July 2006

RNA*later*® Handbook

RNA*later* TissueProtect Tubes

For collection of harvested animal tissues with immediate stabilization of the gene expression profile, and subsequent transport and storage

RNA*later* RNA Stabilization Reagent

For immediate stabilization of the gene expression profile in harvested animal tissues

Trademarks: QIAGEN®, BioRobot®, MagAttract®, MinElute®, Oligotex®, RNeasy® (QIAGEN Group); LightCycler®, TaqMan® (Roche Group); PAXgene™ (PreAnalytiX GmbH). "RNA*later*®" is a trademark of AMBION, Inc., Austin, Texas and is covered by various U.S. and foreign patents.

QIAzol Lysis Reagent is a subject of US Patent No. 5,346,994 and foreign equivalents.

Oligotex Kits are not available in Japan.

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Kit Contents

RNA*later* TissueProtect Tubes	**(50 x 1.5 ml)**	**(20 x 5 ml)**
Catalog no.	**76154**	**76163**
RNA*later* RNA Stabilization Reagent (1.5 ml)	50	–
RNA*later* RNA Stabilization Reagent (5 ml)	–	20
Handbook	1	1

RNA*later* RNA Stabilization Reagent	**(50 ml)**	**(250 ml)**
Catalog no.	**76104**	**76106**
RNA*later* RNA Stabilization Reagent	50 ml	250 ml
Handbook	1	1

Storage

RNA*later* TissueProtect Tubes and RNA*later* RNA Stabilization Reagent should be stored dry at room temperature (15–25°C) and are stable for at least 12 months under these conditions.

Storage of RNA*later* RNA Stabilization Reagent at lower temperatures may cause precipitation. Before using the reagent, redissolve the precipitate by heating to 37°C with agitation.

Quality Control

In accordance with QIAGEN's ISO-certified Quality Management System, each lot of RNA*later* TissueProtect Tubes and RNA*later* RNA Stabilization Reagent is tested against predetermined specifications to ensure consistent product quality.

Product Use Limitations

RNA*later* TissueProtect Tubes and RNA*later* RNA Stabilization Reagent are intended for research applications. No claim or representation is intended for their use to provide information for the diagnosis, prevention, or treatment of a disease.

All due care and attention should be exercised in the handling of the products. We recommend all users of QIAGEN® products to adhere to the NIH guidelines that have been developed for recombinant DNA experiments, or to other applicable guidelines.

Product Warranty and Satisfaction Guarantee

QIAGEN guarantees the performance of all products in the manner described in our product literature. The purchaser must determine the suitability of the product for its particular use. Should any product fail to perform satisfactorily due to any reason other than misuse, QIAGEN will replace it free of charge or refund the purchase price. We reserve the right to change, alter, or modify any product to enhance its performance and design. If a QIAGEN product does not meet your expectations, simply call your local Technical Service Department or distributor. We will credit your account or exchange the product — as you wish. Separate conditions apply to QIAGEN scientific instruments, service products, and to products shipped on dry ice. Please inquire for more information.

A copy of QIAGEN terms and conditions can be obtained on request, and is also provided on the back of our invoices. If you have questions about product specifications or performance, please call QIAGEN Technical Services or your local distributor (see back cover).

Technical Assistance

At QIAGEN we pride ourselves on the quality and availability of our technical support. Our Technical Service Departments are staffed by experienced scientists with extensive practical and theoretical expertise in molecular biology and the use of QIAGEN products. If you have any questions or experience any difficulties regarding RNA*later* TissueProtect Tubes, RNA*later* RNA Stabilization Reagent, or QIAGEN products in general, please do not hesitate to contact us.

QIAGEN customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at QIAGEN. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance and more information please call one of the QIAGEN Technical Service Departments or local distributors (see back cover).

Safety Information

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. For more information, please consult the appropriate material safety data sheets (MSDSs). These are available online in convenient and compact PDF format at www.qiagen.com/ts/msds.asp where you can find, view, and print the MSDS for each QIAGEN kit and kit component.

24-hour emergency information

Emergency medical information in English, French, and German can be obtained 24 hours a day from:

Poison Information Center Mainz, Germany

Tel: +49-6131-19240

Introduction

RNA stabilization is an absolute prerequisite for reliable gene expression analysis. Immediate stabilization of RNA in biological samples is necessary because, directly after harvesting the samples, changes in the gene expression pattern occur due to specific and nonspecific RNA degradation as well as to transcriptional induction. Such changes need to be avoided for all reliable quantitative gene expression analyses, such as microarray analysis, quantitative RT-PCR, such as TaqMan® and LightCycler® technology, and other nucleic acid-based technologies.

RNA*later* RNA Stabilization Reagent is a novel technology for immediate preservation of the gene expression pattern in animal tissues, enabling reliable gene expression analysis. After harvesting, tissues are immediately submerged in RNA*later* RNA Stabilization Reagent, which rapidly permeates the tissues to stabilize and protect cellular RNA in situ. The reagent preserves RNA for up to 1 day at 37°C, 7 days at 15–25°C, or 4 weeks at 2–8°C, allowing transportation, storage, and shipping of samples without ice or dry ice. Alternatively, the samples can be archived at –20°C or –80°C. During storage or transport in RNA*later* RNA Stabilization Reagent, even at elevated temperatures (e.g., room temperature or 37°C), the cellular RNA remains intact and undegraded. RNA*later* technology allows large numbers of samples to be easily processed and replaces inconvenient, dangerous, and equipment-intensive methods, such as snap-freezing of samples in liquid nitrogen, storage at –80°C, cutting and weighing on dry ice, or immediate processing of harvested samples.

Note: RNA*later* RNA Stabilization Reagent is not suitable for stabilization of RNA in animal cells, whole blood, plasma, or serum. The reagent also cannot be used to stabilize RNA in adipose tissue due to the high abundance of fat (however, RNA stabilization of other fatty tissues such as brain is possible).

This handbook provides a detailed protocol for stabilization of RNA in harvested animal tissues. Purification of RNA from the stabilized tissues can then be performed using QIAGEN kits (see Table 1).

Table 1. QIAGEN Kits for RNA Purification from Stabilized Tissues

RNA purified	Procedure	QIAGEN kit
Total RNA	Manual	RNeasy® Micro Kit RNeasy Mini Kit or RNeasy Protect Mini Kit RNeasy Midi Kit or RNeasy Protect Midi Kit* RNeasy Maxi Kit or RNeasy Protect Maxi Kit* RNeasy Plus Mini Kit RNeasy Fibrous Tissue Mini Kit RNeasy Fibrous Tissue Midi Kit* RNeasy Lipid Tissue Mini Kit RNeasy Lipid Tissue Midi Kit*
Total RNA	Manual (high-throughput)	RNeasy 96 Universal Tissue Kit†
Total RNA	Automated (1–6 samples/run)	EZ1 RNA Tissue Mini Kit‡§ EZ1 RNA Universal Tissue Kit‡
Total RNA	Automated (6–48 samples/run)	MagAttract® RNA Tissue Mini M48 Kit¶§ MagAttract RNA Universal Tissue M48 Kit¶
Total RNA	Automated (96 samples/run)	RNeasy 96 Universal Tissue 8000 Kit**
Total RNA and genomic DNA	Manual	AllPrep DNA/RNA Mini Kit
mRNA	Manual	Oligotex® Direct mRNA Micro Kit Oligotex Direct mRNA Mini Kit Oligotex Direct mRNA Midi/Maxi Kit

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

† Requires the QIAGEN 96-Well-Plate Centrifugation system and, optionally, the QIAvac 96 vacuum manifold.

‡ Requires the BioRobot® EZ1 and EZ1 RNA Card.

§ Can also be used to purify total RNA and genomic DNA in the same eluate.

¶ Requires the BioRobot M48 and App. Package, M48, Gene Expression.

** Requires the BioRobot Universal System and Application Pack, Gene Expression; BioRobot Gene Expression — Real-Time RT-PCR (no longer available); or BioRobot 8000.

The range of QIAGEN kits for RNA purification is continuously expanding. Visit www.qiagen.com/RNA to find out about the latest kits.

Important Notes

RNA stabilization

RNA in harvested animal tissue is not protected until the tissue is completely submerged in a sufficient volume of RNA*later* RNA Stabilization Reagent. After harvesting, the tissue should be **immediately** placed in **at least 10 volumes of the reagent (or approximately 10 µl reagent per 1 mg tissue)**. Larger volumes can be used if necessary or desired. Smaller volumes may lead to RNA degradation during storage. Storage containers should be wide enough so that the reagent covers the entire tissue. Storage containers or tubes with large diameters may require more reagent to completely cover the tissue. The procedures for tissue harvesting and RNA stabilization should be carried out as quickly as possible.

Tissue size is critical for successful RNA stabilization with RNA*later* RNA Stabilization Reagent. Immediately upon contact, the reagent diffuses into the surface layer and outer portions of solid tissues. To ensure rapid and reliable stabilization of RNA even in the inner parts of solid tissues, the sample must be cut into slices **less than 0.5 cm thick**. The slices can be any convenient size, provided one dimension of the sample is <0.5 cm. If the slices are thicker than 0.5 cm, the reagent will diffuse too slowly into the interior of the sample and RNA degradation will occur. Small organs such as rat kidney and spleen or most mouse organs (except liver) do not require slicing: the entire organ can be placed in RNA*later* RNA Stabilization Reagent.

The following guide may help you to determine the amount of RNA*later* RNA Stabilization Reagent required for RNA stabilization:

- A cube of rat kidney with a 5 mm edge length ($[5\ mm]^3 = 125\ mm^3 = 125\ \mu l$) weighs 150–175 mg and requires at least 1.5–1.75 ml of the reagent.
- A 3 mm cube ($[3\ mm]^3 = 27\ mm^3 = 27\ \mu l$) of most animal tissues weighs 30–35 mg and requires at least 300–350 µl of the reagent.

Although weighing tissues is generally more accurate, RNA in unstabilized tissues will degrade during weighing. In some cases, however, it may be more convenient to quickly estimate the weight of tissue pieces. Average weights of various entire adult mouse organs and the corresponding amounts of RNA*later* RNA Stabilization Reagent to use are given in Table 2.

RNA in tissues weighing up to 150 mg can be stabilized in 1.5 ml RNA*later* TissueProtect Tubes. For tissue pieces weighing more than 150 mg and less than 500 mg, 5 ml RNA*later* TissueProtect Tubes can be used.

Table 2. Tissue Weights and Amounts of RNA*later* RNA Stabilization Reagent

Mouse organ	Weight (mg)	Minimum amount of RNA*later* RNA Stabilization Reagent (ml)	Appropriate RNA*later* TissueProtect Tube
Kidney	180–250	1.8–2.5	5 ml
Spleen	100–160	1–1.6	1.5 ml or 5 ml
Lung	190–210	1.9–2.1	5 ml
Heart	100–170	1–1.7	1.5 ml or 5 ml
Liver	1000–1800	10–18	Use other container

RNA purification

Before using a QIAGEN kit (see Table 1, page 8) to purify RNA from tissues stabilized with RNA*later* RNA Stabilization Reagent, carefully read the handbook supplied with the kit. The handbook provides guidelines on determining the amount of starting material and on choosing the appropriate method for disruption and homogenization of tissues. Optimal RNA yield and purity depend on using the correct amount of starting material and on efficient disruption and homogenization.

Weighing tissue is the most accurate way to quantify the amount of starting material. Storage in RNA*later* RNA Stabilization Reagent does not dissolve or disrupt the structure of tissue samples. Stabilized tissue can be removed from the reagent for weighing and cutting at room temperature. The tissue pieces can then be used for RNA purification or returned to the reagent for continued storage.

After storage in RNA*later* RNA Stabilization Reagent, tissues become slightly harder than fresh or thawed tissues. However, disruption and homogenization of this tissue is usually not a problem.

Tissues stored in RNA*later* RNA Stabilization Reagent at –20°C can be thawed prior to cutting and weighing at room temperature. RNA remains intact for up to 20 freeze–thaw cycles.

Protocol: Stabilization of RNA in Harvested Animal Tissues

This protocol describes how to stabilize and store human and animal tissues in RNA*later* RNA Stabilization Reagent. For RNA purification from the stabilized tissues using a QIAGEN kit (see Table 1, page 8), refer to the handbook supplied with the kit.

Important points before starting

- If using RNA*later* TissueProtect Tubes or RNA*later* RNA Stabilization Reagent for the first time, read "Important Notes" (page 9).
- RNA*later* RNA Stabilization Reagent may form a precipitate during storage below room temperature (15–25°C). Before using the reagent, redissolve the precipitate by heating to 37°C with agitation.
- RNA*later* TissueProtect Tubes are for single use only. Do not reuse.
- Only fresh, unfrozen tissues can be stabilized using RNA*later* RNA Stabilization Reagent. Previously frozen tissues thaw too slowly in the reagent, preventing the reagent from diffusing into the tissues quickly enough to prevent RNA degradation.

Procedure

1. **Before excising the tissue sample, estimate the volume (or weight) of the sample to be stabilized in RNA*later* RNA Stabilization Reagent.**
2. **Determine the appropriate volume of RNA*later* RNA Stabilization Reagent for preserving the tissue. At least 10 volumes of the reagent (or approximately 10 µl reagent per 1 mg of tissue) is required. Pipet the correct amount of reagent into an appropriate collection vessel, or choose the appropriate sized RNA*later* TissueProtect Tube.**

   Note: Be sure to completely submerge the tissue in RNA*later* RNA Stabilization Reagent. For details, see "Important Notes", page 9.
3. **Excise the tissue sample from the animal and, if necessary, cut it into slices less than 0.5 cm thick. Perform this step as quickly as possible and proceed immediately to step 4.**

   Note: For effective RNA stabilization, the tissue sample must be less than 0.5 cm thick. For details, see "Important Notes", page 9.
4. **Completely submerge the tissue piece(s) in the collection vessel containing RNA*later* RNA Stabilization Reagent from step 2.**

   Note: The tissue sample must be **immediately** submerged in RNA*later* RNA Stabilization Reagent to protect the RNA.

5. **Store the tissue submerged in RNA*later* RNA Stabilization Reagent for up to 4 weeks at 2–8°C, up to 7 days at 15–25°C, or up to 1 day at 37°C.**

   For archival storage at –20°C, first incubate the tissue overnight in the reagent at 2–8°C. Then transfer the tissue, in the reagent, to –20°C for storage.

   For archival storage at –80°C, first incubate the tissue overnight in the reagent at 2–8°C. Then remove the tissue from the reagent, and transfer it to –80°C for storage.

   Note: Lower temperatures are recommended for longer storage (e.g., 2–8°C for up to 4 weeks instead of 37°C or room temperature; –20°C or –80°C for longer storage).

   Tissues stored in RNA*later* RNA Stabilization Reagent at –20°C may not freeze. The low temperature may cause the formation of crystals or a precipitate in the reagent. This will not affect subsequent RNA purification. There is no need to redissolve the precipitate.

   RNA*later* stabilized tissues stored at –20°C or –80°C can be thawed at room temperature and frozen again for up to 20 freeze–thaw cycles without affecting RNA quality or yield.

   If transporting tissue samples in RNA*later* RNA Stabilization Reagent, ensure that the tissues always remain submerged in the reagent. Either keep the tubes upright during transport or fill the tubes completely with RNA*later* RNA Stabilization Reagent.

6. **After storage, purify RNA using a QIAGEN kit (see Table 1, page 8).**

   Be sure to remove tissues from RNA*later* RNA Stabilization Reagent prior to disruption and homogenization in the RNA purification procedure. If tissues were stored at –20°C, remove any crystals that may have formed.

Troubleshooting Guide

This troubleshooting guide may be helpful in solving any problems that may arise. The scientists in QIAGEN Technical Services are always happy to answer any questions you may have about either the information and protocol in this handbook or molecular biology applications (see back cover for contact information).

		Comments and suggestions
RNA degraded		
a)	Harvested animal tissue not immediately stabilized	Submerge the tissue in the appropriate volume of RNA*later* RNA Stabilization Reagent immediately after harvesting.
b)	Too much animal tissue for proper stabilization	Reduce the amount of tissue, increase the amount of RNA*later* RNA Stabilization Reagent, or use 5 ml RNA*later* TissueProtect Tubes (see "Important Notes", page 9).
c)	Animal tissue too thick for stabilization	Cut large samples into slices less than 0.5 cm thick for stabilization in RNA*later* RNA Stabilization Reagent.
d)	Animal tissue not fully submerged in RNA*later* RNA Stabilization Reagent	Ensure that the tissue remains fully submerged in the RNA*later* RNA Stabilization Reagent. Smaller tissues may tend to stick to the lid or the side of the container.
e)	Frozen animal tissue used for stabilization	Use only fresh, unfrozen tissue for stabilization in RNA*later* RNA Stabilization Reagent.
f)	Storage duration in RNA*later* RNA Stabilization Reagent exceeded	RNA*later* stabilized tissue can be stored for up to 1 day at 37°C, up to 7 days at 15–25°C, or up to 4 weeks at 2–8°C, and can be archived at –20°C or –80°C. We recommend lower temperatures whenever possible.
g)	RNA degradation during RNA purification	Although all QIAGEN buffers for RNA purification have been tested and are guaranteed RNase-free, RNases can be introduced during use. Be certain not to introduce any RNases during RNA purification or later handling. See the handbook supplied with the QIAGEN RNA purification kit for general remarks on handling RNA.

Ordering Information

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
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
RNeasy Micro Kit — for purification of concentrated total RNA from small amounts of tissue or small numbers of cells		
RNeasy Micro Kit (50)	50 RNeasy MinElute® Spin Columns, Collection Tubes, RNase-Free DNase I, Carrier RNA, RNase-Free Reagents and Buffers	74004
RNeasy Kits — for purification of total RNA from animal cells or tissues, yeast, or bacteria		
RNeasy Mini Kit (50)*	50 RNeasy Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	74104
RNeasy Midi Kit (10)*	10 RNeasy Midi Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	75142
RNeasy Maxi Kit (12)	12 RNeasy Maxi Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	75162

* Larger kit size available; see www.qiagen.com/RNA .

Ordering Information

Product	Contents	Cat. no.
RNeasy Plus Mini Kit — for purification of total RNA from cultured cells and tissues using gDNA Eliminator columns		
RNeasy Plus Mini Kit (50)	50 RNeasy Mini Spin Columns, 50 gDNA Eliminator Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	74134
RNeasy Fibrous Tissue Kits — for purification of total RNA from fiber-rich tissues		
RNeasy Fibrous Tissue Mini Kit (50)	50 RNeasy Mini Spin Columns, Collection Tubes, 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, Proteinase K, RNase-Free DNase I, RNase-Free Reagents and Buffers	75742
RNeasy Lipid Tissue Kits — for purification of total RNA from fatty tissues		
RNeasy Lipid Tissue Mini Kit (50)	50 RNeasy Mini Spin Columns, Collection Tubes, QIAzol Lysis Reagent, RNase-Free Reagents and Buffers	74804
RNeasy Lipid Tissue Midi Kit (10)	10 RNeasy Midi Spin Columns, Collection Tubes, QIAzol Lysis Reagent, RNase-Free Reagents and Buffers	75842
RNeasy Protect Kits — for immediate stabilization of the gene expression profile in animal tissues and subsequent RNA purification		
RNeasy Protect Mini Kit (50)*	RNA*later* RNA Stabilization Reagent (50 ml), 50 RNeasy Mini Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	74124

* Larger kit size available; see www.qiagen.com/RNA .

Ordering Information

Product	Contents	Cat. no.
RNeasy Protect Midi Kit (10)*	RNA*later* RNA Stabilization Reagent (20 ml), 10 RNeasy Midi Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	75152
RNeasy Protect Maxi Kit (12)	RNA*later* RNA Stabilization Reagent (100 ml), 12 RNeasy Maxi Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	75182
RNeasy 96 Universal Tissue Kit — for high-throughput total RNA purification from any type of animal tissue		
RNeasy 96 Universal Tissue Kit (4)*†	For 4 x 96 total RNA preps: 4 RNeasy 96 Plates, Collection Microtubes, Elution Microtubes CL, Caps, S-Blocks, AirPore Tape Sheets, QIAzol Lysis Reagent, RNase-Free Reagents and Buffers	74881
EZ1 RNA Tissue Mini Kit — for automated total RNA purification from standard clinical tissues using the BioRobot EZ1		
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
EZ1 RNA Universal Tissue Kit — for automated total RNA purification from any type of human or animal tissue using the BioRobot EZ1		
EZ1 RNA Universal Tissue Kit (48)‡	For 48 RNA preps: Reagent Cartridges, Disposable Tips, Disposable Tip-Holders, Sample Tubes, Elution Tubes, QIAzol Lysis Reagent, Buffer RLT	956034

* Larger kit size available; see www.qiagen.com/RNA .

† Requires the QIAGEN 96-Well-Plate Centrifugation system and, optionally, the QIAvac 96 vacuum manifold. For ordering information, visit www.qiagen.com/products/accessories .

‡ Requires the BioRobot EZ1 and EZ1 RNA Card. For ordering information and recommended warranty, visit www.qiagen.com/automation .

Ordering Information

Product	Contents	Cat. no.
MagAttract RNA Tissue Mini M48 Kit — for automated total RNA purification from standard clinical tissues using the BioRobot M48		
MagAttract RNA Tissue Mini M48 Kit (192)*	For 192 RNA preps: MagAttract Suspension E, Buffers, RNase-Free DNase Sets	959236
MagAttract RNA Universal Tissue M48 Kit — for automated total RNA purification from any type of human or animal tissue using the BioRobot M48		
MagAttract RNA Universal Tissue M48 Kit (192)*	For 192 RNA preps: MagAttract Suspension E, Buffers, QIAzol Lysis Reagent	956336
RNeasy 96 Universal Tissue 8000 Kit — for automated, high-throughput RNA purification from any type of animal tissue using the BioRobot 8000 or BioRobot Universal System		
RNeasy 96 Universal Tissue 8000 Kit (12)†	For 12 x 96 total RNA preps: 12 RNeasy 96 Plates, Collection Microtubes, Elution Microtubes CL, Caps, S-Blocks, QIAzol Lysis Reagent, RNase-Free Reagents and Buffers	967852
AllPrep DNA/RNA Mini Kit — for simultaneous purification of genomic DNA and total RNA from the same cell or tissue sample		
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
Oligotex Direct mRNA Kits — for purification of poly A^+ mRNA directly from animal cells or tissues		
Oligotex Direct mRNA Micro Kit (12)	For 12 mRNA micropreps: 250 µl Oligotex Suspension, Small Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	72012

* Requires the BioRobot M48 and App. Package, M48, Gene Expression. For ordering information and recommended warranty, visit www.qiagen.com/automation .

† Requires the BioRobot Universal System and Application Pack, Gene Expression; BioRobot Gene Expression — Real-Time RT-PCR (no longer available); or BioRobot 8000. For ordering information and recommended warranty, visit www.qiagen.com/automation .

Ordering Information

Product	Contents	Cat. no.
Oligotex Direct mRNA Mini Kit (12)	For 12 mRNA minipreps: 420 µl Oligotex Suspension, Small Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	72022
Oligotex Direct mRNA Midi/ Maxi Kit (6/2)	For 6 mRNA midipreps or 2 mRNA maxipreps: 1 ml Oligotex Suspension, Large Spin Columns, Collection Tubes, RNase-Free Reagents and Buffers	72041

QIAGEN also provides products for stabilization and purification of RNA from:

- Human blood — PAXgene™ Blood RNA System
- Human saliva — RNeasy Protect Saliva Mini Kit
- Cultured cells — RNeasy Protect Cell Mini Kit
- Bacteria — RNeasy Protect Bacteria Kits

For details, visit www.qiagen.com/RNA .

QIAGEN Distributors and Importers

Please see the back cover for contact information for your local QIAGEN office.

Argentina
Tecnolab S.A.
Tel: (011) 4555 0010
Fax: (011) 4553 3331
E-mail: info@tecnolab.com.ar

Bangladesh
GeneTech Biotechnology
Tel: +880-2-8624304
Fax: +880-2-9568738
E-mail: info@genebiotechbd.com

Bosnia-Herzegovina
MEDILINE d.o.o.
Tel.: +386 1 830-80-40
Fax: +386 1 830-80-70
+386 1 830-80-63
E-mail: info@mediline.si

Brazil
Uniscience do Brasil
Tel: 011 3622 2320
Fax: 011 3622 2323
E-mail: info@uniscience.com

Chile
Biosonda SA
Tel: +562 209 6770
Fax: +562 274 5462
E-mail: ventas@biosonda.cl

China
Eastwin Scientific, Inc.
Order: +86-400-8182168
Tel: +86-10-51663168
Fax: +86-10-82898283
E-mail: laborder@eastwin.com.cn

Gene Company Limited
Tel: +86-21-64951899
Fax: +86-21-64955468
E-mail:
info_bj@genecompany.com (Beijing)
info_sh@genecompany.com (Shanghai)
info_cd@genecompany.com (Chengdu)
info_gz@genecompany.com
(Guangzhou)

Genetimes Technology, Inc.
Order: 800-820-5565
Tel: +86-21-54262677
Fax: +86-21-64398855
E-mail: order@genetimes.com.cn

Colombia
GENTECH – Genetics & Technology
Tel: (+57)(4)2519037
Fax: (+57)(4)2516555
E-mail:
gerencia@gentechcolombia.com
soporte@gentechcolombia.com

Croatia
INEL Medicinska Tehnika d.o.o.
Tel: (01) 2984-898
Fax: (01) 6520-966
E-mail:
inel-medicinska-tehnika@zg.htnet.hr

Cyprus
Scientronics Ltd
Tel: +357 22 467880/90
Fax: +357 22 764614
E-mail: a.sarpetsas@biotronics.com.cy

Czech Republic
BIO-CONSULT spol. s.r.o.
Tel/Fax: (+420) 2 417 29 792
E-mail: info@bioconsult.cz

Ecuador
INMUNOCHEM S.A.C.
Tel: +51 1 4409678
Fax: +51 1 4223701
E-mail: inmunochem@terra.com.pe

Egypt
Clinilab
Tel: 52 57 212
Fax: 52 57 210
E-mail: Clinilab@link.net

Estonia
Quantum Eesti AS
Tel: +372 7301321
Fax: +372 7304310
E-mail: quantum@quantum.ee

Greece
BioAnalytica S.A.
Tel: (210)-640 03 18
Fax: (210)-646 27 48
E-mail: bioanalyt@hol.gr

Hong Kong SAR
Gene Company Limited
Tel: +852-2896-6283
Fax: +852-2515-9371
E-mail: info@genehk.com

Genetimes Technology International Holding Ltd.
Tel: +852-2385-2818
Fax: +852-2385-1308
E-mail: hongkong@genetimes.com.hk

Hungary
BioMarker Kft.
Tel: +36 28 419 986
Fax: +36 28 422 319
E-mail: biomarker@biomarker.hu

India
Genetix
Tel: +91-11-51427031
Fax: +91-11-25419631
E-mail: genetix@genetixbiotech.com

Indonesia
PT Research Biolabs
Tel: +62 21 5865357
E-mail:
indonesia@researchbiolabs.com

Israel
Eldan Electronic Instruments Co. Ltd.
Tel: +972-3-937 1133
Fax: +972-3-937 1121
E-mail: bio@eldan.biz

Jordan
SAHOURY GROUP
Tel: +962 6 4633290-111
Fax: +962 6 4633290-110
E-mail: info@sahoury.com

Korea
LRS Laboratories, Inc.
Tel: (02) 924-86 97
Fax: (02) 924-86 96
E-mail: webmaster@lrslab.co.kr

Philekorea Technology, Inc.
Tel: 1544-3137
Fax: 1644-3137
E-mail: support@philekorea.co.kr

Latvia
SIA "J.I.M."
Tel: 7136393
Fax: 7136394
E-mail: jim@mednet.lv

Lithuania
INTERLUX
Tel: +370-5-2786850
Fax: +370-5-2796728
E-mail: spirit@interlux.lt

Malaysia
RESEARCH BIOLABS SDN. BHD.
Tel: (603)-8070 3101
Fax: (603)-8070 5101
E-mail: biolabs@tm.net.my

Mexico
Quimica Valaner S.A. de C.V.
Tel: (55) 55 25 57 25
Fax: (55) 55 25 56 25
E-mail: ventas@valaner.com

New Zealand
Biolab Ltd
Tel: (09) 980 6700
0800 933 966
Fax: (09) 980 6788
E-mail:
biosciences@nzl.biolabgroup.com

Oman
Al Mazouri Medical & Chemical Supplies
Tel: +971 4 266 1272
(ext. 301, 310, 311)
Fax: +971 4 269 0612
(ATTN: LAB DIVISION)
E-mail: shaji@almaz.net.ae

Pakistan
Pakistan Microbiological Associates
Tel: +92-51-5567953
Fax: +92-51-5514134
E-mail: orderpma@comsats.net.pk

Peru
INMUNOCHEM S.A.C.
Tel: +51 1 4409678
Fax: +51 1 4223701
E-mail: inmunochem@terra.com.pe

Poland
Syngen Biotech Sp.z.o.o.
Tel: (071) 798 58 50 - 52
Fax: (071) 798 58 53
E-mail: info@syngen.pl

Portugal
IZASA PORTUGAL, LDA
Tel: (21) 424 7312
Fax: (21) 417 2674
E-mail: consultasbiotec@izasa.es

Romania
Zyrcon Medical S. R. L
Tel: +40 21 2245607
Fax: +40 21 2245608
E-mail:
virgil.dracea@zyrconmedical.ro
secretariat@zyrconmedical.ro

Saudi Arabia
Abdulla Fouad Holding Company
Tel: (03) 8324400
Fax: (03) 8346174
E-mail:
sadiq.omar@abdulla-fouad.com

Singapore
Research Biolabs Pte Ltd
Tel: 6777 5366
Fax: 6778 5177
E-mail: sales@researchbiolabs.com

Slovak Republic
BIO-CONSULT Slovakia spol. s.r.o.
Tel/Fax: (02) 5022 1336
E-mail: bio-cons@cdicon.sk

Slovenia
MEDILINE d.o.o.
Tel: (01) 830-80-40
Fax: (01) 830-80-70
(01) 830-80-63
E-mail: info@mediline.si

South Africa
Southern Cross Biotechnology (Pty) Ltd
Tel: (021) 671 5166
Fax: (021) 671 7734
E-mail: info@scb.co.za

Spain
IZASA, S.A.
Tel: (93) 902.20.30.90
Fax: (93) 902.22.33.66
E-mail: consultasbiotec@izasa.es

Taiwan
TAIGEN Bioscience Corporation
Tel: (02) 2880 2913
Fax: (02) 2880 2916
E-mail: order@taigen.com

Thailand
Theera Trading Co. Ltd.
Tel: (02) 412-5672
Fax: (02) 412-3244
E-mail: theetrad@samart.co.th

Turkey
Medek Medikal Ürünler
ve Saglik Hizmetleri A. S.
Tel: (216) 302 15 80
Fax: (216) 302 15 88
E-mail: makialp@med-ek.com

United Arab Emirates
Al Mazouri Medical & Chemical Supplies
Tel: +971 4 266 1272
(ext. 301, 310, 311)
Fax: +971 4 269 0612
(ATTN: LAB DIVISION)
E-mail: shaji@almaz.net.ae

Uruguay
Bionova Ltda
Tel: +598 2 6130442
Fax : +598 2 6142592
E-mail: bionova@internet.com.uy

Venezuela
SAIXX Technologies c.a.
Tel: +58212 3248518
+58212 7616143
+58212 3255838
Fax: +58212 7615945
E-mail: ventas@saixx.com
saixxventas@cantv.net

Vietnam
Viet Anh Instruments Co., Ltd.
Tel: +84-4-5119452
Fax: +84-4-5119453
E-mail: VietanhHN@hn.vnn.vn

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