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TechNotes 11(3)

RNA*later*® for RNA *and* Protein Stabilization

•Simplify sample collection

•No need to freeze sample in liquid nitrogen

•Stabilize both RNA and protein within tissues or cells

•Isolate both RNA and protein from the same sample

RNA*later* is an aqueous, nontoxic, tissue and cell collection reagent that stabilizes and protects RNA in intact, unfrozen tissue and cell samples. The solution permeates the cells, stabilizing the RNA inside them. RNA*later* treated samples can be stored at room temperature (25°C) for up to one week, at 4°C for up to one month, or at -20°C (or lower) indefinitely. Intact protein can be recovered from RNA*later*-stabilized samples for use in downstream applications such as Western blotting or 2D gel analysis. Thus, RNA*later* is the ideal companion to the PARIS™ (Protein And RNA Isolation System) Kit, a kit specifically engineered for the isolation of both protein and RNA from the same experimental sample. (See "RNAi: Get the Whole Story")

To demonstrate the utility of **RNA*later*** for preserving proteins and RNA for long periods of time, RNA and protein were isolated from mouse tissue that had been stored for more than a year in RNA*later*. Fresh brain and kidney tissues were dissected and immediately submerged in 5 volumes of RNA*later*, incubated at 4°C overnight and then transferred to -20°C. Thirteen months later, the RNA*later* treated samples were thawed at room temperature, about 50 mg of tissue was collected, and the remainder of the samples were refrozen. Small tissue pieces from both tissues were subjected to the standard **PARIS** procedure to quickly isolate total RNA and protein. The samples were disrupted with a motorized homogenizer in 400 µl of Cell Disruption Buffer. The bulk of the resulting lysate (300 µl) was then immediately mixed with 1 volume of 2X Lysis/Binding Solution for RNA isolation using the glass fiber filter provided with the PARIS Kit, and the remainder of the lysate was reserved for protein analysis.

TechNotes Archive

Ordering Information

Related Links:

Make Time Stand Still with RNA*later*™
[read]

Thaw Frozen Tissues without Damaging RNA
[read]

A Better Way to Isolate RNA *AND* Protein from the Same Sample
[read]

RNArticles: Keeping RNA Intact Prior to RNA Isolation - RNA*later*®
[read]

RNAlater® Resource
[read]

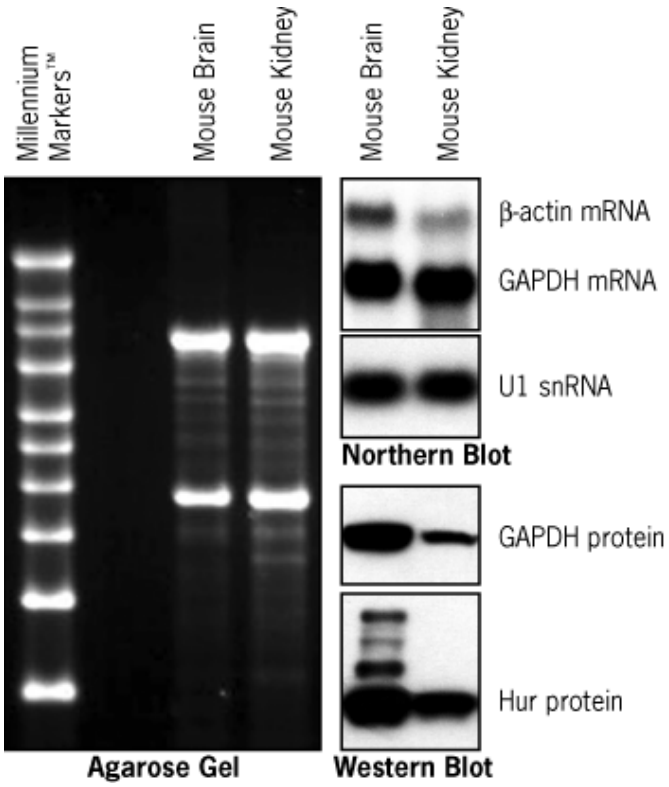

Figure 1. RNA and Protein from Tissues Stored in RNA*later*® for >1 Year. RNA and protein were isolated with the PARIS™ Kit from ~50 mg of mouse brain or kidney stored for 13 months at -20°C in RNA*later*. Purified RNA (1 µg) was analyzed on a denaturing agarose gel and subsequently transferred, blotted, and hybridized using the NorthernMax®-Gly Kit (Ambion). A portion of the protein fraction (10 µg) was used for Western blot analysis with antibodies specific for GAPDH or Hur proteins.

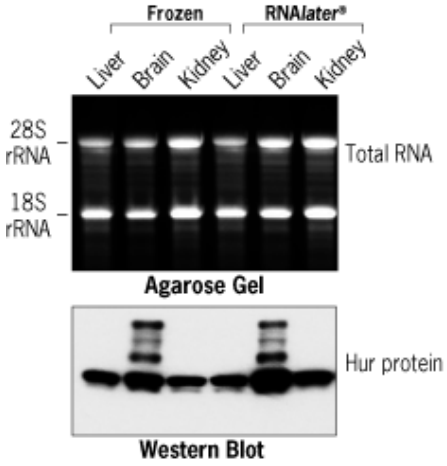

Figure 2. RNA and Protein Isolation from Stabilized Samples. Isolation from ~30 mg of mouse liver, brain or kidney 5 days after collection. Samples were either kept frozen at -80ºC, or stored in RNA*later*® at 4ºC.

As shown in Figure 1, no obvious RNA degradation was observed by denaturing agarose gel analysis or by Northern blot hybridized with probes specific for U1 snRNA, or ß-actin and GAPDH mRNAs. Analysis of the protein fraction by Western blot showed that the recovered proteins were full-length. (Note: The multiple bands observed in the Hur blot correspond to brain-

specific higher molecular weight isoforms of the Hur protein.) Figure 2 further confirms that protein yield and quality are not affected by RNA*later* treatment. These results demonstrate that RNA*later* is an efficient sample collection/stabilization reagent for protecting RNA, and that RNAlater-treated samples can be used for routine protein analysis such as Western blotting.

It is especially useful for the following applications:

•Archiving samples for future analysis

•Collecting samples at different time points without having to process them immediately

•Shipping samples without dry ice

•Collecting samples in the field

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Ordering Information

Cat#	Product Name	Size
1921	PARIS™ Kit	50 purifications
7020	RNA*later*®	100 ml
7021	RNA*later*®	500 ml
7024	RNA*later*®	250 ml

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