

4

RNA stabilization and purification

4.1 Human samples www.qiagen.com/PG/RNAhuman

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■ Stabilization and RNA purification — automated, 96-well plate

<input type="checkbox"/> BioRobot MDx Workstation	365
<input type="checkbox"/> BioRobot Universal System	366
<input type="checkbox"/> Blood	PAXgene Blood RNA MDx Kit 121

■ RNA purification — manual, spin column

■ Blood	QIAamp RNA Blood Mini Kit	123
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□ Viral RNA and DNA (copurification)	QIAamp MinElute Virus Spin Kit	22
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■ RNA purification — automated, spin column, up to 12 samples per run

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■ RNA purification — automated, magnetic particles, 1–6 samples in parallel

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■ Manual solutions

□ Automated solutions

□ Automatable solutions



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■ RNA purification — automated, magnetic particles, up to 48 samples per run**Instrument**

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Software

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Kits

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□ Poly A ⁺ mRNA, blood and cells	MagAttract Direct mRNA M48 Kit	133
□ Viral RNA	MagAttract Viral RNA M48 Kit	134
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■ Stabilization and total RNA purification

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■ Manual solutions

□ Automated solutions

□ Automatable solutions

■ RNA purification — manual, spin column

■ Total RNA, small samples	RNeasy Micro Kit	144
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■ <i>miRNA and total RNA, cells and tissues</i>	New <i>miRNeasy Mini Kit</i>	236

■ RNA purification — manual, 8-, 96-, or 384-well format

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□ Poly A ⁺ mRNA, cells	TurboCapture mRNA Kits	157
■ <i>miRNA and total RNA, cells and tissues</i>	New <i>miRNeasy 96 Kit</i>	237

■ RNA purification — automated, spin column, up to 12 samples per run

□ QIAcube		363
□ <i>Total RNA, cells</i>	<i>RNeasy Mini Kit</i>	145

■ RNA purification — automated, 96-well plate

□ <i>BioRobot Universal System</i>		366
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4.3 Plant, fungal, bacterial, and yeast samples

www.qiagen.com/PG/RNAother

■ Stabilization and RNA purification — manual, spin column

■ Bacteria	RNeasy Protect Bacteria Kits	159
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■ RNA purification — manual, spin column

■ Plants and fungi	RNeasy Plant Mini Kit	160
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4.4 Simultaneous purification of RNA and other biomolecules

www.qiagen.com/PG/AllPrep

■ Purification of genomic DNA and total RNA

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■ Cells, tissues, bacteria, and yeast	QIAGEN RNA/DNA Maxi Kit	162

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■ Cells	AllPrep RNA/Protein Kit	163
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4.5 RNA cleanup and concentration www.qiagen.com/PG/RNAcleanup

■ Selection guide

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■ RNA cleanup

■ Manual, spin column	RNeasy Kits	145
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■ RNA cleanup and concentration

■ Manual, spin column	RNeasy MinElute Cleanup Kit	165
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■ Poly A⁺ mRNA cleanup

■ Manual, spin column	Oligotex mRNA Kits	151
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■ Manual solutions

■ Automated solutions

■ Automatable solutions

Total RNA, total nucleic acids, and mRNA purification: kits for human samples

	Manual			Automated systems			
				1–6 samples/run	Up to 48 samples/run	Up to 96 samples/run	Up to 96 samples/run
Total RNA							
Whole blood	■						
Whole blood, with RNA stabilization†		■					
Blood cells				■*	■*	■	■
Bone marrow, with RNA stabilization							
Cultured cells	■			■	■		
Saliva, with RNA stabilization			■				
Easy-to-lyse tissue	■			■	■		
Any type of tissue				■	■		
Total nucleic acids							
Blood cells				■*	■*		
Cultured cells				■	■		
Tissues				■	■		
mRNA							
Whole blood							
Blood cells						■*	
Cultured cells						■	
Tissues							
For in vitro diagnostics							
		■†					
PAXgene Blood RNA Kit (page 117) QIAamp Blood RNA Kit (page 118) PAXgene Bone Marrow RNA System (page 123) RNeasy Protect Saliva Mini Kit (page 120) EZ1 RNA Cell Mini Kit (page 126) EZ1 RNA Tissue Mini Kit (page 126) MagAttract RNA Universal Tissue Kit (page 127) MagAttract RNA Cell Mini Kit (page 128) MagAttract RNA Tissue Mini Kit (page 130) MagAttract RNA Universal Tissue Mini Kit (page 131) MagAttract Direct mRNA M48 Kit (page 132) PAXgene Blood RNA MDX-System (page 133) PAXgene 96 Blood RNA Kit (page 121)							

* Requires additional Buffer EL (cat. no. 79217). † Stabilization in PAXgene Blood RNA Tubes (available from BD; see www.PreAnalytiX.com) ‡ Not available in all countries; please inquire.

Viral RNA purification: kits for human samples

		QIAamp Viral RNA Mini Kit (page 124)			QIAamp MinElute Virus Kits (pages 22-23)			QIAamp UltraSens Virus Kit (page 24)			EZ1 Virus Mini Kit V2.0 (page 38)			QIAamp MinElute Virus Spin Kit (page 22)			MagAttract Viral RNA M48 Kit (page 134)			QIAamp Virus Mini M48 Kit (page 47)			QIAamp Virus BioRobot Kits (page 30)		
		Manual			Automated systems																				
Samples/run		1-24			1-6	1-12	6-48			96															
Viral RNA																									
Plasma and serum		■							■																
CSF									■																
Viral RNA and DNA																									
Cell-free body fluids			■				■															■			
Plasma and serum			■	■	■	■				■											■				
CSF					■						■										■				

For kits for in vitro diagnostics, see the product guide 2007 supplement, available upon request (not available in all countries).

Total RNA purification: automated kits for human samples

	From 1–6 samples* BioRobot EZ1	From 6–48 samples BioRobot M48	Up to 96 samples BioRobot MDx BioRobot Universal System
Whole blood	–	–	PAXgene Blood RNA MDx Kit
Time per run			160–190 min
Sample size			2.5 ml
Cultured cells	EZ1 RNA Cell Mini Kit	MagAttract RNA Cell Mini M48 Kit	–
Time per run	50–60 min	60–240 min	
Sample size	10–10 [†]	10–10 [‡]	
Standard tissues[§]	EZ1 RNA Tissue Mini Kit	MagAttract RNA Tissue Mini M48 Kit	–
Time per run	50–60 min	60–240 min	
Sample size	Up to 10 mg [§]	Up to 10 mg [§]	
Any type of tissue	EZ1 RNA Universal Tissue Kit	MagAttract RNA Universal Tissue M48 Kit	–
Time per run	30–60 min	30–240 min	
Sample size	Up to 50 mg ^{§***}	Up to 50 mg ^{§***}	
Elution volume	50–200 µl	50–200 µl	120 µl

* RNA purification from up to 12 cell samples is possible with the QIAcube (page 363). [†] RNA purification from 2 x 10⁶ white blood cells is also possible. [‡] For example, kidney, liver, and spleen. [§] Dependent on tissue type; for details, contact QIAGEN Technical Services. [¶] Up to 100 mg for fatty tissues. ^{**} RNA purification from 7.5 x 10⁶ cultured cells or 10⁷ white blood cells is also possible.

PAXgene™ Blood RNA Kit

For isolation and purification of intracellular RNA from whole blood stabilized in PAXgene Blood RNA Tubes for in vitro diagnostics

- For in vitro diagnostic applications, including a CE-IVD mark in accordance with EU Directive 98/79/EC
- Works in conjunction with PAXgene Blood RNA Tubes as part of an integrated system intended for the collection, storage, and transport of whole blood and stabilization of intracellular RNA in a closed tube, and subsequent isolation and purification of RNA
- RNA stabilization in PAXgene Blood RNA Tubes for up to 3 days at 18–25°C
- Standardized sample processing prior to analysis

Product description

The PAXgene Blood RNA system consists of PAXgene Blood RNA Tubes (available from BD, cat. no. 762165; see www.PreAnalytiX.com) for blood collection and stabilization, and the PAXgene Blood RNA Kit, for silica-membrane-based RNA isolation and purification in a spin-column format.

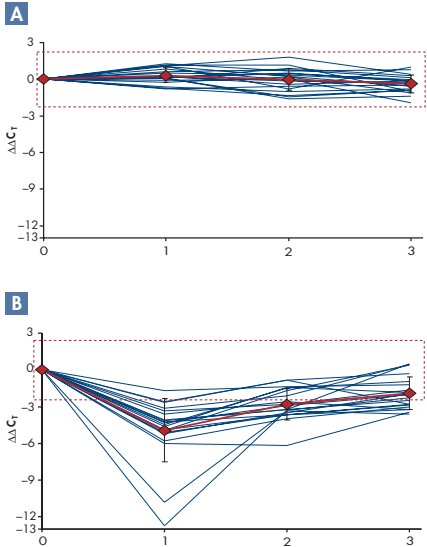
The CE-IVD-marked tubes and kit provide exact performance specifications, assuring highly reliable RNA purification.

Applications

When the kit is used in conjunction with PAXgene Blood RNA Tubes, the system provides intracellular RNA from whole blood for RT-PCR used in molecular diagnostic testing.



RNA Stability in Blood Samples at 18–25°C



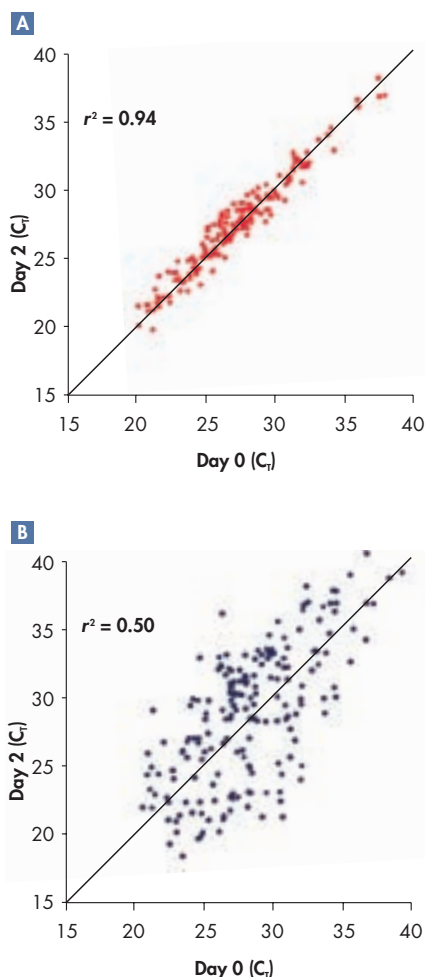
Blood was drawn from 10 donors, with duplicate samples and stored at 18–25°C for the indicated number of days, followed by total RNA purification. **A** Blood was collected and stored in PAXgene Blood RNA Tubes, and total RNA was purified using the PAXgene Blood RNA Kit. **B** Blood was collected and stored in standard blood collection tubes with EDTA as an anticoagulant, and total RNA was purified using a standard organic-extraction method with silica-membrane-based RNA cleanup. Relative transcript levels of *c-fos* were determined by real-time, duplex RT-PCR, using 18S rRNA as an internal standard. The values for all samples are plotted, with means and standard deviations of all samples shown. The dashed lines indicate the $\pm 3\sigma$ total precision of the assay (2.34 C_t).

Product	Contents	Cat. no.
PAXgene Blood RNA Kit (50)*	50 PAXgene RNA and Shredder Spin Columns, Processing Tubes, RNase-Free DNase, Reagents, and Buffers; to be used in conjunction with PAXgene Blood RNA Tubes	762174

* Not available in all countries; please inquire.

For further information: www.qiagen.com/PG/RNAIVD

RNA Stability in Bone Marrow Samples at Room Temperature



Bone marrow samples were collected from 39 individuals and immediately transferred to **A** PAXgene Bone Marrow RNA Tubes or **B** EDTA tubes. RNA was purified using the PAXgene Bone Marrow RNA Kit or a reference silica-membrane-based method at day 0 or after 2 days storage at room temperature. Expression levels of 5 marker transcripts per sample (IL-8, p53, cox-2, IL-1 β , c-fos) were quantified using real-time RT-PCR. The high correlation of C_t values for the samples stabilized in PAXgene Bone Marrow RNA Tubes indicates that the levels of these transcripts did not significantly change during storage, in contrast to the samples stored in EDTA tubes.

New PAXgene Bone Marrow RNA System

For storage and transport of bone marrow samples and stabilization and purification of intracellular RNA

- Integrated system — for storage, stabilization, and purification of intracellular RNA from bone marrow
- Immediate stabilization of intracellular RNA at collection point — providing in vivo snapshots of gene expression profiles
- Rapid purification of high-quality intracellular RNA from heterogeneous bone marrow samples — including cell-rich, viscous samples
- Safe and easy transportation — no need for dry ice or liquid nitrogen

Product description

The PAXgene Bone Marrow RNA System consists of PAXgene Bone Marrow RNA Tubes, for stabilization, storage, and transportation of bone marrow, and the PAXgene Bone Marrow RNA Kit, for silica-membrane-based RNA isolation and purification in a spin-column format. Bone marrow samples are collected using standard medical practices, with commonly used anticoagulants. A 2 ml sample is immediately transferred into a PAXgene Bone Marrow RNA Tube, which stabilizes the RNA in the sample for storage at room temperature, refrigerated, or frozen. RNA can be purified days later using the PAXgene Bone Marrow RNA Kit.

Applications

Purified RNA is ready for use in a wide range of downstream applications, including

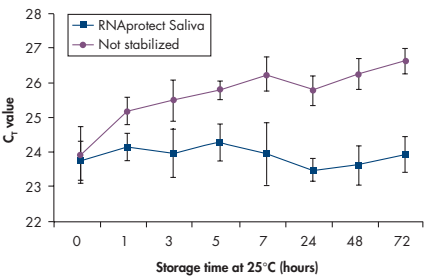
- Real-time RT-PCR analysis of specific transcripts
- Array analysis of complex expression profiles

For Research Use Only. Not for use in diagnostics procedures. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
PAXgene Bone Marrow RNA Tube (50)	50 PAXgene Bone Marrow RNA Tubes; to be used in conjunction with the PAXgene Bone Marrow RNA Kit	764114
PAXgene Bone Marrow RNA Kit (30)	For 30 RNA preps: 30 PAXgene RNA Spin Columns, 30 PAXgene Shredder Spin Columns, Processing Tubes, RNase-Free DNase, RNase-Free Reagents and Buffers; to be used in conjunction with PAXgene Bone Marrow RNA Tubes	764133

For further information: www.qiagen.com/PG/RNAhuman

Effective Stabilization of β -actin Transcript



RNAprotect Saliva Reagent stabilized β -actin mRNA levels in saliva for up to 3 days at 25°C. mRNA levels were quantified by real-time RT-PCR using the QuantiTect® Probe RT-PCR Kit. Each time point shows the mean C_T value from 4 or 6 samples from a saliva pool from 3 donors.

New RNeasy® Protect Saliva Mini Kit

For immediate stabilization of the gene expression profile in human saliva and subsequent RNA purification

- Immediate RNA stabilization in saliva samples at room temperature
- Storage and shipping of saliva samples at 37°C (1 day), 15–25°C (14 days), or 2–8°C (4 weeks)
- Archiving of saliva samples at –20°C or –80°C
- Purification of high-quality RNA in minutes

Product description

The RNeasy Protect Saliva Mini Kit includes RNAprotect® Saliva Reagent for stabilizing RNA in saliva samples, and specialized RNeasy MinElute® spin columns for purifying and concentrating RNA. RNA from a 200 μ l saliva sample is eluted in a volume of just 14 μ l.

Applications

Gene expression analysis of saliva represents a potential, noninvasive alternative to analysis of blood. The kit allows research in the identification of possible RNA biomarkers for oral and systemic diseases. The purified RNA is suitable for applications such as real-time RT-PCR and microarray analysis.

The RNeasy Protect Saliva Mini Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
RNeasy Protect Saliva Mini Kit (50)	RNAprotect Saliva Reagent (50 ml) and RNeasy Micro Kit (50)	74324

For further information: www.qiagen.com/PG/RNAhuman

Automated

PAXgene Blood RNA MDx Kit

For fully automated, high-throughput purification of intracellular RNA from blood stabilized in PAXgene Blood RNA Tubes

- Instant stabilization of RNA at collection — integrated system for use with PAXgene Blood RNA Tubes
- Optimized purification of high-quality RNA — standardized processing of 48 or 96 samples in parallel
- Fully automated RNA purification procedure — on the BioRobot® MDx (page 365) or BioRobot Universal System (page 366)

Product description

The PAXgene Blood RNA MDx Kit is for fully automated, high-throughput purification of cellular RNA on the BioRobot MDx or BioRobot Universal System. (The PAXgene 96 Blood RNA Kit provides the same 96-well technology in a manual format.) Used with PAXgene Blood RNA Tubes (available from BD, cat. no. 762165; see www.PreAnalytiX.com) for sample collection and stabilization, the system provides a complete preanalytical solution for collection and stabilization through to purification of high-quality RNA to support high-throughput projects, such as clinical trials or other large research studies.

Applications

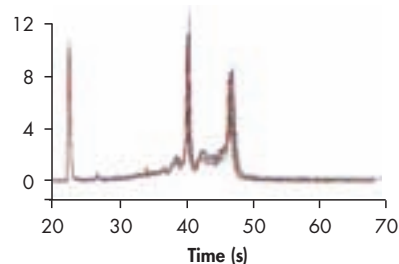
The purified RNA is ready for use in a wide range of downstream applications, including:

- High-throughput, quantitative, real-time RT-PCR
- Expression-array and expression-chip analysis
- cDNA synthesis
- RNase and S1 nuclease protection
- Northern, dot, and slot blot analysis
- Primer extension

The PAXgene Blood RNA MDx Kit and the PAXgene 96 Blood RNA Kit are intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

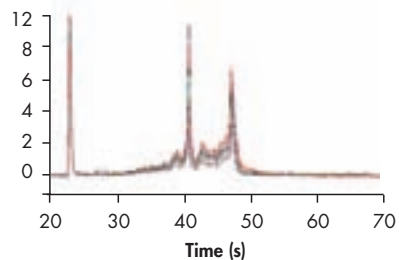
High-Quality RNA from a Donor

A



Sample	1	2	3	4	5	6	7	8	9	10	11	12
RIN	8	8.2	8.1	7.9	8	8.2	8	7.8	7.4	7.8	7.4	7.8

B



Sample	1	2	3	4	5	6	7	8	9	10	11	12
RIN	8.2	7.4	8	8.4	8.2	8	8.1	8.1	8	7.9	7.9	8.2

Blood was collected into PAXgene Blood RNA Tubes in 24 replicates from a single donor. RNA was purified using the PAXgene Blood RNA MDx Kit on the BioRobot Universal System. RNA was analyzed with an Agilent® 2100 bioanalyzer.

A Overlay of 12 samples on chip A. **B** Overlay of 12 samples on chip B. The RNA integrity numbers (RIN), indicated in the tables below the graphs, show the high quality of the purified RNA.

Product	Contents	Cat. no.
PAXgene Blood RNA MDx Kit (4)	For 4 x 96 RNA preps on the BioRobot MDx workstation or the BioRobot Universal System: 4 PAXgene 96 RNA Plates, 4 PAXgene 96 Filter Plates, Buffers (wash buffers are labeled with bar codes), Proteinase K, RNase-Free DNase Set, Plasticware, Collection Vessels. To be used with PAXgene Blood RNA Tubes.	762431
PAXgene 96 Blood RNA Kit (4)*	4 PAXgene 96 RNA Plates, 4 PAXgene 96 Filter Plates, Buffers, Proteinase K, RNase-free DNase Sets, AirPore Tape Sheets, Collection Vessels. To be used in conjunction with PAXgene Blood RNA Tubes.	762331
PAXgene 96 Incubator Block	Block for denaturation of eluates in PAXgene 96 procedures	9238279
Shaker Adapter, 24-tube, PAXgene	Adapter for PAXgene Blood RNA Tubes on the shaker unit of the BioRobot Universal System	9016753

* Requires use of the QIAGEN 96-Well-Plate Centrifugation system (page 396) and the QIAvac 96 vacuum manifold (page 394).

For further information: www.qiagen.com/PG/RNAhuman

QIAamp® RNA Blood Mini Kit

For isolation of cellular RNA from fresh whole blood

- Rapid isolation of high-quality, ready-to-use RNA
- No organic extraction or alcohol precipitation
- Consistent, high yields
- Complete removal of contaminants and inhibitors for reliable downstream applications

Product description

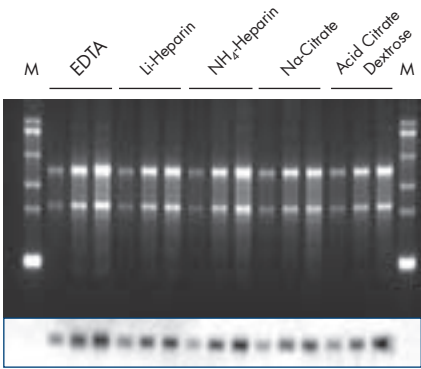
The QIAamp RNA Blood Mini Kit provides silica-membrane-based purification of cellular RNA from up to 1.5 ml of fresh, whole human blood stabilized with any common anticoagulant, such as citrate, heparin, or EDTA. After homogenization using the QIAshredder spin column, a fast spin-column procedure simplifies RNA purification.

Applications

The QIAamp procedure completely removes RNases, contaminants, and enzyme inhibitors, yielding high-quality RNA suitable for any downstream application.

The QIAamp RNA Blood Mini Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

High-Quality RNA for Northern Analysis

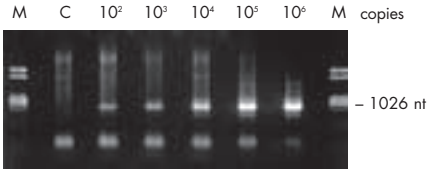


Formaldehyde agarose gel and corresponding northern blot (GAPDH-probed) of total RNA isolated with the QIAamp RNA Blood Mini Kit from 0.5, 1.0, and 1.5 ml (left to right) of human whole blood from a healthy individual (with indicated anticoagulants). 40 µl of a 60 µl eluate were loaded per lane. M: 0.24–9.5 kb RNA ladder.

Product	Contents	Cat. no.
QIAamp RNA Blood Mini Kit (50)	For 50 RNA preps: 50 QIAamp Mini Spin Columns, 50 QIAshredder Spin Columns, Collection Tubes (1.5 ml and 2 ml), RNase-Free Reagents and Buffers	52304

For further information: www.qiagen.com/PG/RNAhuman

Amplification of RNA from Plasma



RT-PCR products of a 1026 nt RNA fragment purified from plasma. Serial tenfold dilutions (as indicated) were added to plasma and purified using the QIAamp Viral RNA Mini Kit. **M**: markers; **C**: negative control.

QIAamp Viral RNA Mini Kit

For isolation of viral RNA from cell-free body fluids

- Rapid isolation of high-quality, ready-to-use RNA
- No organic extraction or alcohol precipitation
- Consistent, high yields
- Complete removal of contaminants and inhibitors for reliable downstream applications

Product description

The QIAamp Viral RNA Mini Kit simplifies purification of viral RNA from cell-free body fluids with fast spin-column or vacuum procedures. Viral RNA binds specifically to the QIAamp silica-gel membrane, and pure viral RNA is eluted in either water or a buffer provided with the kit.

Applications

The high-quality of viral RNA recovered using the QIAamp Viral RNA Mini Kit ensures it performs well in a wide range of downstream applications, including:

- Viral genotyping
- Viral epidemiology
- Infectious disease research

The QIAamp Viral RNA Mini Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
QIAamp Viral RNA Mini Kit (50)*	For 50 RNA preps: 50 QIAamp Mini Spin Columns, Carrier RNA, Collection Tubes (2 ml), RNase-Free Buffers	52904
QIAamp Viral RNA Mini Kit (250)*	For 250 RNA preps: 250 QIAamp Mini Spin Columns, Carrier RNA, Collection Tubes (2 ml), RNase-Free Buffers	52906

* QIAamp Mini spin columns can be used either in a microcentrifuge or on vacuum manifolds (QIAvac 24 Plus with VacConnectors and VacValves, or QIAvac 6S with VacConnectors and QIAvac Luer Adapters, page 394).

For further information: www.qiagen.com/PG/RNAhuman

Automated**EZ1 RNA Card**

For easy setup of RNA purification protocols using the BioRobot EZ1 workstation (page 362) and EZ1 RNA Kits (pages 126–128)

- Easy protocol setup — with credit-card ease of use
- Standardized processing — preset protocols ensure low variability and error-free setup
- Increased processing capacity — with protocols for cell and tissue samples



EZ1 RNA Card.

Product description

The EZ1 RNA Card is a preprogrammed card containing protocols for purification of total RNA or total nucleic acids from cells and standard animal and human tissues, and purification of total RNA from any type of human or animal tissue using EZ1 RNA Kits. These protocols provide both on-screen instructions for the operator and operating commands for the BioRobot EZ1 workstation.

Applications

The high-quality RNA obtained using the EZ1 RNA Cell Mini Kit, the EZ1 RNA Tissue Mini Kit, or the EZ1 RNA Universal Tissue Kit, and the EZ1 RNA Card is suited for use in many applications such as:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology and pathology research

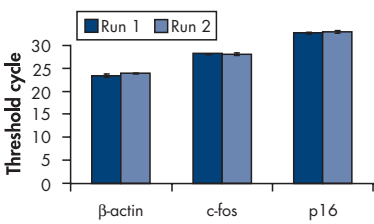
The EZ1 RNA Card is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
EZ1 RNA Card	Preprogrammed card for BioRobot EZ1 RNA purification protocols	9015590

For further information: www.qiagen.com/PG/RNAhuman

Automated

Highly Reproducible Real-Time RT-PCR Analysis



Analysis of 3 amplicons by quantitative real-time RT-PCR using the QuantiTect Probe RT-PCR Kit (page 202). RNA was purified during two consecutive runs of 6 replicates of 1×10^6 HeLa cell samples using the BioRobot EZ1 and the EZ1 RNA Cell Mini Kit. Each bar represents the mean threshold cycle of 6 samples.

EZ1 RNA Cell Mini Kit

For automated purification of high-quality total RNA from up to 2×10^6 cells using the BioRobot EZ1 workstation (page 362)

- Rapid purification — of up to 15 μ g total RNA from a range of cultured cell types
- Rapid purification of total nucleic acids — from 10 to 10^6 cultured cells or 10 to 2×10^6 white blood cells
- RNase-free setup for reliable results — using prefilled and sealed reagent cartridges
- Flexible purification — of 1–6 samples per run
- Credit card ease of use — for protocol and worktable setup

Product description

The EZ1 RNA Cell Mini Kit contains all required reagents and labware for automated purification of total RNA from up to 2×10^6 cells using magnetic-particle technology. Reagents are supplied in prefilled reagent cartridges, which ensures speed and convenience in loading the BioRobot EZ1 workstation.

Applications

The high-quality RNA obtained using the EZ1 RNA Cell Mini Kit and the EZ1 RNA Card is suited for use in many applications, such as:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology and pathology research

The EZ1 RNA Cell Mini Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
EZ1 RNA Cell Mini Kit (48)	For 48 RNA preps: Reagent Cartridges, Disposable Tips, Disposable Tip-Holders, Sample Tubes, Elution Tubes, Buffers, RNase-Free DNase Set	958034

For further information: www.qiagen.com/PG/RNAhuman

Automated

EZ1 RNA Tissue Mini Kit

For automated purification of high-quality total RNA from standard tissue samples up to 10 mg using the BioRobot EZ1 workstation (page 362)

- Rapid purification — of up to 30 µg total RNA from a range of tissue sample types
- Flexible purification — of 1–6 samples per run
- Credit-card ease of use — for protocol and worktable setup

Product description

The EZ1 RNA Tissue Mini Kit contains all required reagents and labware for automated purification of total RNA from up to 10 mg standard tissue samples using magnetic-particle technology. Reagents are supplied in prefilled EZ1 Reagent Cartridges, which ensures speed and convenience in loading the BioRobot EZ1 workstation.

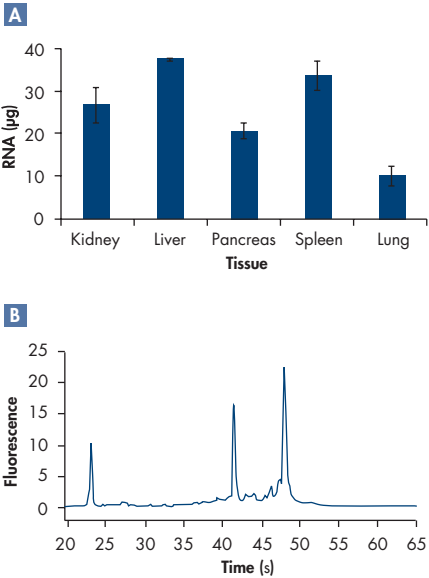
Applications

The high-quality RNA obtained using the EZ1 RNA Tissue Mini Kit and the EZ1 RNA Card is suited for use in many applications, such as:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology and pathology research

The EZ1 RNA Tissue Mini Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Efficient Purification and Reproducible Yields



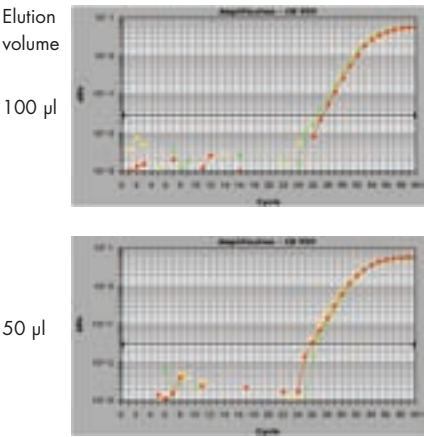
A Total RNA was purified from 10 mg samples of rat kidney and liver and from 5 mg samples of rat pancreas, spleen, and lung. RNA was purified from 3 replicate samples of each tissue type. Yields of total RNA were determined by absorbance (A_{260}) with correction for background (A_{320}). CV Kidney = 15%, CV Liver = 1%, CV Pancreas = 8%, CV Spleen = 10%, CV Lung = 22%. **B** Total RNA purified from spleen was analyzed using the Agilent 2100 bioanalyzer.

Product	Contents	Cat. no.
EZ1 RNA Tissue Mini Kit (48)	For 48 RNA preps: Reagent Cartridges, Disposable Tips, Disposable Tip-Holders, Sample Tubes, Elution Tubes, Buffers, RNase-Free DNase Set	959034

For further information: www.qiagen.com/PG/RNAhuman

Automated

Scalable Elution Volumes for Sensitive Applications



Total RNA was purified from 10 mg rat adipose tissue using the EZ1 RNA Universal Tissue procedure, in triplicate with the indicate elution volumes. Equal amounts of eluate (5 µl) were used in real-time RT-PCR analysis of the Hspa1a transcript, using the QuantiTect Probe RT-PCR Kit (page 202) and an ABI PRISM® 7700 Sequence Detection System. C_t values for the 50 µl and 100 µl elution volumes were 26.00 and 26.84, and CVs were 1.9% and 1.4%, respectively.

EZ1 RNA Universal Tissue Kit

For automated RNA purification from 1–6 samples of any type of human or animal tissue using the BioRobot EZ1 (page 362)

- High yields of total RNA — from all types of animal or human tissue, or cultured cells
- Scalable elution volumes — elute in 200 µl, 100 µl, or concentrated in only 50 µl for microarray analysis
- Efficient lysis and purification for all types of tissue — integrated QIAzol lysis and automated EZ1 purification
- Pure, high-performance RNA for all downstream applications — such as real-time RT-PCR and array analysis

Product description

The EZ1 RNA Universal Tissue Kit contains all required reagents and labware for automated purification of total RNA from all types of human or animal tissue samples (up to 50 mg of most tissues) using magnetic-particle technology. Reagents are supplied in prefilled reagent cartridges, which ensures speed and convenience in loading the BioRobot EZ1 workstation.

Applications

Purified RNA is suited for use in applications such as:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology and pathology research

The EZ1 RNA Universal Tissue Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
EZ1 RNA Universal Tissue Kit (48)	For 48 RNA preps: 48 Reagent Cartridges (Universal Tissue RNA), 100 Disposable Tip Holders, 100 Disposable Filter-Tips, 50 Sample Tubes (2 ml), 50 Elution Tubes (1.5 ml), QIAzol Lysis Reagent, Buffer RLT	956034

For further information: www.qiagen.com/PG/RNAhuman

Automated

App. Package, M48, Gene Expression

For easy setup of RNA purification protocols using the BioRobot M48 workstation (page 364) and MagAttract RNA M48 Kits (pages 130–133)

- Easy protocol setup — all RNA and mRNA purification protocols on one CD-ROM
- Standardized processing — preset protocols ensure low variability and error-free setup
- Increased processing capacity — with protocols for cell or tissue samples, total RNA, mRNA, or total nucleic acid purification, and RNA cleanup

Product description

The App. Package, M48, Gene Expression is a CD-ROM containing protocols for purification of total RNA or mRNA from cells and tissues, and for RNA cleanup. These protocols provide operating commands for the workstation and allow easy setup through comprehensive, on-screen instructions.

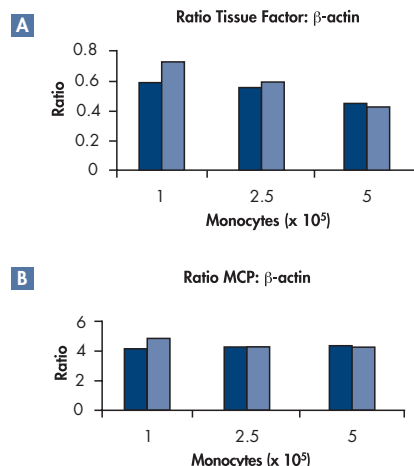
Applications

The high-quality RNA obtained using MagAttract RNA M48 Kits and the App. Package, M48, Gene Expression is suited for use in many applications such as:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology research

The App. Package, M48, Gene Expression is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Consistent Analysis of Relative Gene Expression with Different Cell Inputs



Ratios of mRNA copy numbers relative to β -actin mRNA in increasing numbers of LPS-stimulated human monocytes. **A** Tissue Factor: β -actin.

B MCP-1: β -actin.

Total RNA Purification Protocols on the App. Package, M48, Gene Expression

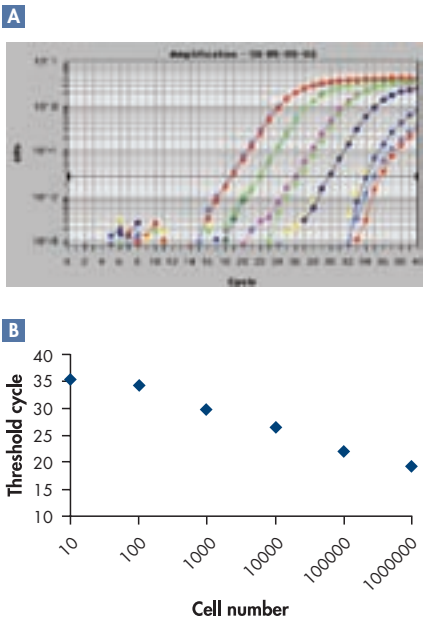
Sample type	Sample volume (μ l)	Kit
Cells	400 ($>1 \times 10^6$ cells)	RNA Cell
Soft tissue	400 (1–10 mg)	RNA Tissue
Any tissue	50 mg tissue or 1×10^7 cultured cells	RNA Universal Tissue
Cultured Cells or blood cells (mRNA purification)	150–370 (pellet from 1 ml cells)	Direct mRNA
Cultured Cells or blood cells (mRNA purification)	740 (pellet from 2 ml cells)	Direct mRNA

Product	Contents	Cat. no.
App. Package, M48, Gene Expression	Software protocol package for gene expression applications on the BioRobot M48 workstation	9016149

For further information: www.qiagen.com/PG/RNAhuman

Automated

Linear C_T Values over a Large Dynamic Range



Tenfold dilution series were performed on lysates of 10⁶ HeLa cells to produce 400 µl aliquots equivalent to 10¹–10⁶ cells. RNA was purified from dilutions of the lysate using the BioRobot M48 workstation and the MagAttract RNA Cell Mini M48 Kit. Purified RNA was eluted in 200 µl elution buffer and duplicate aliquots of 5 µl were used in two 25 µl real-time RT-PCRs of human c-myc mRNA using the QuantiTect Probe RT-PCR Kit (page 202).

A ABI PRISM 7700 real-time amplification plots.

B Plot of C_T values and cell number equivalents.

MagAttract RNA Cell Mini M48 Kit

For automated purification of total RNA from cultured cell samples using the BioRobot M48 workstation (page 364)

- Automated purification of total RNA — from 10 to 10⁶ cultured cells or 10 to 2 x 10⁶ white blood cells
- Automated total nucleic acid preps — from 10 to 10⁶ cultured cells or 10 to 2 x 10⁶ white blood cells
- Purification of up to 15 µg total RNA or 25 µg DNA and RNA — optimized for gene expression assays
- Easy optimization of RNA concentration — through variable elution volumes

Product description

Automated total RNA purification is carried out using proven MagAttract magnetic-particle technology. RNA purification and magnetic separation take place in the pipet tips, increasing the efficiency of the procedure. Up to 48 samples can be processed per run in increments of 6 samples.

Applications

Purified total RNA is suited for a wide range of sensitive downstream applications including:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology and pathology research

The MagAttract RNA Cell Mini M48 Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
MagAttract RNA Cell Mini M48 Kit (192)	For 192 RNA preps: MagAttract Suspension E, Buffers, RNase-Free DNase Sets	958236

For further information: www.qiagen.com/PG/RNAhuman

Automated

MagAttract RNA Tissue Mini M48 Kit

For automated purification of total RNA from standard human tissue samples using the BioRobot M48 workstation (page 364)

- Flexible sample throughput — from 6 to 48 samples per run
- Variable sample input and elution volumes — RNA yield and concentration optimized for each downstream application
- High-quality RNA — using proven MagAttract magnetic particle technology

Product description

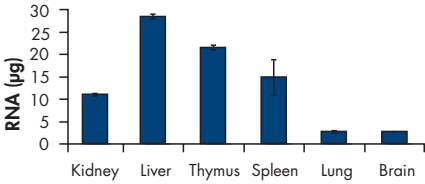
The MagAttract RNA Tissue Mini M48 Kit provides automated purification of total RNA on the BioRobot M48 workstation using proven MagAttract magnetic-particle technology. RNA purification and magnetic separation take place in the pipet tips, increasing the efficiency of the procedure. Up to 48 samples of 1–10 mg tissue can be processed per run in increments of 6 samples.

Applications

Purified total RNA is suited for gene expression analysis applications such as real-time RT-PCR on any real-time cycler, microarray target preparation, northern blotting, melting curve analysis, and more.

The MagAttract RNA Tissue Mini M48 Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Purification of RNA from Various Tissues



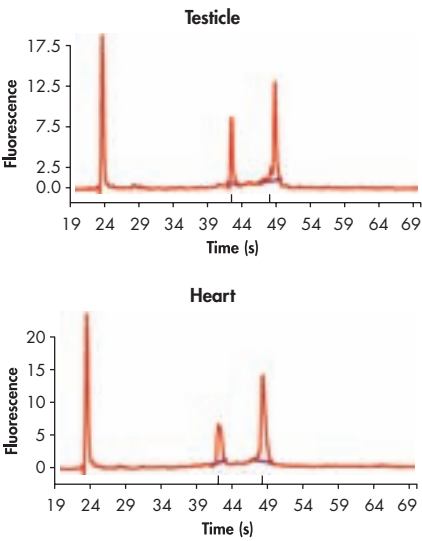
RNA was purified from duplicate samples of kidney (10 mg), liver (10 mg), thymus (10 mg), spleen (5 mg), lung (10 mg), and brain (10 mg) using the BioRobot M48 workstation and the MagAttract RNA Tissue Mini M48 Kit.

Product	Contents	Cat. no.
MagAttract RNA Tissue Mini M48 Kit (192)	For 192 RNA preps: MagAttract Suspension E, Buffers, RNase-Free DNase Sets	959236

For further information: www.qiagen.com/PG/RNAhuman

Automated

High-Quality RNA from Fatty and Fiber-Rich Tissues



Total RNA was purified from 10 mg each of the indicated RNA_{later}® stabilized rat tissues (pages 139, 140). RNA purification was performed using the MagAttract RNA Universal Tissue M48 Kit on the BioRobot M48 workstation, and purified RNA was analyzed with an Agilent 2100 bioanalyzer.

MagAttract RNA Universal Tissue M48 Kit

For automated purification of total RNA from any type of human or animal tissue sample using the BioRobot M48 workstation (page 364)

- High yields of total RNA — from all types of animal or human tissue, or cultured cells
- Flexible sample throughput — from 6 to 48 samples per run
- Variable sample input and elution volumes — RNA yield and concentrations optimized for each downstream application
- Pure, high-performance RNA for all downstream applications — such as real-time RT-PCR and array analysis

Product description

Automated total RNA purification is carried out using proven MagAttract magnetic-particle technology. RNA purification and magnetic separation take place in the pipet tips, increasing the efficiency of the procedure. Up to 48 samples can be processed per run in increments of 6 samples.

Applications

The combination of QIAzol and MagAttract technologies results in highly pure RNA without phenol carryover. Purified total RNA is suited for a wide range of sensitive downstream applications, including:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology and pathology research

The MagAttract RNA Universal Tissue M48 Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
MagAttract RNA Universal Tissue M48 Kit (192)	For 192 RNA preps: MagAttract Suspension E, Buffers, QIAzol Lysis Reagent	956336

For further information: www.qiagen.com/PG/RNAhuman

Automated**MagAttract Direct mRNA M48 Kit**

For automated purification of mRNA from up to 10^6 cultured cells or white blood cells using the BioRobot M48 workstation (page 364)

- Automated purification — of high-quality mRNA, ready-to-use in gene expression assays
- Flexible purification — of 6–48 samples per run
- Easy optimization of mRNA concentration — using variable elution volumes

Product description

The MagAttract Direct mRNA M48 Kit provides automated purification of mRNA on the BioRobot M48 workstation using proven MagAttract magnetic-particle technology. mRNA purification and magnetic separation take place in the pipet tips, increasing the efficiency of the procedure. Up to 48 samples can be processed per run in increments of 6 samples.

Applications

The high-quality mRNA obtained using the MagAttract Direct mRNA M48 Kit and the App. Package, M48, Gene Expression is suited for use in many downstream applications such as:

- Gene expression analysis using real-time RT-PCR technologies
- Gene expression analysis using microarray technologies
- Oncology and pathology research

The MagAttract Direct mRNA M48 Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
MagAttract Direct mRNA M48 Kit (192)	For 192 direct mRNA preps: MagAttract Suspension C, Buffers	957336

For further information: www.qiagen.com/PG/RNAhuman

Automated

MagAttract Viral RNA M48 Kit

For automated purification of viral RNA from up to 300 µl serum or plasma samples using the BioRobot M48 workstation (page 364)

- Rapid purification — of high-quality viral RNA
- Flexible purification — of 6–48 samples per run
- Easy optimization of RNA concentration — using 50, 65, 80, or 100 µl elution volumes

Product description

The MagAttract Viral RNA M48 Kit provides automated purification of viral RNA on the BioRobot M48 workstation using proven MagAttract magnetic-particle technology. Viral RNA purification and magnetic separation take place in the pipet tips, increasing the efficiency of the procedure. Up to 48 samples can be processed per run in increments of 6 samples.

Applications

The high-quality RNA obtained using the MagAttract Viral RNA M48 Kit and the BioRobot M48 workstation is suited for use in many downstream applications such as:

- Viral epidemiology and genotyping
- Infectious disease research

The MagAttract Viral RNA M48 Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
MagAttract Viral RNA M48 Kit (96)	For 96 viral RNA preps: MagAttract Suspension F, Buffers	955235

For further information: www.qiagen.com/PG/RNAhuman

Stabilization and total RNA purification: kits for animal and human samples and for bacteria samples*

	RNAlater TissueProtect Tubes (page 139)	RNAlater RNA Stabilization Reagent (page 140)	RNAprotect Cell Reagent (page 143)	RNAprotect Bacteria Reagent (page 159)	RNeasy Protect Kits (page 141)	RNeasy Protect Cell Mini Kit (page 143)	RNeasy Protect Bacteria Kits (page 159)
Sample collection and stabilization							
Tissues	■						
Stabilization							
Tissues		■					
Cells			■				
Bacteria				■			
Stabilization and total RNA purification							
Tissues					■		
Cells						■	
Bacteria							■

* For stabilization and total RNA purification from human blood, bone marrow, and saliva, see the selection guide on page 115.

Total RNA, mRNA, and miRNA purification: kits for animal and human samples and for other samples

	Spin column												High-throughput	
	Manual												Automatable [†]	
	RNeasy Micro Kit* (page 144)	RNeasy Plus Mini Kit† (page 145)	RNeasy Fibrous Tissue Kit† (page 147)	RNeasy Lipid Tissue Kit* (page 148)	RNeasy FFPE Kit† (page 149)	Oligotex Plant Mini Kit (page 150)	Alloprep DNA/RNA Mini Kit (page 160)	mirNeasy RNA/Protein Kit* (page 161)	RNeasy Mini Kit† (page 163)	RNeasy 96 Universal Tissue Kits* (page 153)	TurboCapture mRNA Kits (page 157)	mirNeasy 96 Kit* (page 237)		
Total RNA purification	■													
Small cell and tissue samples (e.g., LMD)														
Easy-to-lyse tissues (e.g., kidney)		■							■					
Fiber-rich tissues (e.g., muscle)		■	■						■					
Fatty tissues (e.g., brain)		■	■	■					■					
FFPE tissue sections					■									
Cells	■													
Yeast	■													
Plants and fungi						■								
mRNA purification														
Cells					■							■		
Tissues					■									
Total RNA and gDNA purification														
Cells and easy-to-lyse tissues					■									
Total RNA and native protein purification														
Cells														
miRNA and total RNA purification														
Cells and tissues													■	

■ : Recommended kit. □ : Compatible kit.

* Compatible with RNAlater and RNAlater products for sample stabilization (see pages 139–140, 143, and 159).

† Includes gDNA Eliminator spin columns.

‡ EZ1 RNA Kits and MagAttract RNA M48 Kits are also available, providing automated RNA purification from 1–6 samples and 6–48 samples, respectively (see selection guide, page 115).

Total RNA purification: manual kits for different tissue types*

Total RNA purification:
manual kits for different tissue types*

Tissue/organ		Compatible with RNAlater RNA Stabilization Reagent (page 140)					
		RNeasy Protect Kits [†] (page 141)		RNeasy Kits and RNeasy Plus Mini Kit (pages 145–147)		RNeasy Lipid Tissue Kits (see page 149)	
		RNeasy Fibrous Tissue Kits (page 148)		RNeasy Micro Kit (page 144)		RNeasy FFPE Kit (page 150)	
Adipose tissue	No [‡]			■			
Aorta	✓	□	□	■	■		
Bone [§]	N.d.	□	□	■	□		
Brain	✓	□	□	■	□		
Breast tissue	N.d.			■			
Cartilage	N.d.			■	□		
Eye tissue	✓	■	■	■	□		
Glandular tissue	N.d.			■			
Heart	✓	□	□	■	■		
Intestine	✓	■	■	■	□		
Kidney	✓	■	■	■	□		
Liver	✓	■	■	■	□		
Lung	✓	■	■	■	□		
Lymph node tissue**	N.d.			■			
Muscle	✓			■	■		
Neural tissue	N.d.			■	□		
Pancreas [¶]	✓	■	■	■			
Skin – pig/human	✓			■	□		
Skin – rat/mouse	✓			■	■		
Spleen**	✓	■	■	■	□		
Stomach	N.d.	■	■	■	□		
Testicular tissue	✓	■	■	■	□		
Thymus**	✓	■	■	■	□		
Tongue	✓			■	■		
Uterus	✓	■	■	■	□		
Small tissue samples (e.g., FACS and LMD)	✓					■	
FFPE tissue sections	No						■

■: Recommended kit. □: Compatible kit. N.d.: Not determined

* These kits are in spin-column format. A universal tissue kit in 96-well format (page 155) is also available.

[†]RNAlater RNA Stabilization Reagent (page 140) is included with RNeasy Protect Kits. [‡]Adipose tissue can be stabilized in liquid nitrogen. [§]Bone must be thoroughly homogenized using the TissueLyser (page 392) or a mortar and pestle.

[¶]Pancreas should be immediately stabilized after harvesting to prevent rapid RNA degradation caused by the high concentration of RNases in the tissue. **DNase treatment is recommended.

Total RNA purification: manual kits for different sizes of animal and human cells and tissues*

	Micro	Mini	Midi	Maxi
	RNeasy Micro Kit	RNeasy Mini Kit RNeasy Plus Mini Kit RNeasy Protect Mini Kit RNeasy Protect Cell Mini Kit RNeasy Fibrous Tissue Mini Kit RNeasy Lipid Tissue Mini Kit	RNeasy Midi Kit RNeasy Protect Midi Kit RNeasy Fibrous Tissue Midi Kit RNeasy Lipid Tissue Midi Kit	RNeasy Maxi Kit RNeasy Protect Maxi Kit
	up to 45 µg RNA	up to 100 µg RNA	up to 1 mg RNA	up to 6 mg RNA
Cells	1 – 5 x 10 ⁵	10 – 1 x 10 ⁷	5 x 10 ⁶ – 1 x 10 ⁸	5 x 10 ⁷ – 5 x 10 ⁸
Tissues	1 cell – 5 mg	0.5 mg – 30 mg [†]	20 mg – 250 mg [†]	150 mg – 1 g
Elution volume	10 µl – 14 µl	30 µl – 100 µl	300 µl – 500 µl	800 µl – 2400 µl

* These kits are in spin-column format. Kits in 96-well format (pages 153 and 155) are also available.

[†] Up to 100 mg or 500 mg fatty tissues using the RNeasy Lipid Tissue Mini or Midi Kit, respectively.

Total RNA purification: automated kits for animal and human cells and tissues*

	Up to 12 samples	Up to 2 x 96 samples
	QIAcube [†]	BioRobot Universal System BioRobot 8000
Cultured cells [‡]	RNeasy Mini Kit	RNeasy 96 BioRobot 8000 Kit
All tissue types	–	RNeasy 96 Universal Tissue 8000 Kit

* EZ1 RNA Kits and MagAttract RNA M48 Kits are also available, providing automated RNA purification from 1–6 samples and 6–48 samples, respectively (see selection guide, page 116). [†] Protocols for the QIAcube are continually being developed. To find out which protocols are currently available, visit www.qiagen.com/PG/MyQIAcube. [‡] TurboCapture mRNA Kits are also available, providing high-speed, automatable mRNA purification from cells in 8-, 96-, and 384-well formats (see page 157).

RNA^{later} TissueProtect Tubes

For collecting harvested tissues and immediate stabilization of the gene expression profile, and subsequent transport and storage

- Immediate RNA stabilization and protection ensure reliable gene expression and gene-profiling data
- Convenient and safe handling at room temperature
- Archiving of tissue samples without risk of RNA degradation
- Sample collection and storage in convenient, easy-to-handle, reclosable tubes

Product description

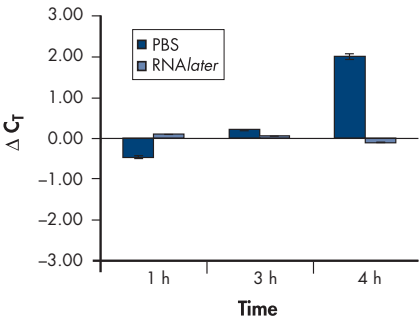
RNA^{later} TissueProtect Tubes are tubes that are prealiquoted with RNA^{later} RNA Stabilization Reagent, which stabilizes RNA in tissue samples. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392).

Applications

RNA^{later} TissueProtect Tubes enable tissue samples to be collected during tissue harvesting without any risk of distorting gene expression profiles. Animal tissues stabilized in RNA^{later} RNA Stabilization Reagent can be used in various RNA purification procedures (see page 140).

RNA^{later} TissueProtect Tubes are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

RNA^{later} Reagent Prevents RNA Changes in Tissues

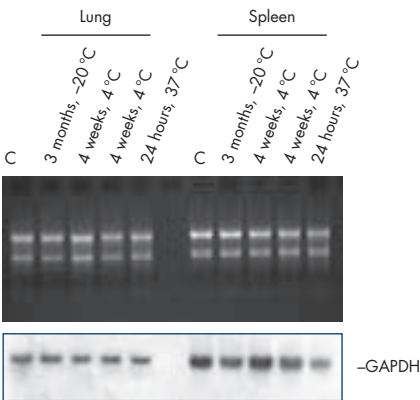


Rat brain samples (10 mg each) were excised and stored at room temperature in phosphate-buffered saline (PBS) or RNA^{later} TissueProtect Tubes (RNA^{later}) for 1, 3, or 4 hours before RNA was purified using the RNeasy Protect Mini Kit. Real-time RT-PCR analysis of the gene for transforming growth factor β (TGF-β) was performed in triplicate on the ABI PRISM 7700 using the QuantiTect Probe RT-PCR Kit. Changes in threshold cycle (C_t) are shown, relative to the C_t at time zero.

Product	Contents	Cat. no.
RNA ^{later} TissueProtect Tubes (50 x 1.5 ml)	For stabilization of RNA in 50 x 150 mg tissue samples: 50 screw-top tubes containing 1.5 ml RNA ^{later} RNA Stabilization Reagent each	76154
RNA ^{later} TissueProtect Tubes (20 x 5 ml)	For stabilization of RNA in 20 x 500 mg tissue samples: 20 screw-top tubes containing 5 ml RNA ^{later} RNA Stabilization Reagent each	76163

For further information: www.qiagen.com/PG/RNAanimalhuman

Protection of RNA in Tissues



Formaldehyde agarose gel and corresponding northern blot (GAPDH-probed, ³²P-labeled) of total RNA isolated with the RNeasy Protect Mini Kit from different rat tissues (10 mg each) stored under the indicated conditions in RNA^{later} RNA Stabilization Reagent. 2.5 µg total RNA was loaded per lane. C: RNA isolated from tissue frozen in liquid nitrogen and stored at -80 °C.

RNA^{later} RNA Stabilization Reagent

For immediate stabilization of the gene expression profile in harvested tissues

- Immediate RNA stabilization and protection ensure reliable gene expression and gene-profiling data
- Convenient and safe handling at room temperature; no need for liquid nitrogen or dry ice
- Archiving of tissue samples without risk of RNA degradation, even after multiple freeze-thaw cycles

Product description

RNA^{later} RNA Stabilization Reagent stabilizes RNA in tissue samples, and is available in 50 ml or 250 ml bottles. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392).

Applications

Tissues stabilized in RNA^{later} RNA Stabilization Reagent can be used for:

- Total RNA purification (pages 127, 128, 131, 132, 144–149, and 155)
- Poly A⁺ mRNA purification (page 151)
- Simultaneous RNA and DNA purification (pages 127, 131, and 161)
- miRNA and total RNA purification (pages 236 and 237)

RNA^{later} RNA Stabilization Reagent is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
RNA ^{later} RNA Stabilization Reagent (50 ml)	For stabilization of RNA in 25 x 200 mg tissue samples: 50 ml RNA ^{later} RNA Stabilization Reagent	76104
RNA ^{later} RNA Stabilization Reagent (250 ml)	For stabilization of RNA in 125 x 200 mg tissue samples: 250 ml RNA ^{later} RNA Stabilization Reagent	76106

For further information: www.qiagen.com/PG/RNAanimalhuman

RNeasy Protect Kits

For immediate stabilization of the gene expression profile in harvested tissues and subsequent RNA purification

- Immediate RNA stabilization and protection ensure reliable gene expression and gene-profiling data
- Convenient and safe RNA stabilization and purification; no need for liquid nitrogen, dry ice, or hot phenol
- Ready-to-use, high-quality total RNA in minutes
- No phenol/chloroform extraction, no CsCl gradients, no LiCl or ethanol precipitation
- Excellent recovery of RNA

Product description

Each RNeasy Protect Kit includes RNA*later* RNA Stabilization Reagent for stabilizing RNA in tissue samples, and RNeasy spin columns for purifying RNA using silica-membrane technology. Kits are available in mini, midi, or maxi format for purification of up to 100 µg, 1 mg, or 6 mg RNA, respectively. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392).

Applications

RNA purified with RNeasy technology has A_{260}/A_{280} ratios of 1.9–2.1* and is ideal for use in all applications. Downstream applications include:

- Northern, dot, and slot blotting
- RT-PCR
- Quantitative, real-time RT-PCR
- Array analysis
- Poly A⁺ RNA selection

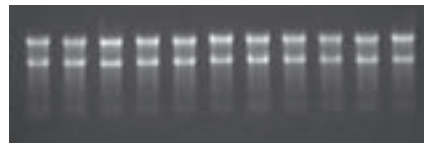
The RNeasy Protect Mini Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease. RNeasy Protect Midi and Maxi Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* Measured in 10 mM Tris-Cl, pH 7.5.

RNA Stable after 20 Tissue Freeze–Thaw Cycles

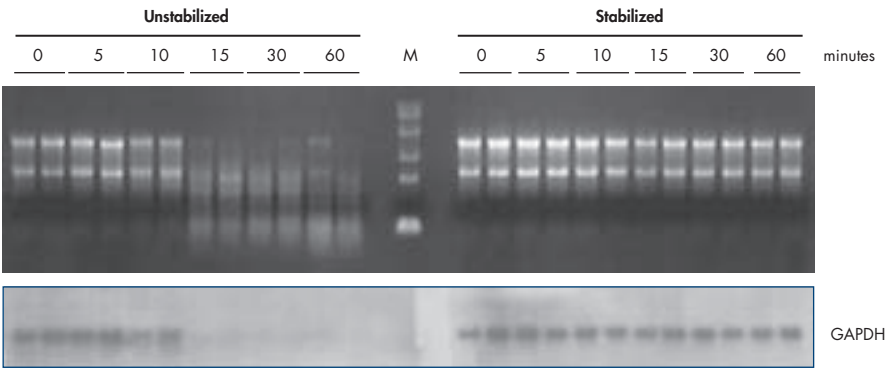
Number of freeze–thaw cycles

C 2 4 6 8 10 12 14 16 18 20



Total RNA was isolated from 10 mg of mouse liver stored in RNA*later* RNA Stabilization Reagent after the indicated number of freeze–thaw cycles (–20°C/25°C). 2.5 µg of total RNA was loaded per lane on a formaldehyde agarose gel. RNA was purified using the RNeasy Protect Mini Kit. **C:** RNA isolated from tissue frozen in liquid nitrogen and stored at –80°C. This sample was not subjected to freeze–thaw cycles.

RNA^{later} Reagent Prevents Degradation of mRNA in Tissues



RNA was purified from fresh rat kidney samples after 0, 5, 10, 15, 30, and 60 minutes, using either standard procedures (**Unstabilized**) or RNeasy Protect Kits (**Stabilized**). The RNA purified was analyzed by agarose gel electrophoresis and expression of GAPDH was examined using northern blot analysis. **M**: markers.

Product	Contents	Cat. no.
RNeasy Protect Mini Kit (50)	RNA ^{later} RNA Stabilization Reagent (50 ml), 50 RNeasy Mini Spin Columns, Collection Tubes (1.5 ml and 2 ml), RNase-Free Reagents and Buffers	74124
RNeasy Protect Mini Kit (250)	RNA ^{later} RNA Stabilization Reagent (250 ml), 250 RNeasy Mini Spin Columns, Collection Tubes (1.5 ml and 2 ml), RNase-Free Reagents and Buffers	74126
RNeasy Protect Midi Kit (10)*	RNA ^{later} RNA Stabilization Reagent (20 ml), 10 RNeasy Midi Spin Columns, Collection Tubes (15 ml), RNase-Free Reagents and Buffers	75152
RNeasy Protect Midi Kit (50)*	RNA ^{later} RNA Stabilization Reagent (100 ml), 50 RNeasy Midi Spin Columns, Collection Tubes (15 ml), RNase-Free Reagents and Buffers	75154
RNeasy Protect Maxi Kit (12)*	RNA ^{later} RNA Stabilization Reagent (100 ml), 12 RNeasy Maxi Spin Columns, Collection Tubes (50 ml), RNase-Free Reagents and Buffers	75182

* Requires use of a centrifuge capable of attaining 3000–5000 x g equipped with a swing-out rotor for 15 ml (Midi) or 50 ml (Maxi) centrifuge tubes.

For further information: www.qiagen.com/PG/RNAanimalhuman

New RNeasy Protect Cell Mini Kit

For immediate stabilization and convenient transport of sorted or cultured cells and subsequent RNA purification

- Immediate RNA stabilization in sorted or cultured cells with no need to remove medium
- Storage and shipping of cells at 30°C (1 day), 15–25°C (7 days), or 2–8°C (4 weeks), instead of on dry ice
- Archiving of cells at –20°C or –80°C
- Purification of high-quality RNA in minutes

Product description

The RNeasy Protect Cell Mini Kit includes RNAp Protect Cell Reagent for stabilization of RNA in cell samples and for convenient and reliable transport of stabilized cells at ambient temperature. The kit also contains the RNeasy Plus Mini Kit for purification of RNA from stabilized cells. Cells are lysed and spun through gDNA Eliminator spin columns to remove genomic DNA. Total RNA is then purified using RNeasy spin columns.

Applications

RNA purified using the RNeasy Protect Cell Mini Kit gives reproducible results in applications such as real-time RT-PCR.

The RNeasy Protect Cell Mini Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

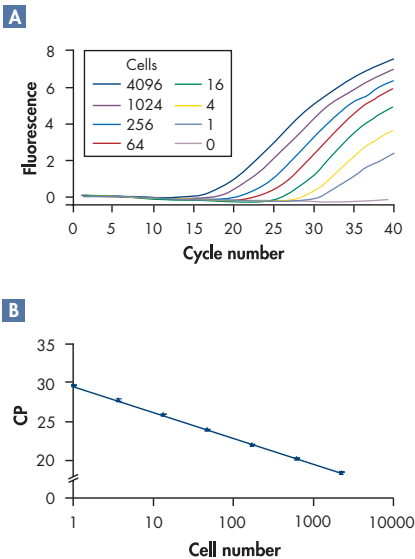
RNAp Protect Cell Reagent Stabilizes c-fos mRNA Levels in Jurkat Cells Stimulated with PMA

Change in c-fos mRNA level (ΔC_t)		
Duration of PMA stimulation	after PMA stimulation	after PMA stimulation followed by 2-hour stabilization in RNAp Protect Cell Reagent
0 hours	0	–0.8
2 hours	–8.41	–8.73
5 hours	–4.12	–4.38

Product	Contents	Cat. no.
RNeasy Protect Cell Mini Kit (50)	RNAp Protect Cell Reagent (50 ml) and RNeasy Plus Mini Kit (50)	74624
RNAp Protect Cell Reagent (250 ml)	250 ml RNAp Protect Cell Reagent	76526

For further information: www.qiagen.com/PG/RNAanimalhuman

Reliable RNA Purification from a Single Cell



Total RNA was purified from the indicated number of HeLa cells using the RNeasy Micro Kit. **A** Amplification plot. **B** Correlation of crossing point (CP) values and cell numbers. Real-time RT-PCR was carried out on the LightCycler® system using the QuantiTect Probe RT-PCR Kit (page 202), with primers and probes specific for β -actin.

RNeasy Micro Kit

For purification of concentrated total RNA from small amounts of tissue or small numbers of cells

- Reliable RNA purification from small samples — microdissected tissues, fibrous tissues, and cells
- High-quality total RNA concentrated in only 10 μ l — for sensitive downstream applications
- Efficient removal of genomic DNA — with integrated on-column DNase digestion
- Maximal yields of RNA from very small samples — even from single cells

Product description

The RNeasy Micro Kit enables purification of RNA from small biological samples using specialized RNeasy MinElute spin columns based on silica-membrane technology. Up to 45 μ g RNA can be purified in a volume as low as 10 μ l.

Applications

Highly reproducible RNA purification using the RNeasy Micro Kit makes it well-suited for sensitive quantitative gene expression analyses (see figure). The small elution volume (10 μ l) ensures small reaction volumes in downstream applications, giving increased reaction efficiency. The high purity allows the complete sample to be used in reverse transcription, for example, without enzyme inhibition.

The RNeasy Micro Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
RNeasy Micro Kit (50)	50 RNeasy MinElute Spin Columns, Collection Tubes (1.5 ml and 2 ml), RNase-Free DNase I, Carrier RNA, RNase-Free Reagents and Buffers	74004

For further information: www.qiagen.com/PG/RNAanimalhuman

Automatable on QIAcube

RNeasy Kits

For purification of up to 100 µg, 1 mg, or 6 mg total RNA from animal cells or tissues,* or yeast

- Fast procedure — high-quality total RNA in minutes
- Ready-to-use RNA — for high performance in any downstream application
- Consistent RNA yields — from small to large amounts of starting material
- Reliable protocol — no phenol/chloroform extraction, CsCl gradients, or LiCl or ethanol precipitation

Product description

RNeasy Kits enable purification of RNA from biological samples in RNeasy spin columns using silica-membrane technology. Kits are available in mini, midi, or maxi format for purification of up to 100 µg, 1 mg, or 6 mg RNA, respectively. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392). The RNeasy Mini Kit can also be automated using the new QIAcube (see page 363).

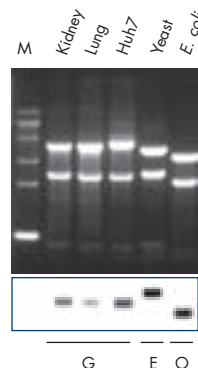
Applications

RNA purified with RNeasy technology has A_{260}/A_{280} ratios of 1.9–2.1[†] and is ideal for use in all applications, including quantitative, real-time RT-PCR and array analysis. Total RNA purified from cultured cells using RNeasy Kits typically gives RIN values of close to 10 on the Agilent 2100 bioanalyzer (depending on cell type and culture conditions), indicating highly intact RNA.

The RNeasy Mini Kit is intended for general laboratory use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease. RNeasy Midi and Maxi Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

*A range of optimized kits for RNA purification from tissue samples are available. See the RNA selection guide on page 137 to choose the right kit. [†] Measured in 10 mM Tris-Cl, pH 7.5. [‡] E and O kindly provided by P. Philippsen, University of Basel, Switzerland and U. Henning, Max Planck Institute of Biology, Tübingen, Germany, respectively.

High-Quality RNA from a Variety of Samples



Formaldehyde agarose gel and northern blot of total RNA purified with the RNeasy Maxi Kit. ³²P-labeled probes: (G) GAPDH; (E) translation elongation factor EF-1α; and (O) outer membrane protein A. M: markers.[‡]

Product	Contents	Cat. no.
RNeasy Mini Kit (50)	50 RNeasy Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	74104
RNeasy Mini Kit (250)	250 RNeasy Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	74106
RNeasy Midi Kit (10) [§]	10 RNeasy Midi Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	75142
RNeasy Midi Kit (50) [§]	50 RNeasy Midi Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	75144
RNeasy Maxi Kit (12) [§]	12 RNeasy Maxi Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	75162

[§] Requires centrifuge capable of 3000–5000 x g equipped with swing-out rotor for 15 ml (Midi) or 50 ml (Maxi) centrifuge tubes.

For further information: www.qiagen.com/PG/RNAanimalhuman

RNeasy Plus Mini Kit

For purification of total RNA from cultured cells and tissues* using gDNA Eliminator spin columns

- Unique genomic DNA elimination step — avoids the need for DNase digestion
- Optimized protocol — efficient genomic DNA removal and highly reproducible yields of RNA
- Fast procedure — high-quality total RNA in minutes
- Convenient sample preparation — ready-to-use RNA for high performance in sensitive downstream applications

Product description

The RNeasy Plus Mini Kit integrates fast and convenient RNA purification with effective elimination of genomic DNA contamination. Cell or tissue lysates are first spun through gDNA Eliminator spin columns, which provide highly efficient removal of genomic DNA. Total RNA is then purified using RNeasy spin columns. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392).

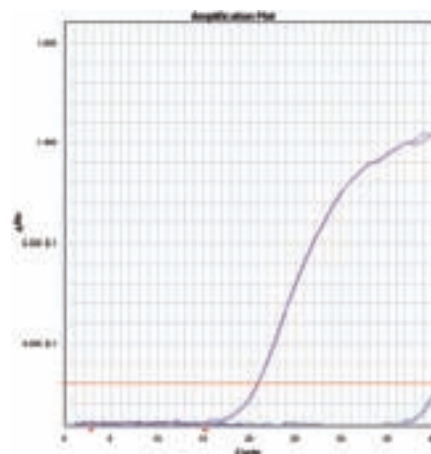
Applications

RNA purified using the RNeasy Plus Mini Kit is highly suited for downstream applications such as quantitative, real-time RT-PCR which are sensitive to low amounts of genomic DNA contamination. Total RNA purified from cultured cells using the RNeasy Plus Mini Kit typically gives RIN values of close to 10 on the Agilent 2100 bioanalyzer (depending on cell type and culture conditions), indicating highly intact RNA.

The RNeasy Plus Mini Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* A range of optimized kits for RNA purification from tissue samples are available. See the RNA selection guide on page 137 to choose the right kit.

Effective Elimination of Genomic DNA Contamination

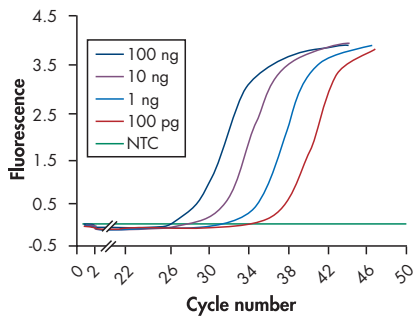


Total RNA was purified from 1×10^6 Jurkat cells using the RNeasy Plus Mini Kit, and real-time RT-PCR was performed using the QuantiTect Probe RT-PCR Kit and TaqMan® primers and probe for human β -actin. The purple curves show the data from duplicate reactions. The blue curves are from control reactions where reverse transcriptase was omitted: the curves are to the far right, indicating the virtual absence of genomic DNA template for real-time PCR.

Product	Contents	Cat. no.
RNeasy Plus Mini Kit (50)	50 RNeasy Mini Spin Columns, 50 gDNA Eliminator Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	74134

For further information: www.qiagen.com/PG/RNAanimalhuman

LightCycler Analysis of High-Quality RNA from Heart



RNA was purified from mouse heart using the RNeasy Fibrous Tissue Mini Kit. After reverse transcription using Omniscript® Reverse Transcriptase (page 186), real-time, quantitative PCR was carried out on the LightCycler system using the QuantiTect SYBR® Green PCR Kit (page 194) and primers specific for alpha-catenin. Amplification curves are shown for the indicated amounts of total RNA. **NTC**: no template control.

RNeasy Fibrous Tissue Kits

For purification of total RNA from fiber-rich tissues*

- Optimized protocols for fibrous tissues
- High yields of total RNA
- High-quality RNA for all downstream applications
- Removal of genomic DNA using DNase I

Product description

Each RNeasy Fibrous Tissue Kit includes proteinase K for removing abundant protein in fiber-rich tissue samples, and RNeasy spin columns for purifying RNA using silica-membrane technology. Kits are available in mini or midi format for purification of up to 100 µg or 1 mg RNA, respectively. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or Tissuelyser (page 392). To ensure accurate gene expression analysis, tissue samples should be treated immediately after harvesting with RNA/ater RNA Stabilization Reagent (page 140).

Applications

The kits provide high-quality total RNA suitable for any downstream application, such as array analysis and real-time RT-PCR.

RNeasy Fibrous Tissue Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* A range of optimized kits for RNA purification from tissue samples are available. See the RNA selection guide on page 137 to choose the right kit.

Product	Contents	Cat. no.
RNeasy Fibrous Tissue Mini Kit (50)	50 RNeasy Mini Spin Columns, Collection Tubes (1.5 ml and 2 ml), Proteinase K, RNase-Free DNase I, RNase-Free Reagents and Buffers	74704
RNeasy Fibrous Tissue Midi Kit (10) [†]	10 RNeasy Midi Spin Columns, Collection Tubes (15 ml), Proteinase K, RNase-Free DNase I, RNase-Free Reagents and Buffers	75742

[†] Requires use of a centrifuge capable of attaining 3000–5000 x g equipped with a swing-out rotor for 15 ml centrifuge tubes.

For further information: www.qiagen.com/PG/RNAanimalhuman

RNeasy Lipid Tissue Kits

For purification of total RNA from fatty tissues (and from other types of tissue)*

- Purification of RNA from larger amounts of fatty tissue
- Optimized lysis conditions for fatty tissues
- High yields of total RNA without phenol contamination
- High-quality RNA for all downstream applications

Product description

Each RNeasy Lipid Tissue Kit includes QIAzol Lysis Reagent for lysing fatty tissue samples, and RNeasy spin columns for purifying RNA using silica-membrane technology. Kits are available in mini or midi format for purification of up to 100 µg or 1mg RNA, respectively. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392).

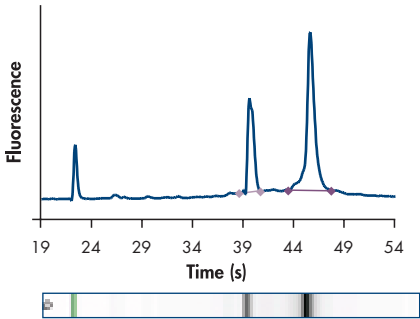
Applications

RNeasy Lipid Tissue Kits provide easy and efficient purification of high-quality RNA for all downstream applications, including array analysis and real-time RT-PCR.

RNeasy Lipid Tissue Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* A range of optimized kits for RNA purification from tissue samples are available. See the RNA selection guide on page 137 to choose the right kit.

High-Quality RNA with the RNeasy Lipid Tissue Midi Kit



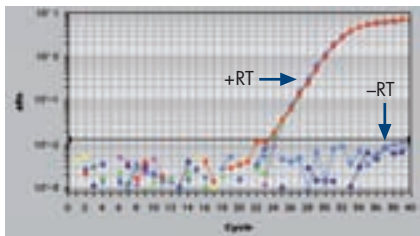
Total RNA was purified from 200 mg rat adipose tissue using the RNeasy Lipid Tissue Midi Kit. The high quality of the RNA is shown by scanning with the Agilent 2100 bioanalyzer.

Product	Contents	Cat. no.
RNeasy Lipid Tissue Mini Kit (50)	50 RNeasy Mini Spin Columns, Collection Tubes (1.5 ml and 2 ml), QIAzol Lysis Reagent, RNase-Free Reagents and Buffers	74804
RNeasy Lipid Tissue Midi Kit (10) [†]	10 RNeasy Midi Spin Columns, Collection Tubes (15 ml), QIAzol Lysis Reagent, RNase-Free Reagents and Buffers	75842
QIAzol Lysis Reagent (200 ml)	200 ml QIAzol Lysis Reagent	79306

[†] Requires use of a centrifuge capable of attaining 3000–5000 x g equipped with a swing-out rotor for 15 ml centrifuge tubes.

For further information: www.qiagen.com/PG/RNAanimalhuman

Successful Real-Time Analysis



RNA purified in duplicate from FFPE rat liver (10 µm sections) was analyzed using a real-time RT-PCR assay for c-jun. Reactions were performed in duplicate with (+RT) or without (-RT) reverse transcriptase. The -RT curves show no amplification after 40 PCR cycles, demonstrating that the RNA is virtually free of genomic DNA.

RNeasy FFPE Kit

For purification of total RNA from formalin-fixed, paraffin-embedded tissue sections

- Reliable RNA purification from tissue sections — optimal results in downstream applications
- High RNA yields — optimal lysis conditions to cope with formalin-crosslinked RNA
- Convenient procedure — streamlined protocol with no overnight incubation
- Unique genomic DNA elimination step — avoids the need for DNase digestion

Product description

The RNeasy FFPE Kit is specially designed for purifying total RNA from formalin-fixed, paraffin-embedded tissue sections. The kit uses special lysis conditions to release RNA from tissue sections and to overcome inhibitory effects caused by formalin crosslinking of nucleic acids. The kit also uses gDNA Eliminator spin columns for removal of genomic DNA contamination and RNeasy MinElute spin columns for purification of total RNA in small volumes.

Applications

By isolating all RNA molecules longer than 70 nucleotides, the RNeasy FFPE Kit provides recovery of any useful RNA fragments for applications such as real-time RT-PCR.

The RNeasy FFPE Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Product	Contents	Cat. no.
RNeasy FFPE Kit (50)	50 RNeasy MinElute Spin Columns, 50 gDNA Eliminator Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	74404

For further information: www.qiagen.com/PG/RNAanimalhuman

Oligotex® Kits

For purification of poly A⁺ mRNA from total RNA, or directly from animal cells or tissues, and cleanup of in vitro transcripts

- High recovery of pure mRNA in as little as 30 minutes
- No oligo-dT cellulose or ethanol precipitation
- Flexibility for use with widely varying amounts of starting RNA

Product description

Each Oligotex Kit includes Oligotex resin for binding poly A⁺ mRNA, and spin columns for washing and eluting bound mRNA. Oligotex mRNA Kits enable purification of mRNA from total RNA and cleanup of poly A⁺ in vitro transcripts. Oligotex Direct mRNA Kits enable purification of mRNA from cells and tissues.

Applications

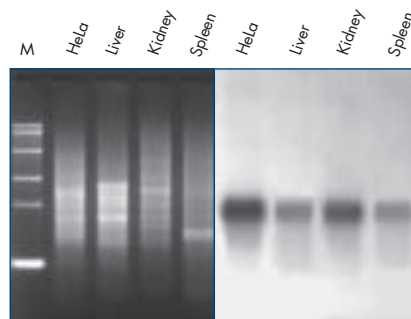
Poly A⁺ mRNA purified with Oligotex resin is ready for use in any downstream application, including:

- RT-PCR, cDNA synthesis, and cDNA library construction
- Subtractive hybridization
- In vitro translation
- Differential display, and SAGE technology
- Expression-array and expression-chip analysis
- RNase and S1 nuclease protection
- Primer extension
- Northern, dot, or slot blotting
- Microinjection

Oligotex resin can replace soluble oligo-dT primers in cDNA synthesis reactions to yield cDNAs immobilized on Oligotex particles. Oligotex:cDNA complexes represent a reusable cDNA pool that can be directly used in subtractive hybridization to enrich low-abundance cDNAs of differentially expressed genes. The subtracted cDNA pool can then be used for library screening or construction. Oligotex resin has also been used successfully for cleanup of poly-A tailed oligonucleotides.

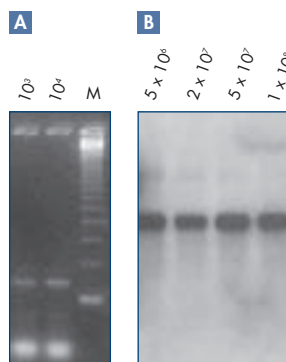
Oligotex Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Purification of mRNA from Total RNA



Formaldehyde agarose gel and northern blot (GAPDH-probed) of poly A⁺ mRNA purified from total RNA from various samples using Oligotex Kits. **M**: markers.

High-Quality mRNA for RT-PCR and Northern Blotting



A RT-PCR and **B** northern blot of poly A⁺ mRNA, isolated from the indicated numbers of HeLa cells using Oligotex Direct mRNA Kits. 2 µg of poly A⁺ RNA were loaded per lane, and β-actin transcription detected. **M**: marker.

Product	Contents	Cat. no.
Oligotex mRNA Mini Kit (12)	For 12 mRNA minipreps: 200 µl Oligotex Suspension, Small Spin Columns, Collection Tubes (1.5 ml), RNase-Free Reagents and Buffers	70022
Oligotex mRNA Midi Kit (12)	For 12 mRNA midipreps: 700 µl Oligotex Suspension, Small Spin Columns, Collection Tubes (1.5 ml), RNase-Free Reagents and Buffers	70042
Oligotex mRNA Maxi Kit (6)	For 6 mRNA maxipreps: 700 µl Oligotex Suspension, Large Spin Columns, Collection Tubes (1.5 ml), RNase-Free Reagents and Buffers	70061
Oligotex Direct mRNA Micro Kit (12)	For 12 mRNA micropreps: 250 µl Oligotex Suspension, Small Spin Columns, Collection Tubes (1.5 ml), RNase-Free Reagents and Buffers	72012
Oligotex Direct mRNA Mini Kit (12)	For 12 mRNA minipreps: 420 µl Oligotex Suspension, Small Spin Columns, Collection Tubes (1.5 ml), RNase-Free Reagents and Buffers	72022
Oligotex Direct mRNA Midi/Maxi Kit (6/2)	For 6 mRNA midi or 2 maxipreps: 1 ml Oligotex Suspension, Large Spin Columns, Collection Tubes (1.5 ml), RNase-Free Reagents and Buffers	72041
Oligotex Suspension (0.5 ml)	0.5 ml for mRNA purification from up to 8 mg of total RNA	79000
Oligotex Suspension (2.5 ml)	2.5 ml for mRNA purification from up to 40 mg of total RNA	79002
Small Spin Columns (24)	24 RNase-Free spin columns for Oligotex spin procedures	79523

Oligotex products are not available in Japan.

For further information: www.qiagen.com/PG/RNAanimalhuman

Automatable

RNeasy 96 Kits

For high-throughput manual or automated RNA minipreps from animal cells

- High-throughput RNA purification
- Fast and convenient sample processing
- No organic extraction or precipitation
- Reproducible yields from 10 to 500,000 cells
- High-quality RNA for any application

Product description

RNeasy 96 Kits enable purification of RNA from up to 96 cell samples in RNeasy 96 plates using silica-membrane technology. Kits are available for manual processing (using the QIAvac 96 vacuum manifold or the QIAGEN 96-Well-Plate Centrifugation system; pages 394 and 396) or for automated processing (using the BioRobot Universal System or BioRobot 8000; pages 366 and 371). The BioRobot Universal System or BioRobot 8000 provides walkaway RNA purification from up to 96 or 192 cultured cell samples followed by reaction setup for real-time RT-PCR.

Applications

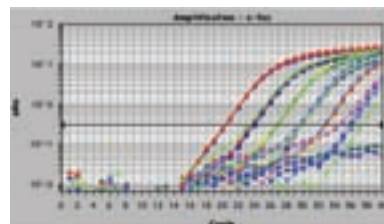
High-throughput RNA analysis is an increasingly important tool in gene expression analysis. RNeasy 96 Kits consistently provide the highest-quality RNA for any application in areas such as pharmacological and toxicological research. The purified RNA is suitable for sensitive applications such as quantitative, real-time RT-PCR.

RNeasy 96 Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

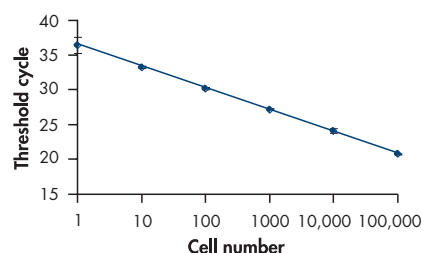
RNA was purified from 96 aliquots (5×10^4 cells each) of a HeLa S3 cell culture using the RNeasy 96 BioRobot 8000 procedure. Quantitative, real-time, one-step RT-PCR was set up in the same protocol on the BioRobot workstation, using the QuantiTect Probe RT-PCR Kit with primers and dual-labeled probe specific for the low-copy c-myc transcript. Threshold cycles (C_T) are shown for all 96 samples. The mean C_T was 21.34 ± 0.34 (mean \pm standard deviation), representing a CV of 1.6%.

High-Quality RNA for Sensitive Analysis of a Low-Copy Transcript

A

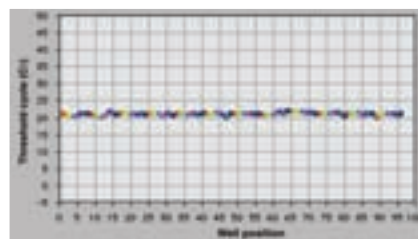


B



RNA was purified from 1 to 1×10^5 HeLa cells using the RNeasy 96 BioRobot 8000 Kit. Total RNA was eluted in 100 μ l RNase-free water, and 5 μ l was used for RT-PCR. Quantitative, real-time, one-step RT-PCR analysis was carried out on an ABI™ Sequence Detection System using the QuantiTect Probe RT-PCR Kit (page 202) with primers and probe specific for the low-copy c-fos transcript. **A** Amplification plot **B** C_T values. Error bars represent standard deviation from 4 different samples for each cell number.

High-Throughput Purification and Reaction Setup on a Single Workstation



Automatable

Product	Contents	Cat. no.
RNeasy 96 Kit (4)*	For 4 x 96 total and cytoplasmic RNA preps: 4 RNeasy 96 Plates, Elution Microtubes CL, Caps, S-Blocks, AirPore Tape Sheets, RNase-Free Reagents and Buffers	74181
RNeasy 96 Kit (12)*	For 12 x 96 total and cytoplasmic RNA preps: 12 RNeasy 96 Plates, Elution Microtubes CL, Caps, S-Blocks, AirPore Tape Sheets, RNase-Free Reagents and Buffers	74182
RNeasy 96 BioRobot 8000 Kit (12) [†]	For 12 x 96 total RNA preps on the BioRobot Universal System or BioRobot 8000: 12 RNeasy 96 Plates, Elution Microtubes CL, Caps, S-Blocks, RNase-Free Reagents and Buffers	967152
RNeasy 96 BioRobot 9604 Kit (12) [‡]	For 12 x 96 total and cytoplasmic RNA preps on the BioRobot 9604: 12 RNeasy 96 Plates, Elution Microtubes CL, Caps, S-Blocks, RNase-Free Reagents and Buffers	967142

* Requires use of QIAvac 96 (page 394) or the QIAGEN 96-Well-Plate Centrifugation system (page 396).

[†] For fully automated RNA purification on the BioRobot Universal System (page 366), the BioRobot 8000 (page 371), or the BioRobot Gene Expression — Real-Time RT-PCR (no longer available).

[‡] For automated RNA purification on the BioRobot 9604 workstation, configuration C (no longer available).

For further information: www.qiagen.com/PG/RNAanimalhuman

Automatable**RNeasy 96 Universal Tissue Kits**

For high-throughput manual or automated RNA purification from any type of animal tissue

- High yields of total RNA — from all types of tissue in 96-well format
- Integration of QIAzol lysis and high-throughput RNeasy purification — in an easy-to-follow protocol
- Pure, high-performance RNA — without phenol contamination
- High-quality RNA for all downstream applications — such as real-time RT-PCR and array analysis

Product description

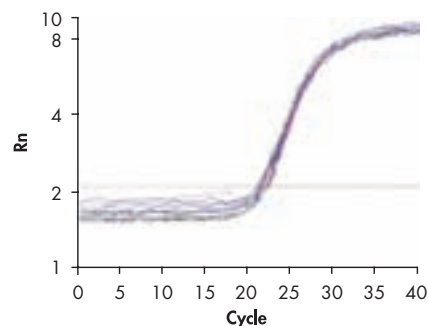
With RNeasy 96 Universal Tissue Kits, up to 96 tissue samples are lysed and homogenized in QIAzol Lysis Reagent, and RNA is purified in RNeasy 96 plates using silica-membrane technology. For disruption and homogenization of samples, the TissueLyser system is recommended (page 392). Kits are available for manual processing (using the QIAGEN 96-Well-Plate Centrifugation system and, optionally, the QIAvac 96 vacuum manifold; pages 396 and 394) or for automated processing (using the BioRobot Universal System or BioRobot 8000; pages 366 and 371). The BioRobot Universal System or BioRobot 8000 provides walkaway RNA purification from up to 96 or 192 tissue samples followed by reaction setup for real-time RT-PCR.

Applications

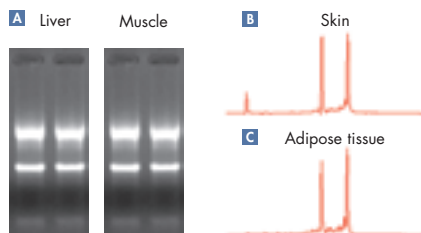
High-throughput RNA analysis is an increasingly important tool in gene expression analysis. RNeasy 96 Universal Tissue Kits enable researchers to purify RNA from a wide range of tissue types in one run using the same procedure, saving both time and effort.

The kits consistently provide the highest-quality RNA for any application in areas such as pharmacological and toxicological research. The purified RNA is suitable for sensitive applications such as array analysis and quantitative, real-time RT-PCR.

RNeasy 96 Universal Tissue Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Real-Time Analysis of High-Quality RNA from Rat Brain

Total RNA was purified from 50 mg samples of rat brain using the RNeasy 96 Universal Tissue Kit. Twenty-four purified samples, with an average of 90 ng RNA per reaction, were analyzed by real-time RT-PCR on the ABI PRISM 7900HT Sequence Detection System, using the QuantiTect Probe RT-PCR Kit with primers and probe specific for the c-jun gene.

High-Quality RNA from Any Tissue Sample

Total RNA was purified from the indicated rat tissues using the RNeasy 96 Universal Tissue Kit and analyzed by formaldehyde agarose gel electrophoresis or on the Agilent 2100 bioanalyzer. Starting materials were **A** 25 mg RNA/ater stabilized liver and muscle, **B** 50 mg flash-frozen skin, and **C** 100 mg flash-frozen adipose tissue.

Product	Contents	Cat. no.
RNeasy 96 Universal Tissue Kit (4)*	For 4 x 96 total RNA preps: 4 RNeasy 96 Plates, Collection Microtubes (racked), Elution Microtubes CL, Caps, S-Blocks, AirPore Tape Sheets, RNase-Free Reagents and Buffers (including QIAzol Lysis Reagent)	74881
RNeasy 96 Universal Tissue Kit (12)*	For 12 x 96 total RNA preps: 12 RNeasy 96 Plates, Collection Microtubes (racked), Elution Microtubes CL, Caps, S-Blocks, AirPore Tape Sheets, RNase-Free Reagents and Buffers (including QIAzol Lysis Reagent)	74882
RNeasy 96 Universal Tissue 8000 Kit (12)†	For 12 x 96 total RNA preps on the BioRobot Universal System or BioRobot 8000: 12 RNeasy 96 Plates, Collection Microtubes (racked), Elution Microtubes CL, Caps, S-Blocks, RNase-Free Reagents and Buffers (including QIAzol Lysis Reagent)	967852

* Requires use of the Plate Rotor 2 x 96 and Centrifuge 4K15C (Tissuelyser system recommended for disruption and homogenization; QIAvac 96 optional).

† For fully automated RNA purification on the BioRobot Universal System (page 366), the BioRobot 8000 (page 371), or the BioRobot Gene Expression — Real-Time RT-PCR (no longer available). Requires use of the Plate Rotor 2 x 96 and Centrifuge 4K15C (Tissuelyser system recommended for disruption and homogenization).

For further information: www.qiagen.com/PG/RNAanimalhuman

Automatable

TurboCapture mRNA Kits

For rapid and easy mRNA purification from cultured cells in high-throughput applications

- Fast mRNA purification — few protocol steps and minimal hands-on time
- Simplification of gene expression analysis — mRNA purification and downstream cDNA synthesis and PCR in the same strip or plate
- Choice of throughput — mRNA purification in 8-, 96-, and 384-well formats
- Option of automated sample processing — kits are compatible with robotic workstations

Product description

TurboCapture mRNA Kits use unique oligonucleotide immobilization technology to provide a fast and simple procedure for purifying mRNA. Cell lysates are added to the wells of a TurboCapture strip (8 wells) or TurboCapture plate (96 or 384 wells), and mRNA is allowed to hybridize to the immobilized oligo-dT in each well. Contaminants are washed away, and the isolated mRNA is then either used directly in cDNA synthesis or eluted for use in downstream applications.

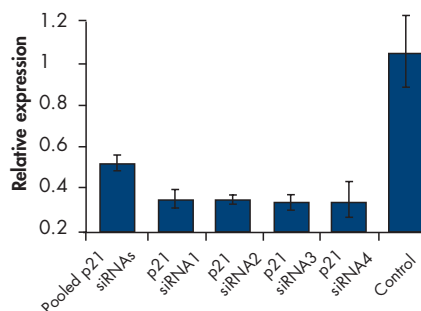
Applications

Large numbers of samples can be processed simultaneously, making TurboCapture mRNA Kits ideal for high-throughput applications such as compound screening and target validation (e.g., by siRNA screening).

Due to the standard plate formats and simple workflows, TurboCapture mRNA Kits can be automated on robotic workstations. mRNA purification, cDNA synthesis, and PCR can be performed in the same well, avoiding the need for sample transfer and ensuring high well-to-well reproducibility.

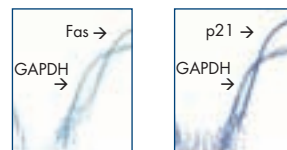
TurboCapture mRNA Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Parallel Analysis of Different siRNAs by Real-Time RT-PCR



DLD-1 colon carcinoma cells were transfected with different siRNAs targeting p21. After 72 hours, mRNA was purified using the TurboCapture 384 mRNA Kit. The expression levels of p21 relative to GAPDH were determined by real-time RT-PCR. Each bar of the graph represents the mean and standard deviation from 3 samples.

High Well-to-Well Reproducibility



	Fas	GAPDH	p21	GAPDH
Avg.	26.33	20.29	23.63	20.42
Std. Dev.	0.80	0.37	0.50	0.35
CV's	3.05	1.80	2.10	1.72

mRNA was purified from K562 cells using the TurboCapture 384 mRNA Kit. While the isolated mRNA was immobilized in the wells of the TurboCapture plate, cDNA was synthesized. Using cDNA from 8 wells of the TurboCapture plate, duplex, real-time PCR of an apoptosis-related gene (Fas or p21) and GAPDH internal control was performed. Well-to-well reproducibility with regard to C_T values was high, with CV's of <3%. All protocol steps were performed on a robotic workstation.

Product	Contents	Cat. no.
TurboCapture 8 mRNA Kit (12)*	12 x TurboCapture 8 mRNA Strips, and RNase-Free Buffers	72232
TurboCapture 8 mRNA Kit (60)*	60 x TurboCapture 8 mRNA Strips, and RNase-Free Buffers	72234
TurboCapture 96 mRNA Kit (1)*	1 x TurboCapture 96 mRNA Plate, and RNase-Free Buffers	72250
TurboCapture 96 mRNA Kit (5)*	5 x TurboCapture 96 mRNA Plates, and RNase-Free Buffers	72251
TurboCapture 384 mRNA Kit (5)*	5 x TurboCapture 384 mRNA Plates, and RNase-Free Buffers	72271
Buffer TCL, 2x (8.5 ml) [†]	8.5 ml of 2x lysis buffer for TurboCapture mRNA Kits	1031586
Random Hexamers (100 µl)	100 µl of random hexamers (0.4 µg/µl) for cDNA synthesis with TurboCapture mRNA Kits	79236
Oligo-dT Primers (100 µl)	100 µl of oligo-dT primers (0.4 µg/µl) for cDNA synthesis with TurboCapture mRNA Kits	79237
TurboCapture Microplate Holder, Type A	Holder for accommodating TurboCapture plates on robotic workstations	79238
TurboCapture Microplate Holder, Type B	Holder for accommodating TurboCapture plates on the Biomek 2000 robotic workstation	79239
Buffer TCW (34 ml)	34 ml wash buffer for TurboCapture mRNA Kits	1031575
Buffer TCW (250 ml)	250 ml wash buffer for TurboCapture mRNA Kits	1031578
Buffer TCL (10 ml)	10 ml lysis buffer for TurboCapture mRNA Kits	1031573
Buffer TCL (125 ml)	125 ml lysis buffer for TurboCapture mRNA Kits	1031576
Buffer TCE (125 ml)	125 ml elution buffer for TurboCapture mRNA Kits	1031577

* TurboCapture mRNA Kits are supplied with Buffer TCL (lysis buffer), Buffer TCW (wash buffer), and Buffer TCE (elution buffer). Additional quantities can be purchased if necessary.

[†] 2x Buffer TCL is required if purifying mRNA from suspension cells.

For further information: www.qiagen.com/PG/RNAanimalhuman

RNeasy Protect Bacteria Kits

For in vivo stabilization of the gene expression profile in bacteria and subsequent RNA purification

- Immediate RNA stabilization and protection ensure reliable gene expression and gene-profiling data
- Convenient and safe RNA stabilization and purification; no need for liquid nitrogen, dry ice, or hot phenol
- Ready-to-use, high-quality total RNA in minutes
- No phenol/chloroform extraction, no CsCl gradients, no LiCl or ethanol precipitation

Product description

Each RNeasy Protect Bacteria Kit includes RNAprotect Bacteria Reagent for stabilizing RNA in bacterial samples, and RNeasy spin columns for purifying RNA using silica-membrane technology. Kits are available in mini or midi format for purification of up to 100 µg or 1 mg RNA, respectively. Efficient disruption of bacterial samples can be achieved using the TissueLyser (page 392).

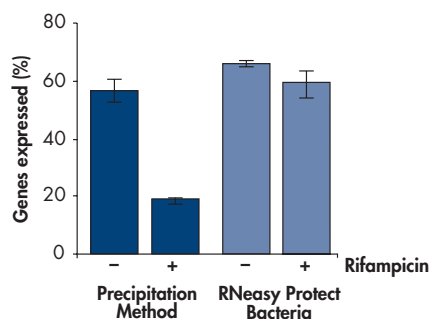
Applications

RNA purified with the kits has A_{260}/A_{280} ratios of 1.9–2.1* and is suited for all applications, including real-time RT-PCR.

RNeasy Protect Bacteria Kits are intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* Measured in 10 mM Tris-Cl, pH 7.5.

GeneChip® Analysis Shows Accurate Gene-Expression Profiles with RNAprotect Stabilization



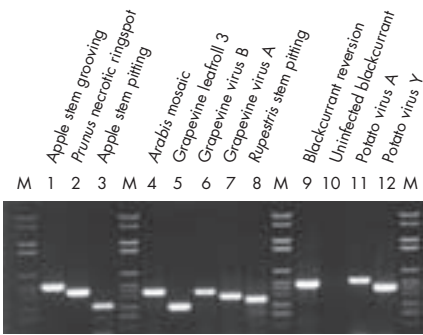
Total RNA was purified from *E. coli* cultures using the RNeasy Protect Bacteria Kit (**RNeasy Protect Bacteria**) or a precipitation method (**Precipitation Method**). The RNA polymerase inhibitor rifampicin was added to half of the cultures prior to RNA purification. Differences in transcript levels with and without rifampicin therefore generally reflect the degree of RNA degradation. GeneChip analysis of *E. coli* microarrays was carried out according to standard Affymetrix® protocols. The percentage of genes expressed was estimated as the number of different transcripts determined present by GeneChip analysis divided by the total number of transcripts represented on the microarray. (Data from a collaborative study with Affymetrix.)

Product	Contents	Cat. no.
RNeasy Protect Bacteria Mini Kit (50)	RNeasy Mini Kit (50) and RNAprotect Bacteria Reagent (2 x 100 ml)	74524
RNeasy Protect Bacteria Midi Kit (10) [†]	RNeasy Midi Kit (10) and RNAprotect Bacteria Reagent (2 x 100 ml)	75552
RNAprotect Bacteria Reagent	RNAprotect Bacteria Reagent (2 x 100 ml)	76506

[†] Requires use of a centrifuge capable of attaining 3000–5000 x g equipped with a swing-out rotor for 15 ml centrifuge tubes.

For further information: www.qiagen.com/PG/RNAother

Detection of Viruses from a Variety of Plant Species by RT-PCR



Total RNA was purified from budwood obtained from infected apple (1), cherry (2), apple (3), and grapevine (4–8), leaf tissue from blackcurrant (9, 10), and dormant tuber tissue from infected potato (11, 12) using a modification of the RNeasy protocol. Viral RNA was amplified using a one-tube RT-PCR. Amplification products were analyzed on a 1.5% agarose gel. **M:** DNA Markers VI, Boehringer Mannheim. (Data kindly provided by D.J. MacKenzie, Centre for Plant Health, Agriculture and Agri-Food Canada and M.A. McLean, Euro Nursery & Vineyard (West) Inc., Sidney, Canada.)

RNeasy Plant Mini Kit

For purification of up to 100 µg total RNA from plants and fungi

- High-quality total RNA in 30 minutes
- No phenol/chloroform extraction, no CsCl gradients, no LiCl or ethanol precipitation
- Excellent recovery of RNA
- Ready-to-use RNA for any downstream application

Product description

The RNeasy Plant Mini Kit includes QIAshredder spin columns for homogenizing and filtering viscous plant or fungi lysates, and RNeasy spin columns for purifying RNA using silica-membrane technology. The kit enables purification of up to 100 µg RNA. Efficient disruption of multiple plant samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392).

Applications

RNA purified with RNeasy technology has A_{260}/A_{280} ratios of 1.9–2.1* and is ideal for use in all applications. Downstream applications include northern, dot, and slot blotting, RT-PCR, quantitative, real-time RT-PCR, array analysis, and poly A⁺ RNA selection.

The RNeasy Plant Mini Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* Measured in 10 mM Tris-Cl, pH 7.5.

Product	Contents	Cat. no.
RNeasy Plant Mini Kit (20)	20 RNeasy Mini Spin Columns, 20 QIAshredder Mini Spin Columns, Collection Tubes (1.5 ml and 2 ml), RNase-Free Reagents and Buffers	74903
RNeasy Plant Mini Kit (50)	50 RNeasy Mini Spin Columns, 50 QIAshredder Mini Spin Columns, Collection Tubes (1.5 ml and 2 ml), RNase-Free Reagents and Buffers	74904

For further information: www.qiagen.com/PG/RNAother

AllPrep DNA/RNA Mini Kit

For simultaneous purification of genomic DNA and total RNA from the same cell or tissue sample

- Convenient purification of DNA and RNA — high-quality genomic DNA and total RNA from the same sample
- Reliable sample preparation — high yields of DNA and RNA from precious samples
- Rapid procedure — short, streamlined protocol
- Ready-to-use DNA and RNA — for any downstream application

Product description

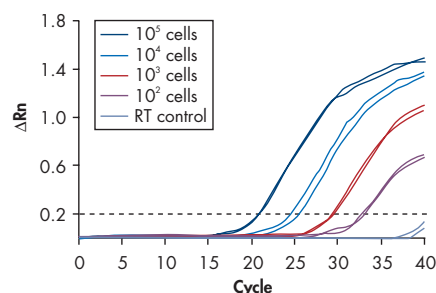
The AllPrep DNA/RNA Mini Kit allows the simultaneous purification of genomic DNA and total RNA from the same biological sample. Genomic DNA is purified using the novel AllPrep DNA spin column. Total RNA is purified from the flow-through of the AllPrep DNA spin column using an RNeasy spin column. The kit is compatible with cultured cells and animal tissues. Efficient disruption of tissue samples can be achieved using the TissueRuptor (page 391) or TissueLyser (page 392).

Applications

Genomic DNA purified using the kit has an average length of 15–30 kb, depending on homogenization conditions, and is suited for any downstream application, including PCR and Southern, dot, and slot blot analyses. Total RNA purified using the kit can be used in any downstream application, including RT-PCR, real-time RT-PCR, differential display, cDNA synthesis, Northern, dot, and slot blot analyses, primer extension, poly A⁺ selection, RNase/S1 nuclease protection, and microarrays.

The AllPrep DNA/RNA Mini Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

Wide Dynamic Range



Total RNA was purified in duplicate from different amounts of Jurkat cells using the AllPrep DNA/RNA Mini Kit. A real-time RT-PCR assay for β -actin was performed. The transcript was reliably detected in the range from 10^5 to 10^2 cells. **RT control:** no reverse transcriptase in reaction.

Product	Contents	Cat. no.
AllPrep DNA/RNA Mini Kit (50)	50 AllPrep DNA Mini Spin Columns, 50 RNeasy Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	80204

For further information: www.qiagen.com/PG/AllPrep

QIAGEN RNA/DNA Maxi Kit

For purification of total RNA, parallel purification of RNA and genomic DNA, and purification of low-molecular-weight RNA*

- Ultrapure RNA and DNA from the same sample
- Flexibility to purify low-molecular-weight RNA, total RNA, or both RNA and DNA, or cleanup RNA
- No phenol/chloroform extraction or CsCl ultracentrifugation

Product description

The QIAGEN RNA/DNA Maxi Kit enables purification of nucleic acids in QIAGEN-tips using anion-exchange technology. Either total RNA or both total RNA and genomic DNA are eluted from QIAGEN-tips, depending on the procedure followed. Up to 1000 µg RNA and/or up to 500 µg DNA can be purified.

Applications

Since QIAGEN anion-exchange technology completely avoids the use of phenol, RNA and DNA purified using QIAGEN-tips are ideal for both standard and highly sensitive biological applications, including:

- Gene expression research
- PCR and RT-PCR
- Northern and Southern blotting
- RNase protection
- Primer extension
- Differential display
- Restriction and RFLP analysis
- Bacterial fingerprinting with LMW RNAs

The QIAGEN RNA/DNA Maxi Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* Additional buffer required for purification of low-molecular-weight RNAs (e.g., tRNA and 5S rRNA).

Product	Contents	Cat. no.
QIAGEN RNA/DNA Maxi Kit (10)	10 QIAGEN-tip 500, RNase-free Reagents and Buffers	14162

For further information: www.qiagen.com/PG/AllPrep

AllPrep RNA/Protein Kit

For simultaneous purification of total RNA and protein from the same cultured cell sample

- Convenient purification of RNA and protein — high-quality RNA and native protein from the same sample
- Rapid procedure — streamlined, spin-column-based protocol
- Efficient sample preparation — high yields of total RNA and protein
- Ready-to-use RNA and protein — for high performance in downstream applications

Product description

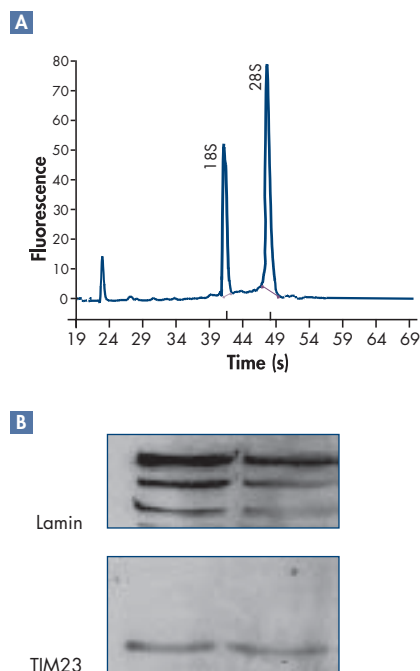
The AllPrep RNA/Protein Kit allows the simultaneous purification of total RNA and native protein from the same cultured cell sample. For applications where only denatured protein is required (e.g., SDS-PAGE and Western blotting), there is a supplementary protocol for RNeasy Kits and the AllPrep DNA/RNA Mini Kit that allows the simultaneous purification of total RNA and denatured protein from cells and tissues (www.qiagen.com/literature/protocols/pdf/RY22.pdf).

Applications

Total RNA purified using the kit can be used in any downstream application, including RT-PCR, real-time RT-PCR, differential display, and cDNA synthesis. Proteins purified using the kit remain in their native state and are suitable for use in many protein applications, including 1D and 2D gel electrophoresis, Western blotting, enzyme assays,* and LiquiChip assays.* The AllPrep RNA/Protein Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

* The functionality of the protein of interest has to be tested according to its properties.

High-Quality RNA and Protein Fractions



A Total RNA was purified from HeLa cells using the AllPrep RNA/Protein Kit and analyzed on the Agilent 2100 bioanalyzer. The rRNA ratio (28S/18S) was 2.04 and the RIN value was 10.

B Total protein was purified from HeLa cells using the AllPrep RNA/Protein Kit. Western blot analysis of lamin (nuclear protein) and TIM23 (mitochondrial protein) demonstrates that proteins from subcellular compartments are present in the total protein fraction.

Product	Contents	Cat. no.
AllPrep RNA/Protein Kit (50)	50 RNeasy Mini Spin Columns, 50 AllPrep Mini Spin Columns, 50 Protein Cleanup Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	80404

For further information: www.qiagen.com/PG/AllPrep

RNA cleanup and concentration

	Spin column			High throughput		
Total RNA cleanup						
Enzymatic reactions		■			■	
Total RNA cleanup and concentration						
Enzymatic reactions	□	□	■		□	
Poly A⁺ RNA cleanup						
Poly A ⁺ in vitro transcripts				■		
Total RNA				■		■

■: Recommended kit. □: Compatible kit.

RNeasy Micro Kit (page 144)

RNeasy Kits (page 145)

RNeasy MinElute Cleanup Kit (page 165)

Oligotex mRNA Kits (page 151)

RNeasy 96 Kit (page 153)

TurboCapture mRNA Kits (page 157)

RNeasy MinElute Cleanup Kit

For RNA cleanup and concentration with small elution volumes

- Efficient cleanup of enzymatic reactions — remove RNases, nucleotides, and other impurities
- Concentration of small amounts of RNA to only 10 μ l — for sensitive applications
- Cleanup of RNA purified by different methods — including crude preps
- High-quality RNA in less than 15 minutes — no time-consuming precipitation or vacuum centrifugation

Product description

The RNeasy MinElute Cleanup Kit enables cleanup and concentration of RNA from enzymatic reactions or other samples using specialized RNeasy MinElute spin columns based on silica-membrane technology. The kit can also be used to desalt RNA samples. Up to 45 μ g RNA can be purified in a volume as low as 10 μ l.

Applications

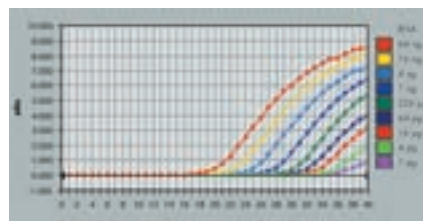
RNA purified with RNeasy technology has A_{260}/A_{280} ratios of 1.9–2.1* and is ideal for use in all applications, including:

- Northern, dot, and slot blotting
- RT-PCR and quantitative, real-time RT-PCR
- Array analysis
- Poly A⁺ RNA selection

The RNeasy MinElute Cleanup Kit is intended for research use. No claim or representation is intended to provide information for the diagnosis, prevention, or treatment of a disease.

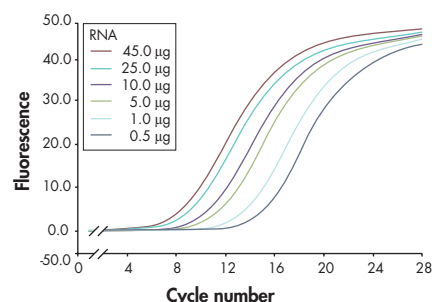
* Measured in 10 mM Tris-Cl, pH 7.5.

Concentration of Picogram Amounts of RNA



The indicated amounts of total RNA from HeLa cells were concentrated using the RNeasy MinElute Cleanup Kit, and 5 μ l of each 12 μ l eluate was used for RT-PCR. Real-time RT-PCR was carried out on an ABI Sequence Detection System using the QuantiTect Probe RT-PCR Kit (page 202), with primers and probes specific for β -actin.

Reliable Cleanup of up to 45 μ g RNA



The indicated amounts of total RNA from HeLa cells were concentrated using the RNeasy MinElute Cleanup Kit. Real-time RT-PCR was carried out on the LightCycler system using the QuantiTect Probe RT-PCR Kit, with primers and probes specific for the p16 gene.

Product	Contents	Cat. no.
RNeasy MinElute Cleanup Kit (50)	50 RNeasy MinElute Spin Columns, Collection Tubes (1.5 ml and 2 ml), RNase-Free Reagents and Buffers	74204

For further information: www.qiagen.com/PG/RNAcleanup