

DB Ultima H RNase Inhibitor

Technical Specification

Version DB-1306-TS-001-01-250910-EN

General Description

DB Ultima H RNase inhibitor (DB-1306) is a highly engineered human placental RNase inhibitor overcoming the stability issues common to all other protein inhibitors. It provides the highest oxidative and thermal stability on the market, while retaining or even improving the potency of the human RNase inhibitor.

Unlike other inhibitors, DB Ultima H is **highly resistant to oxidation** and remains active without DTT for at least 1 week at 25 °C in standard buffers (e.g. Tris pH 7.5 - 9.0). The inhibitor remains active even in strongly oxidative solutions, such as 2% hydrogen peroxide, where other inhibitors completely lose activity. In contrast to other inhibitors, it also remains fully active at basic pH (at least 9.0) and after multiple freeze-thaw cycles in such buffers, making it the most robust protein RNase inhibitor across diverse assay and storage conditions. Nevertheless, for maximal stability, we recommend adding 1 mM DTT to your assay buffer when possible.

DB Ultima H demonstrates **superior thermal stability**, with a melting temperature up to 10 °C higher than other inhibitors. It retains 100% activity at least to 55 °C in RT-PCR buffers and remains active even after 5 minutes at 60 °C. Stability can be further improved in optimized buffers (e.g., with glycerol), and due to its high potency, the protein gains additional stabilization upon RNase binding (up to +20 °C). As a result, the DB Ultima H protects RNA during reverse transcription to at least 60°C, not achievable by other inhibitors.

DB Ultima H surpasses the wild-type human inhibitor in activity, forming high-affinity 1:1 complexes with a wide range of eukaryotic RNases (including RNase A, B, and C). Compared to inhibitors derived from other species (porcine, bovine, rat, or mouse), and even compared to the human wild-type RNase inhibitor, it shows significantly higher efficiency in inhibiting RNase activity in human samples. This enhanced performance allows effective inhibition of RNases in bodily fluids such as whole blood, serum, plasma, and saliva, enabling direct RT-PCR from cells, tissues, and fluids without the need for prior RNA extraction.

DB Ultima H does not inhibit RNases H, 1, T1, S1 Nuclease, SP6, T7 RNA Polymerase, T3 RNA Polymerase, AMV Reverse Transcriptase, M-MLV Reverse Transcriptase, or Taq Polymerase.

The protein has the molecular weight of 50 kDa and is recombinantly expressed in *E.coli*.

For research use only.



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Applications

DB Ultima H RNase Inhibitor should be used in the amount of **0.5 unit per 1 µL of reaction** (e.g., 0.25 µL per 20 µL reaction), even though lower concentration might be sufficient for some applications, such as one step RT-qPCR.

DB Ultima H RNase Inhibitor is ideal for all applications requiring protection of RNA integrity from endogenous or environmental RNases, including:

- cDNA synthesis or one step RT-PCR including one step quantitative real-time RT-PCR from isolated RNA,
- cDNA synthesis or one step RT-PCR including one step quantitative real-time RT-PCR from biological samples such as human serum or saliva without the need of RNA isolation (direct RT-PCR),
- cDNA synthesis with thermostable reverse transcriptase at temperatures up to 60 °C,
- cDNA synthesis for subsequent cloning, especially of longer fragments,
- Expression profiling from single cells,
- *In-vitro* transcription and translation,
- RNA structural and functional studies,
- RNA purification.

DB Ultima H RNase Inhibitor is active in common buffers used for reverse transcription, PCR, or *in vitro* translation.

Concentration: 40 U/µL

Unit Definition

One unit is defined as the amount required to inhibit 5 ng of RNase A activity by 50 %, using cytidine 2',3'-cyclic monophosphate (cCMP) as the substrate. Activity is measured in 100 mM Tris-acetate pH 6.5, 0.5 mM EDTA buffer, at 25 °C.

Kit Components

	REF code	Volume (µL)			Cap color
		2.5 kU	10 kU	40 kU	
DB Ultima H RNase Inhibitor	RF04940	63	250	1 000	Ulti H RI

Storage and Shelf Life

Store at -18 °C to -25 °C. Under these conditions, the product remains stable for 3 years from the date of manufacture. Additionally, the stock solution of Ultima H RNase Inhibitor is stable for up to 2 months at 25 °C.

Storage Buffer:

20 mM HEPES pH 7.5, 50 mM KCl, 8 mM DTT, 0.5 mM EDTA, 50 % v/v glycerol

Quality Control

Each production lot is tested to confirm:

- Activity of the RNase inhibitor.
- Purity ≥90%, determined by SDS-PAGE.
- Absence of contaminating nucleases, including DNase, RNase, latent RNase, and endonuclease activity.
- Absence of *E. coli* genomic DNA.

Ordering information

Catalogue number	Product size
DB-1306-2.5kU	2.5 kU
DB-1306-10kU	10 kU
DB-1306-40kU	40 kU