan, and in 1998 in Taiwan, there were HFMD epidemics involving sudden deaths among young children, and EV71 was isolated from the HFMD patients, including the fatal cases. The nucleotide sequences of each EV71 isolate were determined and compared by phylogenetical analysis. EV71 strains from previously reported epidemics belonged to genotype A-1, while those from recent epidemics could be divided into two genotypes, A-2 and B. Coxsackieviruses are nonenveloped viruses with linear single-stranded RNA. Coxsackieviruses are divided into group A and group B viruses based on early observations of their pathogenicity in mice. Group A coxsackieviruses were noted to cause a flaccid paralysis, which was caused by generalized myositis, while group B coxsackieviruses were noted to cause a spastic paralysis due to focal muscle injury and degeneration of neuronal tissue. At least 23 serotypes (1-22, 24) of group A and 6 serotypes (1-6) of group B are recognized.

The Enterovirus 71 & Coxsackie Virus A16 real time RT-PCR kit contains a specific ready-to-use system for the detection of the EV71 and CA16 using RT-PCR (Reverse Transcription Polymerase Chain Reaction) in the real-time PCR system. The master contains a Super Mix for the specific amplification of the EV71 and CA16 RNA. The reaction is done in one step real time RT-PCR. The first step is a reverse transcription (RT), during which the virus RNA is transcribed into cDNA. Afterwards, a thermostable DNA polymerase is used to amplify the specific gene fragments by means of PCR (polymerase chain reaction). Fluorescence is emitted and measured by the real time systems' optical unit during the PCR. The detection of amplified EV 71 DNA fragment is performed in fluorimeter channel FAM with the fluorescent quencher BHQ1. The detection of amplified CA16 DNA fragment is performed in fluorimeter channel HEX/VIC/JOE with the fluorescent quencher BHQ1. An external positive control defined as 1x10⁷copies/ml is supplied which allow the determination of the gene load. For further information, please refer to section 9.2 Quantitation.

4. Kit Contents

Ref.	Type of reagent	Presentation	25rxms
1	EV71 & CA16 Super Mix	1 vial, 530µl	
2	RT-PCR Enzyme Mix	1 vial, 8.5µl	
3	Molecular Grade Water	1 vial, 400µl	
4	EV71 & CA16 Positive Control (1x10 ⁷ copies/ml)	1 vial, 30µl	

Analysis sensitivity: 1x10³copies/ml **LOQ:** 2x10³~1x10⁶copies/ml

Note: Analysis sensitivity depends on the sample volume, elution volume, nucleic acid extraction methods and other factors. If you use the RNA extraction kits recommended, the analysis sensitivity is the same as it declares. However, when the sample volume is dozens or even hundreds of times greater than elution volume by some concentrating method, it can be much higher.

5. Storage

- All reagents should be stored at -20°C. Storage at +4°C is not recommended.
- All reagents can be used until the expiration date indicated on the kit label.
- Repeated thawing and freezing (> 3x) should be avoided.
- Cool all reagents during the working steps.
- Super Mix and Reaction Mix should be stored in the dark.

6. Additionally Required Materials and Devices

- Biological cabinet
- Vortex mixer
- Cryo-container
- Sterile filter tips for micro pipets
- Disposable gloves, powderless
- Refrigerator and Freezer
- Desktop microcentrifuge for "eppendorf" type tubes (RCF max. 16,000 x g)
- Real time PCR system
- Real time PCR reaction tubes/plates
- Pipets (0.5µl – 1000µl)
- Sterile microtubes
- Biohazard waste container
- Tube racks

7. Warnings and Precaution

- Carefully read this instruction before starting the procedure.
- For in vitro diagnostic use only.
- This assay needs to be carried out by skilled personnel.
- Clinical samples should be regarded as potentially infectious materials and should be prepared in a laminar flow hood.
- This assay needs to be run according to Good Laboratory Practice.
- Do not use the kit after its expiration date.
- Avoid repeated thawing and freezing of the reagents, this may reduce the sensitivity of the test.
- Once the reagents have been thawed, vortex and centrifuge briefly the tubes before use.
- Prepare quickly the Reaction mix on ice or in the cooling block.
- Set up two separate working areas: 1) Isolation of the RNA/ DNA and 2) Amplification/ detection of amplification products.
- Pipets, vials and other working materials should not circulate among working units.
- Use always sterile pipette tips with filters.

- Wear separate coats and gloves in each area.
- Do not pipette by mouth. Do not eat, drink, smoke in laboratory.
- Avoid aerosols.

8. Sample Collection, Storage and transport

- Collected samples in sterile tubes.
- Specimens can be extracted immediately or frozen at -20°C to -80°C.

9. Procedure

9.1 RNA-Extraction

RNA extraction kits are available from various manufacturers. You may use your own extraction systems or the commercial kit based on the yield. For the RNA extraction, please comply with the manufacturer's instructions. The recommended extraction kit is as follows:

Nucleic Acid Isolation Kit	Cat. Number	Manufacturer
RNA Isolation Kit	ME-0010/ME-0012	ZJ Biotech
QIAamp Viral RNA Mini extraction Kit (50)	52904	QIAGEN

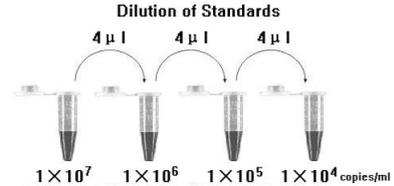
9.2 Quantitation

The kit can be used for **quantitative** or **qualitative** real-time RT-PCR.

For performance of quantitative real-time PCR, standard dilution must be prepared first as follows. Molecular Grade Water is used for dilution.

Dilution is not needed for performance of qualitative real-time PCR.

Take positive control (1x10⁷copies/ml) as the starting high standard in the first tube. Respectively pipette **36µl** of Molecular Grade Water into next three tubes. Do three dilutions as the following figures:



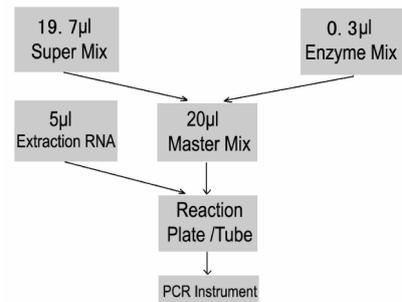
To generate a standard curve on the real-time system, all four dilution standards should be used and defined as standards with specification of the corresponding concentrations.

Attention:

- A. Mix thoroughly before next transfer.
- B. The positive control (1x10⁷copies/ml) contains high concentration of the target DNA. Therefore, be careful during the dilution in order to avoid contamination.

9.3 RT-PCR Protocol

The Master Mix volume for each reaction should be pipetted as follows:



- 1) The volumes of Super Mix and Enzyme Mix per reaction multiply with the number of samples, which includes the number of controls, standards, and sample prepared. Molecular Grade Water is used as the negative control. For reasons of unprecise pipetting, always add an extra virtual sample. Mix completely then spin down briefly in a centrifuge.
- 2) Pipet **20µl** Master Mix with micropipets of sterile filter tips to each of the real time PCR reaction plate/tubes. Separately add **5µl** RNA sample template, positive and negative controls to different plate/tubes. Immediately close the plate/tubes to avoid contamination.
- 3) Spin down briefly in order to collect the Master Mix in the bottom of the reaction tubes.
- 4) Perform the following protocol in the instrument:

45°C for 10min	1cycle	Selection of fluorescence channels	
95°C for 5min	1cycle	FAM	EV71
95°C for 15sec, 60°C for 1min (Fluorescence measured at 60°C)	50cycles	HEX/VIC/JOE	CA16

- 5) **⚠** If you use ABI Prism® system, please choose "none" as **passive reference** and **quencher**.

10. Threshold setting: just above the maximum level of molecular grade water.

11. Calibration for quantitative detection: Input each concentration of standard controls at the end of run, and a standard curve will be automatically formed.

12. Quality control:

Negative control, positive control, and QS curve must be performed correctly, otherwise the sample results is invalid.

Control	Channel	Ct value	
		FAM	HEX/VIC/JOE
Molecular Grade Water		UNDET	UNDET
Positive Control(qualitative assay)		≤45	≤45
QS (quantitative detection)		Correlation coefficient of QS curves ≤ -0.98	

13. Data Analysis and Interpretation

The following sample results are possible:

	Ct value	Result Analysis
1#	UNDET	Below the detection limit or negative
2#	≤48	Channel FAM: EV71 positive Channel HEX/VIC/JOE: CA16 Positive; and the software displays the quantitative value
3#	48~50	Re-test; if it is still 48~50, report as 1#