RNA Research

4

RNA RESEARCH

cDNA SYNTHESIS

RNase Inhibitor

RNase Inhibitor is a robust inhibitor that specifically inhibits RNase A, B and C. It is not effective against RNase 1, RNase T1, S1 Nuclease, RNase H or RNase from *Aspergillus*. It is a recombinant enzyme from murine origin produced in *Escherichia coli*. The enzyme is highly purified to be used in applications where the integrity of RNA is important. This enzyme has improved resistance to oxidation compared to the human and porcine RNase inhibitors.

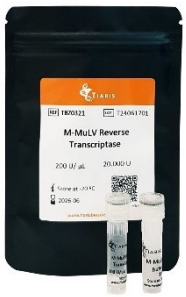
Features

- Purity ≥ 99%.
- Molecular weight, **~ 50 kDa**.
- Compatible with AMV or M-MLV Reverse Transcriptase.
- **Compatible with Taq DNA polymerases and RNA polymerases** (T3, T7, SP6).

Applications

- First-strand cDNA synthesis experiments.
- RT-PCR and RT-qPCR.
- RNA labeling.
- In vitro transcription/translation.
- Ideal for reactions where low DTT concentrations are required (e.g., Real-time PCR).

M-MuLV Reverse Transcriptase



M-MuLV Reverse Transcriptase is a recombinant reverse transcriptase from Moloney Murine Leukemia Virus produced in *Escherichia coli*. Highly purified the enzyme is an useful RNA-dependent DNA polymerase to synthesize cDNA using a RNA template and an oligo(dT) primer or a specific reverse primer.

Features

- **Recombinant enzyme**, MW 69 kDa.
- The enzyme **lacks of 3'→5' and 5'→3' exonuclease activity**.
- The enzyme has **not RNase H activity**.

Applications

- First-strand cDNA synthesis experiments
- RT-PCR
- RT-qPCR

REFERENCES	DESCRIPTION	FORMAT
TBZ0320	RNase INHIBITOR, 4000 u	100 µL
TBZ0321	M-MuLV REVERSE TRANSCRIPTASE, 200 U/ µL	20,000 U
TBZ0322	M-MuLV REVERSE TRANSCRIPTASE, 200 U/ µL	100,000 U

Complementary Products

- ✓ **HIGH-Q™ dNTP Mix 10 mM** (TBR0208, TBR0209)
- ✓ **HIGH-Q™ dNTP Mix 100 mM** (TBR0211)

RT-PCR & RT-qPCR

TIARIS™ One-Step RT-PCR Kit

Tiaris™ One-Step RT-PCR Kit is designed for first-strand cDNA synthesis and subsequent PCR in a single-tube reaction procedure, decreasing contamination risk and reducing hands-on time considerably. The kit consists of a RT mix and a PCR Master Mix. The RT mix comprises a mutant M-MuLV reverse transcriptase without RNase H activity and increased thermostability, and an advanced RNase inhibitor to avoid RNA degradation. The Master mix contains all the reagent (*except PCR primers and template*) needed for running PCR reactions.

Features

- **Thermostable reverse transcriptase**, allows cDNA synthesis at 45-55°C.
- Modified M-MuLV reverse transcriptase **lacks RNase H activity**.
- **High yield, specificity and sensitivity**.

Applications

- cDNA synthesis.
- Rapid one-step RT-PCR, one-tube RNA quantification, reducing experimental variation and contamination with a convenient RT-PCR protocol.
- Gene expression analysis by end-point RT-PCR.

REFERENCES	DESCRIPTION	FORMAT
TBK1040	TIARIS™ ONE-STEP RT-PCR KIT	100 rxn

Q-PLUS™ One-Step Green RT-qPCR Master Mix 2x

Q-PLUS™ One-Step Green RT-qPCR Master Mix allows first-strand cDNA synthesis and subsequent qPCR in a single-tube reaction procedure, decreasing contamination risk and reducing hands-on time considerably. The kit includes our Q-PLUS™ Green qPCR Master mix developed for fast PCR, provided as a 2x reaction mixture, which contains all components necessary for real-time PCR, including a green fluorescent dye, ultrapure dNTPs, stabilizers and enhancers. In addition, a separate RT mix that comprises a balanced mixture of both reverse transcriptase and ribonuclease inhibitor is also provided.

Features

- High Efficiency in **multiplex reactions**.
- High Efficiency in **GC/ AT-rich templates**.
- Early C_T values – **Rapid extension rate**.
- **Extreme sensitivity** – increased limit of detection.
- Includes a separate vial ROX that can be added to the qPCR reaction based on thermocycler manufacturer's specification.

Applications

- Absolute quantification
- Gene copy number determination
- Gene expression analysis.

Q-PLUS™ One-Step Probe RT-qPCR Master Mix 2x

The kit includes our Q-PLUS™- Probe qPCR Master Mix, presented as a 2× reaction mixture. This master mix incorporates all essential components for real-time PCR, including ultrapure dNTPs, stabilizers, and enhancers, designed for the efficient amplification and detection in qPCR based on a wide range of probe-based technologies, including Taqman®, Molecular Beacons® and Scorpion® probes. In addition, a separate RT mix that comprises a balanced mixture of both reverse transcriptase and ribonuclease inhibitor is also provided.

Features

- High efficiency in **multiplex reactions**.
- **High efficiency** in GC/ AT-rich templates.
- **Early C_T values**, rapid extension rate.
- **Extreme sensitivity**.
- **Compatible with fast and standard PCR** program.

Applications

- One-Step RT-qPCR.
- Absolute quantification.
- Gene copy number determination.
- Gene expression analysis.

REFERENCES	DESCRIPTION	FORMAT
TBK0014	Q-PLUS™ ONE-STEP GREEN RT-qPCR MASTER MIX 2X	100 rxn
TBK0015	Q-PLUS™ ONE-STEP GREEN RT-qPCR MASTER MIX 2X	500 rxn
TBK0010	Q-PLUS™ ONE-STEP PROBE RT-qPCR MASTER MIX 2X	100 rxn
TBK0011	Q-PLUS™ ONE-STEP PROBE RT-qPCR MASTER MIX 2X	500 rxn

IN VITRO TRANSCRIPTION

T7 RNA Polymerase

T7 RNA polymerase is a highly specific and efficient enzyme derived from bacteriophage T7 produced in *Escherichia coli*. T7 RNA polymerase is responsible for synthesizing RNA from DNA templates that contain a T7 promoter sequence. Its remarkable specificity for this promoter ensures that only the desired target sequence is transcribed, minimizing off-target effects. Unlike many host RNA polymerases, T7 RNA polymerase operates independently of cellular machinery, making it an ideal tool for controlled transcription in a laboratory setting.

REFERENCES	DESCRIPTION	FORMAT
TBZ0216	T7 RNA POLYMERASE 50 U/ µL	5000 U

Features

- Recombinant enzyme.
- Monomer, 99 kDa.
- Requires Mg^{2+} as cofactor.
- Low error rate.

Applications

- *In vitro* transcription from T7 promoter.
- Synthesis of single strand RNA.
- RNA Labeling.
- Studies of RNA secondary structure and RNA-protein interactions, RNA splicing.

RELATED REAGENTS

TIARIS™ RNase Decontamination Solution

TIARIS™ RNase Decontamination Solution is a convenient and effective solution for the inactivation and removal of RNases and DNases from laboratory bench, biosafety cabinet and PCR equipment. It is based on the action of anionic surfactants and a secondary alcohol on nucleases.

REFERENCES	DESCRIPTION	FORMAT
TBR0310	TIARIS™ RNase DECONTAMINATION SOLUTION	500 mL

Water, DEPC treated

Water, DEPC treated is a molecular biology grade water obtained by diethylpyrocarbonate (DEPC) treatment and autoclaving of ultra-filtrated water. DEPC efficiently inhibits RNases by covalent modification. DEPC-treated water is ideal for molecular biology procedures where DNase and RNase activity must be absent.

REFERENCES	DESCRIPTION	FORMAT
TBB0304	WATER, DEPC TREATED	1 L
TBB0305	WATER, DEPC TREATED	0.5 L
TBB0306	WATER, DEPC TREATED	5x 1.5 mL

There are literally as many ideas as there are organisms.

Janine Benyus

Throughout history, the wisdom of Mother Nature has inspired keen observers in the creation of various inventions, new materials, and incredible architectural works. George de Mestral (*Switzerland, 1907-1990*) stands out on this list for creating Velcro®, one of the most widespread, useful, and versatile innovations of the 20th century.

From a young age, he showed a fascination with how things worked around him, and by the age of 12, he had already patented his first invention: a toy airplane. This curiosity for engineering and innovative design led him to study at the *École Polytechnique Fédérale de Lausanne*, where he gained a solid formation in engineering.

In 1941, while returning home after a walk in the countryside, de Mestral noticed that burdock seeds—a type of thistle—had stuck to his dog's fur and his own clothing. Intrigued, he decided to examine the seeds under a microscope and observed that they were covered with tiny hooks that easily attached to fabric fibers and hair. Inspired by the structure of these natural hooks, de Mestral conceived the ingenious idea of applying what he observed to a closure system that could be easily opened and closed repeatedly. This system would consist of two parts: one covered with tiny hooks and the other with soft loops.

To put his idea into practice, de Mestral visited several textile factories in Europe, but the first six companies he met with were generally skeptical. While manufacturing the soft loops wasn't a problem, producing the tiny hooks was a challenge. They needed to be flexible enough to detach from the loops but strong enough to ensure secure fastening. In Lyon, he finally found a manufacturer that combined durable nylon with cotton, producing a fabric capable of maintaining its shape. Using this material, de Mestral successfully replicated the microscopic hooks he had observed on the burdock seeds.

In 1955, George de Mestral was granted the patent for Velcro®, a combination of the French words "velours" (*velvet*) and "crochet" (*hook*). He also founded a company with the same name for the production of Velcro®, establishing his first factories in the United States; in Europe, Spain was a pioneer in manufacturing Velcro® starting in 1959.

The applications of billions of meters of Velcro® have reached as far as imagination allows. From the textile, construction, medical, and transportation industries to aerospace, this invention has become a key and indispensable product.

#NatureWithHooks