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XMRV End-Point RT-PCR Kit

Product Insert

Product# EP34700

Intended Use

Norgen's Xenotropic Murine Leukemia Virus-Related Virus (XMRV) End-Point RT-PCR Kit is designed for the detection of XMRV specific RNA based on the use of end-point RT-PCR technology. This kit is designed for research use only and not for use in diagnostic procedures.

Background Information

Xenotropic murine leukemia virus-related virus (XMRV) is a gammaretrovirus. The virus was first described in 2006 and has since been isolated from human biological samples. XMRV belongs to the family Retroviridae and the genus gammaretrovirus. It has a single-stranded RNA genome that replicates through a DNA intermediate. The virus gets its name due to its close relationship with the murine leukemia viruses (MuLVs). The viral genome is approximately 8100 nucleotides in length and is 95% identical with several endogenous retroviruses of mice. While gammaretroviruses have well-characterized oncogenic effects in animals, they have not been shown to cause human cancers. However, XMRV was recently discovered in human prostate cancers and is the first gammaretrovirus known to infect humans. In addition to prostate cancer, a possible association with chronic fatigue syndrome has been reported, however it has yet to be established whether XMRV is a cause of this disease.

The causal role of XMRV in cancer has yet to be established and the virus does not appear to be capable of transforming cells directly. In prostate cancer, XMRV protein has been found in tumour-associated but non-malignant stromal cells, but not in the actual prostate cancer cells. This raises the possibility that the virus may support tumorigenesis. In other studies, XMRV proteins and nucleic acids were found in malignant cells.

Product Description

Norgen's XMRV End-Point RT-PCR Kit is designed for the detection of XMRV specific RNA based on the use of end-point RT-PCR technology. This kit is designed for research use only and not for use in diagnostic procedures. The kit includes Master Mix and primers for the specific amplification of a 301 nucleotide region of the XMRV genome, as well as a positive control and a negative control to confirm the integrity of the kit reagents. In addition, the kit contains loading dye and a DNA ladder to facilitate analysis of the results. The detection of XMRV specific RNA is based on end-point RT-PCR technology, utilizing Reverse transcription polymerase chain reaction (RT-PCR) for the amplification of specific XMRV RNA sequences. For analysis of the RT-PCR data, the RT-PCR reaction is loaded on an agarose RNA gel along with the provided DNA ladder for qualitative analysis.

Norgen's Xenotropic Murine Leukemia Virus-Related Virus (XMRV) End-Point RT-PCR Kit was developed and validated to be used with the following PCR instruments:

- Qiagen Rotor-Gene Q
- BioRad CFX96 Touch™ Real-Time PCR Detection System

Kit Components

Component	Product # EP34700 (24 preps)
MDx 2X RT-PCR Master Mix	350 µL
XMRV Primer Mix	70 µL
XMRV Positive Control	50 µL
Nuclease-Free Water	1.25 mL
Loading Dye	100 µL
DNA Ladder	100 µL
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Storage Conditions and Product Stability

- All kit components should be stored at -20°C upon arrival
- Repeated thawing and freezing (> 2 x) of the Master Mix and Positive Control should be avoided, as this may affect the performance of the assay. If the reagents are to be used only intermittently, they should be frozen in aliquots.
- All reagents can be stored for 1 year at -20°C without showing any reduction in performance.

Customer-Supplied Reagents and Equipment

- Appropriate End-point PCR Instrument
- RNA Purification Kit
    - The kit is compatible with all RNA purification kits that yield high quality, inhibitor-free RNA
    - **Recommended Purification Kit:** Urine Total RNA Purification Maxi Kit (Slurry Format) (Cat. 29600, 29650) or Total RNA Purification Kit (Cat. 17200, 37500).
- Disposable powder-free gloves
- Benchtop microcentrifuge
- Micropipettors
- Sterile pipette tips with filters
- PCR tubes
- Vortex mixer
- Agarose gel electrophoresis apparatus
- UV transilluminator with suitable gel documentation system
- PCR reaction preparation station (Optional)

Quality Control

In accordance with Norgen's ISO 9001 and ISO 13485-certified Quality Management System, each lot of Norgen's XMRV End-Point RT-PCR Kit is tested against predetermined specifications to ensure consistent product quality.

Warnings and Precautions

- Norgen's XMRV End-Point RT-PCR Kit is intended for research purposes only. It is not intended for diagnostic use.
- Follow universal precautions. All specimens should be considered as potentially infectious and handled accordingly.
- Ensure that a suitable lab coat, disposable gloves and protective goggles are worn when handling specimens and kit reagents.
- Use sterile pipette tips with filters. Use proper pipetting techniques and maintain the same pipetting pattern throughout the procedure to ensure optimal and reproducible values.
- As contamination of specimens or reagents can produce erroneous results, it is essential to use aseptic techniques. Pipette and handle reagents carefully to avoid mixing of the samples.
- Do not use supplies and equipment across the dedicated areas of i) specimen extraction, ii) reaction set-up and iii) amplification/detection. No cross-movement should be allowed between the different areas. Personal protective equipment, such as laboratory coats and disposable gloves, should be area specific.
- Store and extract positive material (specimens, controls and amplicons) separately from all other reagents and add it to the reaction mix in a spatially separated facility.

- Dispose of unused kit reagents and specimens according to local, provincial or federal regulations.
- Do not substitute or mix reagents from different kit lots or from other manufacturers. Do not use components of the kit that have been stored for more than 1 year.
- The presence of RT-PCR inhibitors may cause false negative or invalid results.
- Potential mutations within the target regions of the XMRV genome covered by the primers in this kit may result in failure to detect the presence of the pathogen.
- Good laboratory practice is essential for the proper performance of this kit. Ensure that the purity of the kit and reactions is maintained at all times, and closely monitor all reagents for contamination. Do not use any reagents that appear to be contaminated.
- Ensure that appropriate specimen collection, transport, storage and processing techniques are followed for optimal performance of this test.

Instructions for Use

A. Sample Preparation

Purified RNA is the starting material for Norgen's XMRV End-Point RT-PCR Kit. The quality of the RNA template will have a major impact on the performance of the XMRV detection test. The user must ensure that the method used for RNA purification is compatible with end-point RT-PCR. We recommend the use of Norgen's **Urine Total RNA Purification Maxi Kit (Slurry Format) (Cat. 29600, 29650) or Total RNA Purification Kit (Cat. 17200, 37500).** Norgen's Urine Total RNA Purification Maxi Kit (Slurry Format) or Total RNA Purification Kit have been fully validated with Norgen's XMRV End-Point RT-PCR Kit.

If a different spin column based sample preparation procedure that includes ethanol-based wash buffers is used, a column drying step consisting of centrifugation for 3 minutes at 20,000 x g (~14,000 RPM), using a new collection tube, is highly recommended prior to the elution of the RNA. This will help to prevent the carry-over of any ethanol into the purified RNA, as ethanol is known to be a strong inhibitor of PCR. **Ensure that any traces of ethanol from the sample preparation steps are eliminated prior to the elution of the RNA.**

B. RT-PCR Assay Preparation

Notes:

- Before use, suitable amounts of all PCR components should be completely thawed at room temperature, mixed by gentle vortexing or by pipetting, and centrifuged briefly.
- Work quickly on ice.
- The amount of MDx 2X RT-PCR Master Mix provided is enough for up to 32 RT-PCR reactions (24 sample PCR, 4 positive control PCR and 4 no template control PCR).
- For every RT-PCR run, one reaction containing XMRV Positive Control and one reaction as no template control must be included for proper interpretation of results.
- The recommended minimum number of RNA samples tested per RT-PCR run is 6.
- To avoid any contamination while preparing the RT-PCR assay, follow the order outlined in Tables 1, 2 and 3 below to prepare the Negative Control, Detection Assay and Positive Control:
    1. Prepare the PCR Negative Control (Table 1)
    2. Prepare the PCR XMRV Assay (Table 2)
    3. Prepare the PCR Positive Control (Table 3)

To further avoid contamination, add the components to the PCR tubes in the order shown in the tables below (ie: 1) Nuclease-free water; 2) Master Mix; 3) Primer Mix; and 4) the Sample RNA or Positive Control).

1. For each RT-PCR set, prepare **one** no template control PCR as shown in Table 1 below:

Table 1. RT-PCR Negative Control Preparation

RT-PCR Components	Volume Per PCR Reaction
Nuclease-Free Water	8 µL
MDx 2X RT-PCR Master Mix	10 µL
XMRV Primer Mix	2 µL
Total Volume	20 µL

2. Prepare the RT-PCR reaction for sample detection as shown in Table 2 below. The recommended amount of sample RNA to be used is 2.5 µL. However, a volume between 1 and 5 µL of sample RNA may be used as template. Adjust the final volume of the RT-PCR reaction to 20 µL using the Nuclease-Free Water provided.

Table 2. RT-PCR XMRV Assay Preparation

RT-PCR Components	Volume Per PCR Reaction
Nuclease-Free Water	5.5 µL
MDx 2X RT-PCR Master Mix	10 µL
XMRV Primer Mix	2 µL
Sample RNA	2.5 µL
Total Volume	20 µL

3. For each RT-PCR set, prepare **one** positive control RT-PCR as shown in Table 3 below:

Table 3. RT-PCR Positive Control Preparation

RT-PCR Components	Volume Per PCR Reaction
MDx 2X RT-PCR Master Mix	10 µL
XMRV Primer Mix	2 µL
XMRV Positive Control (PosC)	8 µL
Total Volume	20 µL

C. XMRV RT-PCR Assay Programming

1. Program the thermocylcer according to the program shown in Table 4 below.
2. Run one step RT-PCR.

Table 4. XMRV Assay Program

One Step RT-PCR Cycle	Step	Temperature	Duration
Cycle 1	Step 1	50°C	30 min
Cycle 2	Step 1	95°C	3 min
Cycle 3 (40x)	Step 1	94°C	15 sec
	Step 2	60°C	30 sec
	Step 3	72°C	45 sec
Cycle 4	Step 1	72°C	5 min
Cycle 5	Step 1	4°C	∞

D. XMRV RT-PCR Assay Interpretation

- For the analysis of the RT-PCR data, the entire 20 µL RT-PCR reaction should be loaded on a 1X TAE 1.4 % Agarose DNA gel along with 10 µL of Norgen's DNA Ladder (provided).
- The RT-PCR products should be resolved on the 1X TAE, 1.4 % Agarose gel at 150V for 30 minutes (Gel running time will vary depending on an electrophoresis apparatus).

Table 5. Interpretation of Assay Results

Input Type	Target amplification		Interpretation
	XMRV Target Band (301 bp)	PCR control Band (150 bp)	
Positive Control	Yes	Yes	Valid
Positive Control	Yes	No	Valid
Negative Control	No	Yes	Valid
Sample	Yes	Yes	Positive
Sample	No	Yes	Negative
Sample	No	No	PCR inhibition
Sample	Yes	No	Positive

For results obtained that are not covered in Table 5 above, please refer to the Frequently Asked Questions.

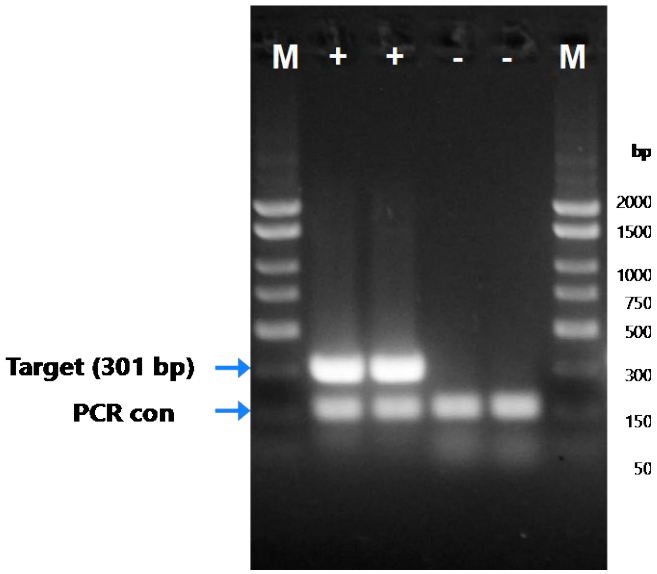

Figure 1: A representative 1X TAE, 1.4 % agarose gel showing the amplification of *XMRV* at different concentrations. The size of the XMRV target amplicon corresponds to the 301 bp band represented by the provided DNA Marker (M).

E. XMRV RT-PCR Assay Specificity

The specificity of Norgen's XMRV End-Point RT-PCR Kit is first and foremost ensured by the selection of the XMRV-specific primers, as well as the selection of stringent reaction conditions. The primers were checked for possible homologies in GenBank published sequences by sequence comparison analyses. Furthermore, the specificity of the XMRV-specific primers was tested against most of the known sexually-transmitted pathogens.

Frequently Asked Questions

1. How many samples should be included per RT-PCR run?

- Norgen's XMRV End-Point RT-PCR Kit is designed to test 24 samples. For every 6 samples, a non-template control (Nuclease Free Water) and a Positive Control must be included. It is preferable to collect and test 6 samples at a time.

2. How should it be interpreted if in the negative control the XMRV RT-PCR control and the XMRV target showed amplification in a sample?

- The assay has to be repeated. It could happen when there is carryover contamination.

3. How should it be interpreted if only the XMRV target was amplified in a sample?

- The sample tested should be considered as XMRV positive. At high XMRV input, the XMRV amplicon will be predominant and thus the XMRV PCR control may not amplify as they compete for PCR resources.

Related Products	Product #
XMRV Primers and Control Set	EP34710
XMRV TaqMan TaqMan RT-PCR Kit	TM34700
XMRV TaqMan Probe/Primer and Control Set - 100 Reactions	TM34710
Total RNA Purification Kit	17200, 37500
Urine Total RNA Purification Maxi Kit (Slurry Format)	29600, 29650

Technical Support

Contact our Technical Support Team between the hours of 8:30 and 5:30 (Eastern Standard Time) at (905) 227-8848 or Toll Free at 1-866-667-4362.

Technical support can also be obtained from our website (www.norgenbiotek.com) or through email at techsupport@norgenbiotek.com.

Product Use Restriction

Norgen's XMRV End-Point RT-PCR Kit is designed for the detection of XMRV specific RNA based on the use of end-point RT-PCR technology. This kit is designed for research use only and not for use in diagnostic procedures.

Norgen's XMRV End-Point RT-PCR Kit is intended for use by professional users such as technicians and biologists experienced and trained in molecular biological techniques including PCR.

Good laboratory practice is essential for the proper performance of this kit. Ensure that the purity of the kit and reactions is maintained at all times, and closely monitor all reagents for contamination. Do not use any reagents that appear to be contaminated.

Ensure that appropriate specimen collection, transport, storage and processing techniques are followed for optimal performance of this test.

The presence of PCR inhibitors may cause false negative or invalid results.

Potential mutations within the target regions of the XMRV genome covered by the primers in this kit may result in failure to detect the presence of the pathogen.

The respective user is liable for any and all damages resulting from application of Norgen's XMRV End-Point RT-PCR Kit for use deviating from the intended use as specified in the user manual.

All products sold by Norgen Biotek are subjected to extensive quality control procedures and are warranted to perform as described when used correctly. Any problems should be reported immediately. The kit contents are for laboratory use only, and they must be stored in the laboratory and must not be used for purposes other than intended. The kit contents are unfit for consumption.

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