PicoPure RNA Isolation Kit

Maximize RNA recovery from microscopic samples

Benefits

- Enables consistent, efficient RNA recovery
- Low-volume elution
- Isolate RNA from a single cell
- Rapid isolation of RNA

Figure 1. PicoPure RNA Isolation Kit.

Consistent RNA isolation

The Applied Biosystems™ PicoPure™ RNA Isolation Kit from Thermo Fisher Scientific enables researchers to recover total cellular RNA from very small samples. The PicoPure RNA Isolation Kit is optimized for use with cells acquired using laser capture microdissection (LCM) on Applied Biosystems™ CapSure™ HS LCM Caps and CapSure™ Macro LCM Caps, but can be used with various cell sample types to isolate total cellular RNA (Figure 1).

Researchers can obtain high recoveries of total cellular RNA from as little as a single cell to samples with up to 100 µg of RNA. Total cellular RNA isolated using the PicoPure RNA Isolation Kit is eluted in a small volume of low ionic strength buffer, ready for use in downstream applications, including reverse transcription for real-time PCR, production of labeled cDNA, or linear amplification using the Applied Biosystems™ RiboAmp™ RNA Amplification Kit (Figure 2).

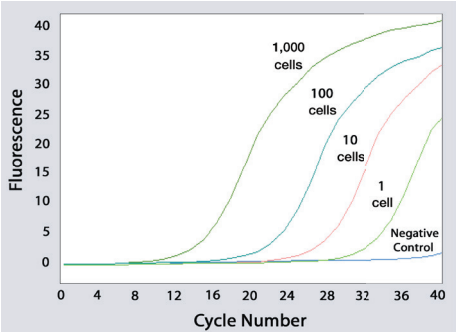

Figure 2. Isolate RNA from a single cell. Quantitative real-time PCR of RNA isolated from 1 to 1,000 LCM cells. Cultured mouse Leydig (TM3) cells (ATCC) were spun down onto a microscope slide, fixed, and dehydrated. Replicate samples of 1, 10, 100, and 1,000 cells were microdissected using the Applied Biosystems™ ArcturusXT™ LCM Instrument. RNA was isolated using the PicoPure RNA Isolation Kit, reverse-transcribed, and assayed by quantitative real-time PCR for GAPDH. Quantifiable message can be detected from a single cell, and the fluorescent signal is proportional to the cell number for all samples studied.

Obtain superior RNA recovery

Small, valuable samples often cannot be replaced. Performing gene expression studies on these precious samples requires maximum RNA recovery. Comparative studies show that with small, RNA-poor cell or tissue samples, the PicoPure RNA Isolation Kit dramatically outperforms other commercial total RNA isolation kits in efficiency (Figure 3).

Maintain high-quality RNA

The PicoPure RNA isolation process maintains high-quality RNA. Total cellular RNA prepared from LCM samples remains intact after isolation, increasing confidence in subsequent molecular analyses (Figure 4).

Use high-yield purification columns

The PicoPure RNA Isolation Kit features unique, high-recovery Arcturus MiraCol™ Purification Columns, engineered to maximize RNA recovery from microscopic samples (Figure 5). The columns have convenient integrated lids to help ensure that samples remain RNase-free. In addition, the kit comes complete with all necessary buffers, an easy-to-follow user guide, optimized protocols for handling LCM samples, and protocols for isolating RNA from larger samples.

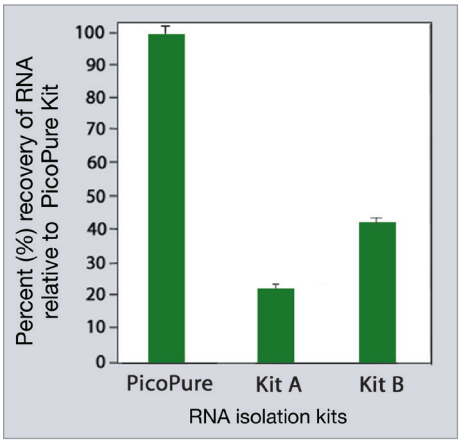

Figure 3. Obtain superior RNA recovery. RNA recovery efficiency comparison among commercial RNA isolation kits. Using the PicoPure RNA Isolation Kit and other leading products for purifying small RNA samples, 100 ng of Cy®3 dye–labeled RNA was bound to columns, washed, and eluted following each manufacturer's protocol. The graph shows average percent recovery of RNA relative to the recovery with the PicoPure RNA Isolation Kit, for five replicates per kit, quantified using fluorescence detection.

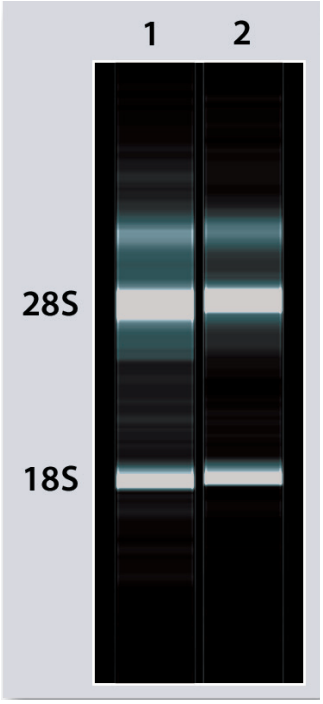

Figure 4. Maintain high-quality RNA. The PicoPure RNA Isolation Kit maintains RNA integrity. Total RNA from 15,000 mouse kidney cells was isolated from two samples with the PicoPure RNA Isolation Kit. RNA samples were run using an Agilent Bioanalyzer 2100. Lane 1: total RNA from non-LCM cells; lane 2: total RNA from LCM-captured cells. Comparable 18S and 28S ribosomal RNA band intensities are observed between RNA isolated from both the intact tissue and the LCM sample, demonstrating that high-quality RNA is obtained.

Figure 5. MiraCol Purification Columns maximize recovery.

Deliver RNA ready for amplification and microarray analysis

RNA isolated with the PicoPure RNA Isolation Kit is ready, without vacuum concentration, for amplification with the Applied Biosystems™ RiboAmp™ PLUS RNA Amplification Kit. Together, the two kits provide highly reproducible microarray results (Figure 6).

Retain low-abundance mRNA

The PicoPure RNA Isolation Kit preserves mRNA in all abundance classes throughout the isolation process, minimizing the loss of important genes of interest. Low-, medium-, and high-abundance genes are consistently recovered and available for expression analysis (Figure 7).

Eliminate time-consuming RNA concentration

The simple isolation protocol consists of extracting cellular RNA, then loading the extract onto the MiraCol Purification Column to bind the RNA. After impurities are washed away, the RNA elutes in only 10 µL of buffer, ready for use without vacuum concentration or transfer into a new reaction tube.

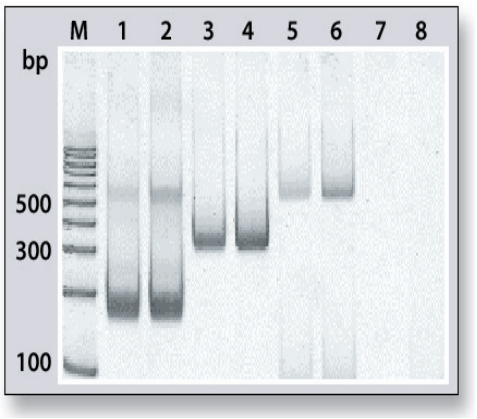

Figure 7. Retain low-abundance mRNA. Quantitative real-time PCR of low-, medium-, and high-abundance genes in RNA isolated using the PicoPure RNA Isolation Kit. Real-time PCR was performed on RNA from 500 cells captured from mouse liver and kidney. Equal quantities of cDNA were analyzed with three mouse primer sets: elongation factor -1 alpha (EF-1α, high-abundance gene, ~3,000 copies/cell, 187 bp), glyceraldehyde-3-phosphate dehydrogenase (GAPDH, medium-abundance gene, 300–3,000 copies/cell, 357 bp), and protein phosphatase 1 (PP1, low-abundance gene, <300 copies/cell, 498 bp). Samples were run on a polyacrylamide gel. M: molecular weight markers; lane 1: kidney EF-1α; lane 2: liver EF-1α; lane 3: kidney GAPDH; lane 4: liver GAPDH; lane 5: kidney PP1; lane 6: liver PP1; lane 7: liver EF-1α, no-RT control; lane 8: no-template control.

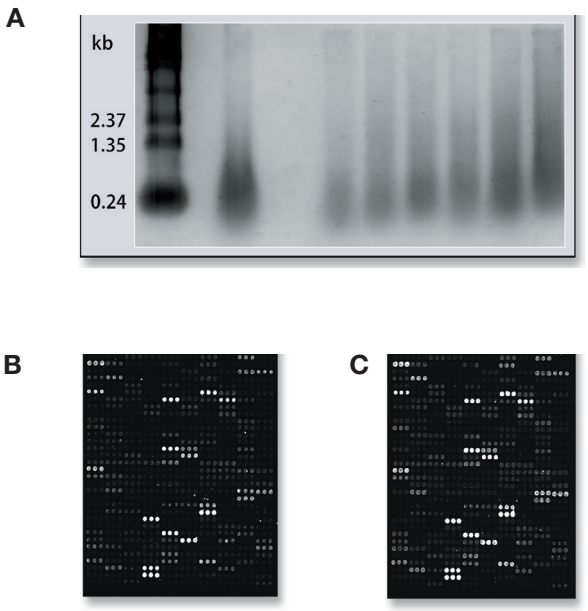

Figure 6. Deliver RNA ready for microarray analysis. Reproducible amplification and microarray results using RNA isolated with the PicoPure RNA Isolation Kit. **(A)** Total RNA was isolated from 6 independent LCM samples using the PicoPure RNA Isolation Kit. RNA from each capture was amplified through two rounds using the RiboAmp PLUS RNA Amplification Kit. Amplified RNA was run on an agarose gel. M: marker; lane 1: positive amplification control; lane 2: negative control; lane 3: kidney duct 1; lane 4: kidney duct 2; lane 5: mouse kidney glomerulus; lane 6: whole kidney; lane 7: SKBR3 cell line (250 captured cells); lane 8: SKBR3 cell line (500 captured cells). **(B, C)** RNA from 1,500 mouse kidney duct cells was isolated using the PicoPure RNA Isolation Kit, amplified for two rounds using the RiboAmp PLUS kit, labeled with Cy®5-dUTP, and hybridized to 9,000-element mouse cDNA arrays. One region of two arrays (one in **B**, one in **C**) illustrates high correlation between gene expression patterns (R = 0.979).

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Ordering information

Product	Quantity	Cat. No.
Related products		
HistoGene LCM Frozen Section Staining Kit	72 slides	KIT0401
RiboAmp PLUS RNA Amplification Kit	12 samples	KIT0521
RiboAmp HS PLUS RNA Amplification Kit	6 samples	KIT0525
PicoPure DNA Extraction Kit	150 preps	KIT0103
PicoPure RNA Isolation Kit	40 RNA isolations	KIT0204
PicoPure RNA Isolation Kit, Bulk Pack	200 RNA isolations	KIT0214
CapSure Macro LCM Caps	48 caps	LCM0211
CapSure HS LCM Caps	32 caps	LCM0214

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