

GenTegra RNAssure™

Immediate and complete protection directly from RNA extraction

Cellular RNA provides data-rich biological information about gene expression. Genomic RNA in viruses is used as the basis for viral genetics. Researchers rely on RNA extraction kits to purify and collect their RNA samples for downstream applications including next-generation sequencing (NGS) RNA-Seq, qPCR, and other expression profiling techniques. Keeping RNA samples on ice all the time can slow RNA degradation. However, during handling, the sample temperature can often rise above 0 °C, and even brief exposure to elevated temperature is detrimental to RNA, especially with prevalent contamination from endogenous or environmental RNases^{1,2}. On the other hand, the amount of RNase contamination varies depending on sample types and extraction methods, and it is extremely difficult to assess the level of contamination in an extracted RNA sample. Therefore, it is important to preventively treat the RNA samples with a stabilization agent immediately after extraction to eliminate concerns of RNA degradation during subsequent procedures.

GenTegra RNAssure is a robust, reliable protection product that utilizes GenTegra's proven, patented Active Chemical Protection™ (ACP) chemistry to protect RNA against all RNases as well as exposure to oxidation. Maximum RNA protection is achieved by treating purified RNA samples with RNAssure as soon as they are isolated. With RNAssure, RNA can be

protected even at room temperature (RT), eliminating the concern that RNA may degrade during every day experimental protocols or due to catastrophic freezer failure. RNAssure can protect RNA for at least 3 days at RT and 2 weeks at 4 °C. GenTegra's RNAssure is easily integrated into extraction and purification kits from all major life science manufacturers including, for example, Invitrogen, Zymo, and QIAGEN (**Figure 1**). RNAssure protected samples can be used directly in downstream applications without the need for further purification.

Benefits

- Protect RNA integrity during routine sample handling and preparation
- Protect RNA samples from adverse or accidental exposure to higher temperatures
- Inactivate all residual RNase activity carried over from purification process or environmental contamination
- Protect RNA from oxidation damage and non-specific adherence to plastic
- Integrates seamlessly into standard RNA extraction kit workflows

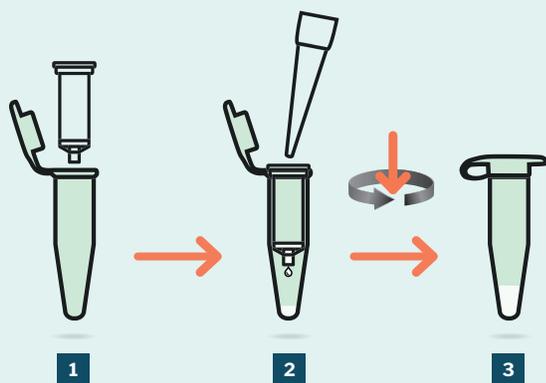


Figure 1: RNAssure Elution Tube simply replaces the manufacturer's elution collection tubes and integrates with standard column-based purification kits and protocols. **1.** For the final elution step, simply place the spin column into the RNAssure collection tube. **2.** Add the elution buffer to the column. Centrifuge the column and tube. Remove and discard the column. **3.** Purified RNA is now protected by RNAssure for at least 3 days at RT.

STORAGE CONDITION	LENGTH OF PROTECTION
Room temperature (15 – 25 °C)	3 days
Refrigeration (2 – 8 °C)	2 weeks
Frozen (< – 70 °C)	> 1 year

¹ Precautions for Handling of RNA. https://lifescience.roche.com/en_us/articles/precautions-for-handling-of-rna.html

² The Basics: RNase Control. <https://www.thermofisher.com/us/en/home/references/ambion-tech-support/nuclease-enzymes/general-articles/the-basics-rnase-control.html>

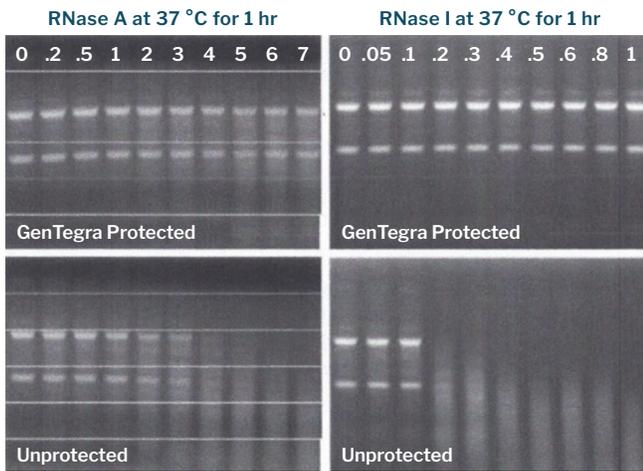


Figure 2: GenTegra RNAssure increases RNA stability in the liquid state at 37 °C in the presence of trace RNase. RNA integrity is maintained in the liquid state in the presence of increasing amounts of RNase A (left) and RNase I (right) only when protected with GenTegra RNAssure. HeLa cell RNA (5 µg) was incubated with the indicated amounts of RNase at 37 °C for one hour in the presence (top row) or absence (bottom row) of GenTegra RNAssure.

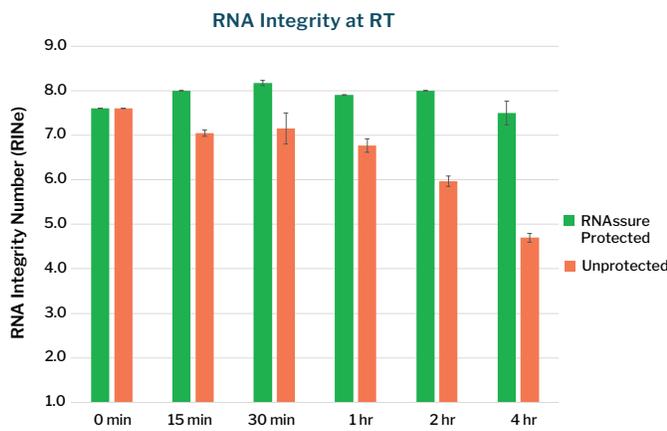


Figure 3: RNAssure protects RNA from degradation during short exposures to RT. Following shorter incubations at RT, purified mouse spleen RNA samples (commercially sourced) were analyzed on a Bioanalyzer for both fragmentation length and RIN scores. In the absence of RNAssure (orange), the RNA sample started to show noticeable degradation, after as short as 15 min exposure at RT, and the RNA quality progressively decreased as the exposure time increased. Whereas in the presence of RNAssure (green), the RNA sample was protected with no significant change in RIN value, throughout the 4 hr exposure to RT.

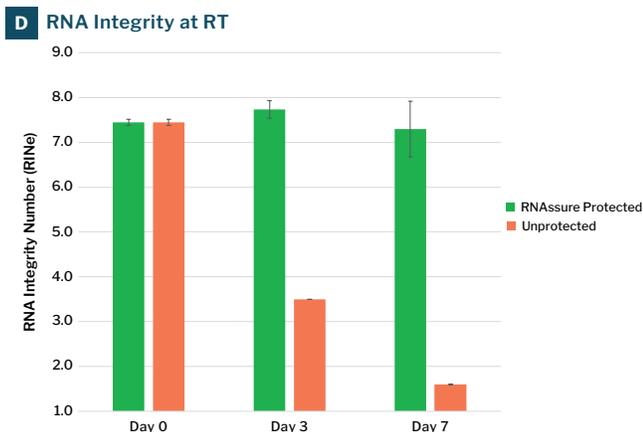
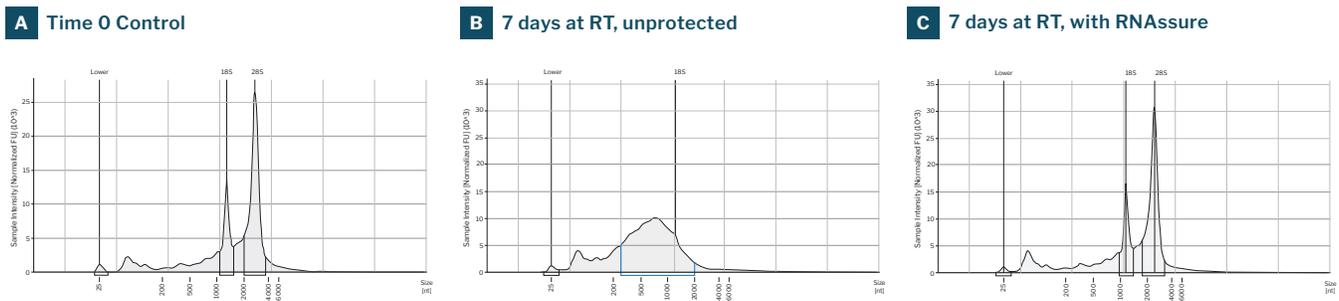


Figure 4: RNAssure protects RNA from degradation for long-term exposure at RT. Following 3 or 7 days of incubation at RT, purified mouse spleen RNA samples (commercially sourced) were analyzed on a Bioanalyzer for both fragmentation length and RIN scores. **A.** Prior to incubation at RT, control mouse spleen RNA showed no significant degradation. **B.** After 7 days at 25 °C, RNA showed severe degradation in the absence of RNAssure. **C.** In the presence of RNAssure, no significant degradation was observed after 7 days compared to control RNA. **D.** At 25 °C, it is observed that RIN values for the unprotected RNA (orange) showed a dramatic decrease at 3 days, while the RNAssure protected RNA (green) maintained high RIN scores even after 7 days.