SIGNALCHEM DIAGNOSTICS

Catalog #	Aliquot Size
RTM01-E311-10000	10000 U

M-MLV (H-) Reverse Transcriptase

Catalog # RTM01-E311
Lot # 1L2208-1

Product Description

Moloney Murine Leukemia Virus (M-MLV) reverse transcriptase mutant with loss of RNase H activity (H-) expressed in *E. coli*.

Components

	Component Name	10000 U
	M-MLV (H-) Reverse Transcriptase (200U/µl)	50 µl
b	5X RT Buffer	500 µl

Storage and Stability

Store all components at -30°C to -15°C. To avoid repeated handling and multiple freeze/thaw cycles aliquot product into smaller quantities.

Scientific Background

M-MLV RT is a monomeric reverse transcriptase from the Moloney murine leukemia retrovirus. Wild type M-MLV RT exhibits RNA and DNA dependent DNA polymerase activity, and RNase H activity which catalyzes the cleavage of RNA in RNA-DNA hybrids (1). The RNase activity of wild type M-MLV RT limits its efficiency in synthesizing long cDNA in vitro (2). M-MLV (H-) is a single site mutant of wild type M-MLV which leads to the loss of RNase H activity. M-MLV (H-) retains complete protein structure and polymerase activity and exhibits higher thermostability and greater processivity, making it a better choice in long cDNA synthesis and high-temperature RT reactions. Applications of this product include synthesis of cDNA from animal, plant and microbial RNA and generation of cDNA libraries.

References

1. Tanese N, Goff SP. Domain structure of the Moloney murine leukemia virus reverse transcriptase: mutational analysis and separate expression of the DNA polymerase and RNase H activities. Proc Natl Acad Sci U S A. 1988 Mar;85(6):1777-81. PMID: 2450347
2. Bahram Arezi, Holly Hogrefe. Novel mutations in Moloney Murine Leukemia Virus reverse transcriptase increase thermostability through tighter binding to template-primer, *Nucleic Acids Research*, 2009 Feb; 37(2):473–481.

Activity

The activity of M-MLV (H-) Reverse Transcriptase was determined to be 200 U/µl, using the unit definition below:

Unit Definition:

One unit (U) is defined as the amount of enzyme that incorporates 1 nmol of dTTPs into acid-insoluble products in 10 min at 37°C with Poly (rA)-Oligo (dT) as the template/primer.

This product is manufactured in an ISO 9001 and ISO 13485 certified facility.

M-MLV (H-) Reverse Transcriptase

Catalog #	RTM01-E311
Lot #	1L2208-1
Activity	200 U/µl
Stability	2 yrs. from date of shipment at -30°C to -15°C
Storage & Shipping	Store all components at -30°C to -15 °C. Transport at ≤0 °C. To avoid repeated handling and multiple freeze/thaw cycles aliquot product into smaller quantities.

To place your order, please contact us by phone 1-778-326-0223 or 1-888-606-3424 (Toll free)
or by email: orders@signalchemdx.com or info@signalchemdx.com - www.signalchemdx.com

FOR IN VITRO RESEARCH PURPOSES ONLY. NOT INTENDED FOR USE IN HUMANS OR ANIMALS.

cDNA Synthesis Protocol

1. Mix the following components in an RNase-free tube.

Component	20 µl system
5x RT Buffer	4 µl
dNTP Mix (10 mM each)	1 µl
Oligo $(dT)_{18}$ (50 µM) or Random hexamers (50 ng/µl) or Gene Specific Primers (2 µM)	1 µl
RNase Inhibitor (40 U/µl)	1 µl
M-MLV(H-) Reverse Transcriptase (200 U/µl)	1 µl
Total RNA	100 pg-5 µg
Or Poly $(A)^+$ RNA	10 pg-500 ng
RNase-free ddH_2O	to 20 µl

2. Program for 1st-strand cDNA synthesis.

Primer	Temperature	Time
Oligo $(dT)_{18}$	42°C	45 minutes*
	85°C	5 minutes
Random Hexamers	25°C	10 minutes
	42°C	45 minutes*
	85°C	5 minutes
Gene Specific Primers	42~50°C	45 minutes*
	85°C	5 minutes

* Time can be adjusted between 30 ~ 60 min and extended reverse transcription time may help to obtain longer cDNA (>5 kb).

3. Incubate at 85°C for 5 min to inactivate the reverse transcriptase. The cDNA can be used for PCR immediately or can be stored at -20°C. For PCR, it is recommended that the volume of cDNA ≤1/10 of total PCR reaction system volume.

SAFETY DATA SHEET

Article 1 - Product Identification

Product Name: M-MLV (H-) Reverse Transcriptase **Catalog # RTM01-E311**

This product is sold only for research use by qualified laboratory personnel, and is not to be used as a drug, medical device, food additive, cosmetic, nor household chemical. It is not to be used in diagnostic, therapeutic, consumer, agricultural, nor pesticidal applications.

Supplier of Datasheet:	SignalChem Diagnostics Inc.
Street Address:	*190-13160 Vanier Place*
City, Prov. Postal Code:	*Richmond, BC, V6V 2J2*
Country:	*Canada*
Emergency Phone:	1-888-606-3424 (Toll free) 1-778-326-0223 (local)

Article 2 - Hazard Identification

- **WHMIS Classification:** Not WHMIS controlled.
- **GHS classification:** Not GHS classified.
- **Hazard Pictograms:** No labelling applicable.
- **Signal words:** None.
- **Hazard statements:** None.
- **Precautionary statements:** Wear protective gloves/protective clothing/eye protection/ face protection. Avoid breathing dust. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- **Other hazards:** May cause eye and skin irritation. May cause respiratory and digestive tract irritation.

Article 3 – Composition/Information on Ingredients

Description: This product consists of the components listed below.

Component: M-MLV (H-) Reverse Transcriptase (200 U/µl)
Chemical Characterization: Mixture.

Common name	Chemical name	CAS-No.	Concentration
Glycerol	Glycerol	56-81-5	≤50%

Component: 5 × RT Buffer
Chemical Characterization: Mixture.
No Hazardous substances in concentrations to be declared.

Article 4 – First-aid Measures

- **General information:** Consult a physician by providing the SDS.
- **After inhalation:** Breath in fresh air. If casualty cannot breathe, give artificial respiration and consult a physician.
- **After skin contact:** Immediately wash with soap and plenty of water and rinse thoroughly. Consult a physician.
- **After eye contact:** Rinse opened eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do so. Consult a physician.
- **After swallowing:** Not expected to present a significant ingestion hazard under anticipated conditions of normal use. If you feel unwell, seek medical advice.

Article 5 - Fire-fighting Measures

- **Suitable extinguishing media:** Use water spray, extinguishing powder, carbon dioxide, or other appropriate measure that is suitable to the environment.
- **Specific hazards arising from the substance or mixture:** None known.
- **Special protective equipment and precautions for fire-fighters:** Self-contained breathing apparatus if necessary.

Article 6 – Accidental Release Measures

- **Personal precautions, protective equipment, and emergency procedures:** Apply standard laboratory practices and personal protective equipment. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation.
- **Environmental precautions:** Do not allow to enter drains.
- **Methods and materials for containment and cleaning up:** Absorb on sand or vermiculite and place in closed containers for disposal.

SAFETY DATA SHEET

Article 7 - Handling and Storage

- **Precautions for safe handling:** Wear chemical safety goggles and compatible chemical-resistant gloves. Avoid inhalation, contact with eyes, skin or clothing.
- **Conditions for safe storage:** Store according to product label instructions. Keep container upright and tightly closed.

Article 8 - Exposure Controls/Personal Protection

- **Components with limit monitoring values at workplace:**
  Glycerol (CAS-No: 56-81-5)

Values	Control parameters	Regulations
TWA	10 mg/m³ for mist	British Columbia, Canada
TWA	3 mg/m³ for respirable mist	British Columbia, Canada
TWA	10 mg/m³	Alberta, Canada
TWAEV	10 mg/m³	Ontario, Canada
TWAEV	10 mg/m³	Quebec, Canada
TWA	10 mg/m³	USA

- **Appropriate engineering controls:**
  Apply adequate ventilation including mechanical exhaust or laboratory fume hood. Follow standard laboratory practices.
- **Individual protection measures:**

Respiratory protection:
Use appropriate respirator if there is inadequate ventilation by following the government standards.

Hand protection:
Wear gloves and use proper glove removal technique to avoid skin contact. Discard gloves after use by following the applicable laboratory regulations. Wash and dry hands.

Eye/face protection:
Safety goggles with side-shields approved under appropriate government standards.

Skin/body protection:
Use appropriate clothing, footwear and any additional protection measures to protect from splashing or contamination.

Article 9 – Physical and Chemical Properties

Component: M-MLV (H-) Reverse Transcriptase

Appearance: Colorless liquid.	**Danger of explosion:** Product does not present an explosion hazard.
Odour/Odour Threshold: Not determined.	**Explosion limits:** Not available.
pH: ~7.2	**Decomposition temperature:** Not available.
Melting point/freezing point: Not determined.	**Vapor pressure at 20 °C:** Not available.
Boiling point/Boiling range: ~106°C	**Density:** Not determined.
Flash point: Not determined.	**Relative density:** ~1.12 g/cm³
Flammability (solid, gaseous): Not determined.	**Vapor density:** Not determined.
Ignition temperature: Not determined.	**Evaporation rate:** Not determined.
Auto-igniting: Product is not self-igniting.	**Solubility in / Miscibility with Water:** Fully miscible.

Component: 5X RT Buffer

Appearance: Colorless liquid.	**Danger of explosion:** Product does not present an explosion hazard.
Odour/Odour Threshold: Not determined.	**Explosion limits:** Not available.
pH: ~8.3	**Decomposition temperature:** Not available.
Melting point/freezing point: Not determined.	**Vapor pressure at 20 °C:** Not available.
Boiling point/Boiling range: ~100°C	**Density:** Not determined.
Flash point: Not determined.	**Relative density:** ~1.02 g/cm³
Flammability (solid, gaseous): Not determined.	**Vapor density:** Not determined.
Ignition temperature: Not determined.	**Evaporation rate:** Not determined.
Auto-igniting: Product is not self-igniting.	**Solubility in / Miscibility with Water:** Fully miscible.

SAFETY DATA SHEET

Article 10 - Stability and Reactivity

- **Reactivity:** Stable under recommended transport and storage conditions.
- **Chemical stability:** Stable under recommended transport and storage conditions.
- **Possible hazardous reactions:** No dangerous reactions known.
- **Conditions to avoid:** Heat and moisture.
- **Incompatible materials:** Not determined.
- **Hazardous decomposition products:** Not determined.

Article 11 - Toxicological Information

- **Acute toxicity:** Not available.
- **LD/LC50:** Not available.
- **Skin corrosion/irritation:** Not available.
- **Serious eye damage/eye irritation:** Not available.
- **Respiratory or skin sensitization:** Not available.
- **Germ cell mutagenicity:** Not available.
- **Carcinogenicity:** No components are listed in IARC, or NTP, or OSHA, or ACGIH.
- **Reproductive toxicity:** Not available.
- **Teratogenicity:** Not available.
- **Specific target organ toxicity - single exposure/ - repeated exposure (GHS):** Not available.
- **Aspiration hazard:** Not available.
- **Potential health effects:**
  Inhalation: No data available
  Ingestion: No data available
  Skin: No data available
  Eyes: No data available
- **Signs and Symptoms of Exposure:** No data available
- **Synergistic effects:** Not available.

Article 12 - Ecological Information

- **Eco-toxicity:** No data available.
- **Biodegradability:** Not applicable.
- **Bio-accumulative potential:** Not applicable.
- **Mobility in soil:** Not applicable.
- **PBT and vPvB assessment:** Not applicable.
- **Other adverse effects:** Not applicable.

Article 13 - Disposal Considerations

- **Disposal methods:** In accordance to applicable national, regional, or local laws and regulations. For additional handling information and protection of employees please refer to Article 7 and 8.
- **Contaminated packaging:** Disposal should be made in accordance to official regulations. Use water or cleansing agents to clean the area.

Article 14 - Transport Information

- **DOT:** Not dangerous goods.
- **IMDG:** Not dangerous goods.
- **IATA:** Not dangerous goods.

Article 15 – Regulatory Information

- **WHMIS Classification:** Non-hazardous.
- **GHS label elements:** Not applicable.
- **Signal word:** Not applicable.
- **Hazard statements:** Not applicable.

Article 16 - Other Information

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. SignalChem shall not be held liable for any damage resulting from handling or from contact with the above product. See the Technical Specification, Packing Slip, Invoice, and Product Catalog for additional terms and conditions of sale.

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