

Lyo NZY Ribonuclease Inhibitor

Catalogue number	Presentation
MB41102	20,000 U
MB41103	5 x 20,000 U

Description

Lyo NZY Ribonuclease Inhibitor is a freeze-dried enzyme preparation provided with an optimized reconstitution buffer designed to confer maximal levels of stability and enzymatic activity. The enzyme is subjected to rigorous purification protocols to ensure optimal performance. Lyo NZY Ribonuclease Inhibitor inhibits the activity of ribonucleases (RNases; EC 3.1) of the pancreatic type, such as RNase A, RNase B and RNase C, by binding them noncovalently in a 1:1 ratio. Lyo NZY Ribonuclease Inhibitor is useful in any application where RNase contamination is a potential problem. For instance, it can be used to protect template RNA in cDNA synthesis reactions, RT-PCR or in vitro transcription/translation, as well as to protect viral RNA during in vitro replication. In addition, it will inhibit RNases during RNA isolation and purification and during RNase-free antibodies preparation. Lyo NZY Ribonuclease Inhibitor is not active against RNase 1, RNase T1, RNase T2, S1 nuclease and RNase H.

Shipping & Storage Conditions

This product can be shipped at a range of temperatures from dry ice to room temperature. Upon receipt, store all components at -85 to -15 °C in a constant temperature freezer. The protein will remain stable until the expiry date if stored as specified. Once resuspended, the enzyme should be stored in the same conditions previously mentioned.

Components

COMPONENT	MB41102 (20,000 U)		MB41103 (5 x 20,000 U)	
	TUBES	VOLUME	TUBES	VOLUME
Lyo NZY Ribonuclease Inhibitor	1	for 500 µL	5	for 500 µL
Lyo NZY-RI resuspension buffer	1	600 µL	5	600 µL

Specifications

Unit Definition: One unit is defined as the amount that inhibits 50% of the activity of 5 ng RNase A. This activity is determined by measuring the inhibition of hydrolysis of cytidine 2',3'-cyclic monophosphate by RNase A.

Enzyme concentration: 40 U/µL.

Inhibition & Inactivation: Lyo NZY Ribonuclease Inhibitor is inhibited by common denaturants such as SDS, urea and all oxidizing reagents. Temperatures above 65 °C also inactivate the inhibitor. There is some residual activity up to 50-55 °C.

Standard Protocol

Recommendations before starting

Reagents usage: Lyo NZY Ribonuclease Inhibitor requires 0.5 to 1 mM DTT (not provided) in the reaction system to maintain activity. The storage buffer of this protein contains 8 mM DTT, but additional DTT is required if volume of the inhibitor in the reaction mixture is less than 1/8 of the total volume.

Procedures before starting

Reconstitute the Lyo NZY Ribonuclease Inhibitor as follows:

- Add 500 µL of Lyo NZY-RI resuspension buffer provided into the tube containing the lyophilized protein.
Note: Do not replace the resuspension buffer with water or any other buffer.
- Flick the tube to mix thoroughly or pipette gently up and down;
- Wait 2-3 min. Complete resuspension can take some time.
- Spin down to collect the solution.

Procedure

Upon resuspension, Lyo NZY Ribonuclease Inhibitor can be added directly to the reaction mixtures when the RNases A, B or C could cause RNA degradation. Factors like incubation temperature, concentration of protein, buffer composition, DTT concentration and presence of stabilizing agents may affect the effective unit activity of Lyo NZY Ribonuclease Inhibitor.

For First-strand cDNA synthesis: Use 40 units of protein in a 20 µL reaction mixture to protect the template RNA, improve total cDNA yields and increase the percentage of full-length cDNA. The presence of Lyo NZY Ribonuclease Inhibitor does not affect the use of RNase H after first-strand cDNA synthesis.

For RT-PCR: Use 40 units of protein in a 20 µL reaction mixture. Lyo NZY Ribonuclease Inhibitor does not affect the enzymes used in RT-PCR.

For *In Vitro* Transcription: Use 20-40 units of protein in a 10 µL reaction mixture. Lyo NZY Ribonuclease Inhibitor is compatible with T3, T7, and SP6 RNA Polymerases.

Quality control

Purity

Lyo NZY Ribonuclease Inhibitor is >90% pure as judged by SDS polyacrylamide gel electrophoresis followed by Coomassie Blue staining.

Genomic DNA contamination

The product must comply with internal standards of DNA contamination as evaluated through real-time qPCR.

Nucleases assay

To test for DNase contamination, 0.2-0.3 µg of pNZY28 DNA are incubated with 40 U of Lyo NZY Ribonuclease Inhibitor for 14-16 h at 37 °C. To test for RNase contamination, 1 µg of RNA is incubated with 40 U of the protein for 1 h at 37°C. Following incubation, the nucleic acids are visualized on a GreenSafe-stained agarose gel. There must be no visible nicking or cutting of the nucleic acids. Similar tests are performed with reaction buffer.

Functional assay

Lyo NZY Ribonuclease Inhibitor is tested in a reaction to protect the integrity of 125 ng of RNA exposed to a complex mixture of RNases from serum origin. Different amounts of Lyo NZY Ribonuclease Inhibitor are assayed in a 20 µL reaction. The integrity of RNA is judged through a real-time one-step RT-qPCR experiment. Complete preservation of RNA integrity is observed in the presence of Lyo NZY Ribonuclease Inhibitor (in all units tested) when using 1 mM DTT as cofactor, as measured by the successful amplification of the desired target in the real-time RT-PCR assay (the signal overlaps to that emitted by an equivalent RNA sample not exposed to the RNases mixture).

Troubleshooting

Troubleshooting is often a systematic, meticulous process where varying one parameter at a time and evaluating impacts can unveil the root cause of issues. These adjusted suggestions, incorporating a blend of specificity and exploratory approaches, aim to enhance the clarity and actionability of your troubleshooting guide. Should any other technical or procedural aspects require attention, your feedback and additional information will always be welcomed.

PROTEIN NOT SHOWING RNASE INHIBITION ACTIVITY
<ul style="list-style-type: none">Protein not active
Prior to use, ensure to reconstitute the lyophilized protein according to the provided instructions (refer to Procedures before Starting). Do not reconstitute the protein with water, or any other buffer. The enzyme should be reconstituted with the Lyo NZY-RI resuspension buffer provided, acquiring its functional activity thereafter.
<ul style="list-style-type: none">Presence of other RNases type
It is possible that other types of RNases, against which the Lyo NZY Ribonuclease Inhibitor is not effective, are present as contaminants in the reaction.
<ul style="list-style-type: none">Inadequate DTT concentration
Ensure that an adequate amount of DTT is present in the reaction. Lyo NZY Ribonuclease Inhibitor requires a concentration of 0.5 to 1 mM DTT to maintain its activity. In addition, ensure that the DTT used is of high quality and has not degraded. DTT can degrade over time, especially when exposed to air or light. Consider preparing a fresh DTT solution if there are concerns about its quality.
<ul style="list-style-type: none">Denaturing conditions
Check for the presence of potential inhibitors of the Lyo NZY Ribonuclease Inhibitor. Adjust the temperature to optimize its functionality under the specified conditions.
<ul style="list-style-type: none">Inadequate storage conditions
Verify that the Lyo NZY Ribonuclease Inhibitor is stored properly, preferably at -15 °C or below, to prevent degradation. Since the protein contains DTT in its storage buffer ensure proper sealing to maintain activity.

For life science research only. Not for use in diagnostic procedures.

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