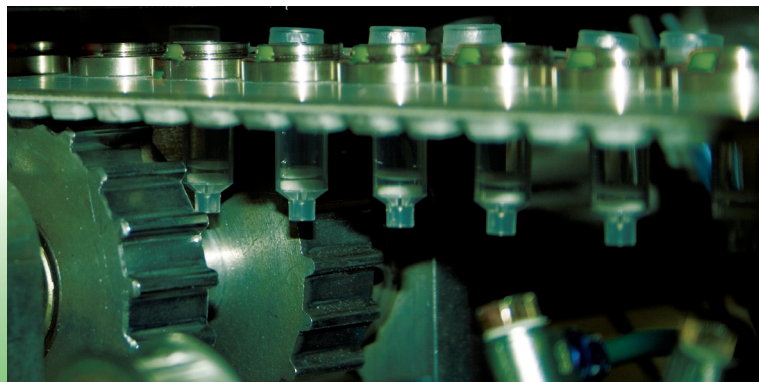


# RNA

The world of nucleic acid analysis also switches to the specific detection of different RNA species from a variety of different starting materials. MACHEREY-NAGEL has also become a new “RNA company” offering a very broad range of innovative methods and products for sophisticated RNA purification.

The MACHEREY-NAGEL RNA product line covers various RNA applications, like simultaneous RNA/DNA/protein isolation, ultra-sensitive RNA extraction, or selective small RNA purification.

<i>Total RNA from cells and tissue</i>	58
<i>MicroRNA, total RNA, and protein isolation</i>	65
<i>Total RNA, DNA, and protein isolation</i>	66
<i>Total RNA from plant</i>	70
<i>Total RNA and DNA from FFPE samples</i>	71
<i>RNA clean-up</i>	73
<i>Poly(A) mRNA isolation from total RNA</i>	75



[www.mn-net.com/RNA](http://www.mn-net.com/RNA)



## RNA · Summary of Products

### Total RNA from cells and tissue

Format	Sample	Product	Page
<b>Single prep (silica-membrane technology)</b>			
Mini spin columns	<30 mg tissue, <5 x 10 <sup>6</sup> cultured cells	NucleoSpin® RNA II	58
Mini spin columns – XS design	<5 mg tissue, 1 – 10 <sup>5</sup> cultured cells	NucleoSpin® RNA XS	59
Midi spin columns	<200 mg tissue, <5 x 10 <sup>7</sup> cultured cells	NucleoSpin® RNA L	60
Gravity-flow columns (anion-exchange chromatography)	<100 mg tissue, <2 x 10 <sup>7</sup> cultured cells	NucleoBond® RNA/DNA	61
<b>Manual and automated high throughput (HTP)</b>			
8-well strips, 96-well plates (silica-membrane technology)	<30 mg tissue, <10 <sup>7</sup> cultured cells	NucleoSpin® 8/96 RNA NucleoSpin® 8/96 RNA Core Kit	62
96-well systems (magnetic-bead technology)	<20 mg tissue, <2 x 10 <sup>6</sup> cultured cells	NucleoMag® 96 RNA	64

### MicroRNA, total RNA, and protein isolation

Format	Sample	Product	Page
<b>Single prep (silica-membrane technology)</b>			
Mini spin columns	<30 mg human/animal tissue, <50 mg plant tissue, <10 <sup>7</sup> cultured cells, <150 µL reaction mixture	NucleoSpin® miRNA	65

### Total RNA, DNA, and protein isolation

Format	Sample	Product	Page
<b>Single prep (silica-membrane technology)</b>			
<b>Total RNA, DNA, and protein isolation</b>			
Mini spin columns	<30 mg tissue, <100 mg plant tissue, <5 x 10 <sup>6</sup> cultured cells	NucleoSpin® TriPrep	66
<b>Total RNA and protein isolation</b>			
Mini spin columns	<30 mg tissue, <100 mg plant tissue, <5 x 10 <sup>6</sup> cultured cells	NucleoSpin® RNA/Protein	67
<b>Total RNA and DNA isolation</b>			
Buffer set	<30 mg tissue, <100 mg plant tissue, <5 x 10 <sup>6</sup> cultured cells	NucleoSpin® RNA/DNA Buffer Set	68
<b>Protein quantification</b>			
Buffer and reagent set		Protein Quantification Assay	69



## RNA · Summary of Products

### Total RNA from plant

Format	Sample	Product	Page
<b>Single prep (silica-membrane technology)</b>			
Mini spin columns	<100 mg plant tissue	NucleoSpin® RNA Plant	70

### Total RNA and DNA from FFPE samples

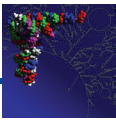
Format	Sample	Product	Page
<b>Single prep (silica-membrane technology)</b>			
<b>Total RNA from FFPE samples</b>			
Mini spin columns – XS design	≤7 sections (10 µm) of 250 mm <sup>2</sup> total area (<15 mg paraffin)	NucleoSpin® FFPE RNA	71
<b>Total RNA and DNA from FFPE samples</b>			
Mini spin columns – XS design	≤7 sections (10 µm) of 250 mm <sup>2</sup> total area (<15 mg paraffin)	NucleoSpin® FFPE RNA/DNA	72

### RNA clean-up

Format	Sample	Product	Page
<b>Single prep (silica-membrane technology)</b>			
Mini spin columns	≤200 µL phenol / chloroform extract or reaction mixture	NucleoSpin® RNA Clean-up	73
Mini spin columns – XS design	≤300 µL phenol / chloroform extract or reaction mixture	NucleoSpin® RNA Clean-up XS	74


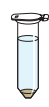

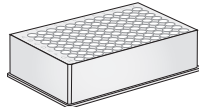

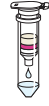





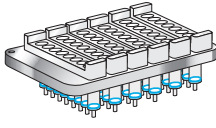
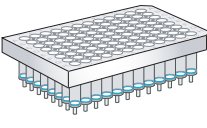

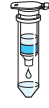

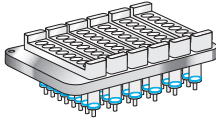
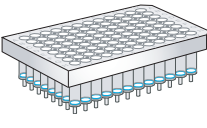



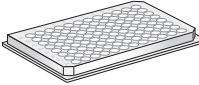
### Poly(A) mRNA isolation from total RNA

Format	Sample	Product	Page
<b>Single prep (affinity chromatography)</b>			
Latex beads	250 – 1 000 µg total RNA	NucleoTrap® mRNA	75

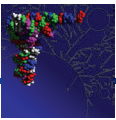


## RNA · Summary of Procedures

### Total RNA from cells and tissue

Single prep			Manual and automated HTP	
NucleoSpin® RNA II page 58	NucleoSpin® RNA XS page 59	NucleoSpin® RNA L page 60	NucleoSpin® 8 RNA page 62	NucleoSpin® 96 RNA page 62
 <p>sample, e.g., cells, tissue, bacteria, yeast</p> <p><b>lysis</b></p>	 <p>sample, e.g., small amounts of cells, tissue</p> <p><b>lysis</b></p>	 <p>sample, e.g., cells, tissue, bacteria, yeast</p> <p><b>lysis</b></p>	 <p>sample, e.g., cells, tissue</p> <p><b>lysis</b></p>	
 <p><b>homogenization by filtration</b></p> <p>NucleoSpin® Filter</p>	 <p><b>homogenization by filtration (optional)</b></p> <p>NucleoSpin® Filter</p>	 <p><b>homogenization by filtration</b></p> <p>NucleoSpin® Filter L</p>	 <p><b>homogenization by filtration (optional)</b></p> <p>NucleoSpin® RNA Filter Strips (not included)</p> <p>NucleoSpin® RNA Filter Plate (not included)</p>	
 <p><b>binding</b></p>	 <p><b>binding</b></p>	 <p><b>binding</b></p>	 <p><b>binding</b></p> <p>NucleoSpin® RNA Binding Strips</p>	 <p><b>binding</b></p> <p>NucleoSpin® RNA Binding Plate</p>
 <p><b>on-column rDNase digest washing</b></p>	 <p><b>on-column rDNase digest washing</b></p>	 <p><b>on-column rDNase digest washing</b></p>	 <p><b>on-column rDNase digest washing</b></p>	 <p><b>on-column rDNase digest washing</b></p>
 <p><b>elution</b> in 40 – 120 µL</p>	 <p><b>elution</b> in 5 – 30 µL</p>	 <p><b>elution</b> in 500 µL</p>	 <p><b>elution</b> in 50 – 130 µL</p>	

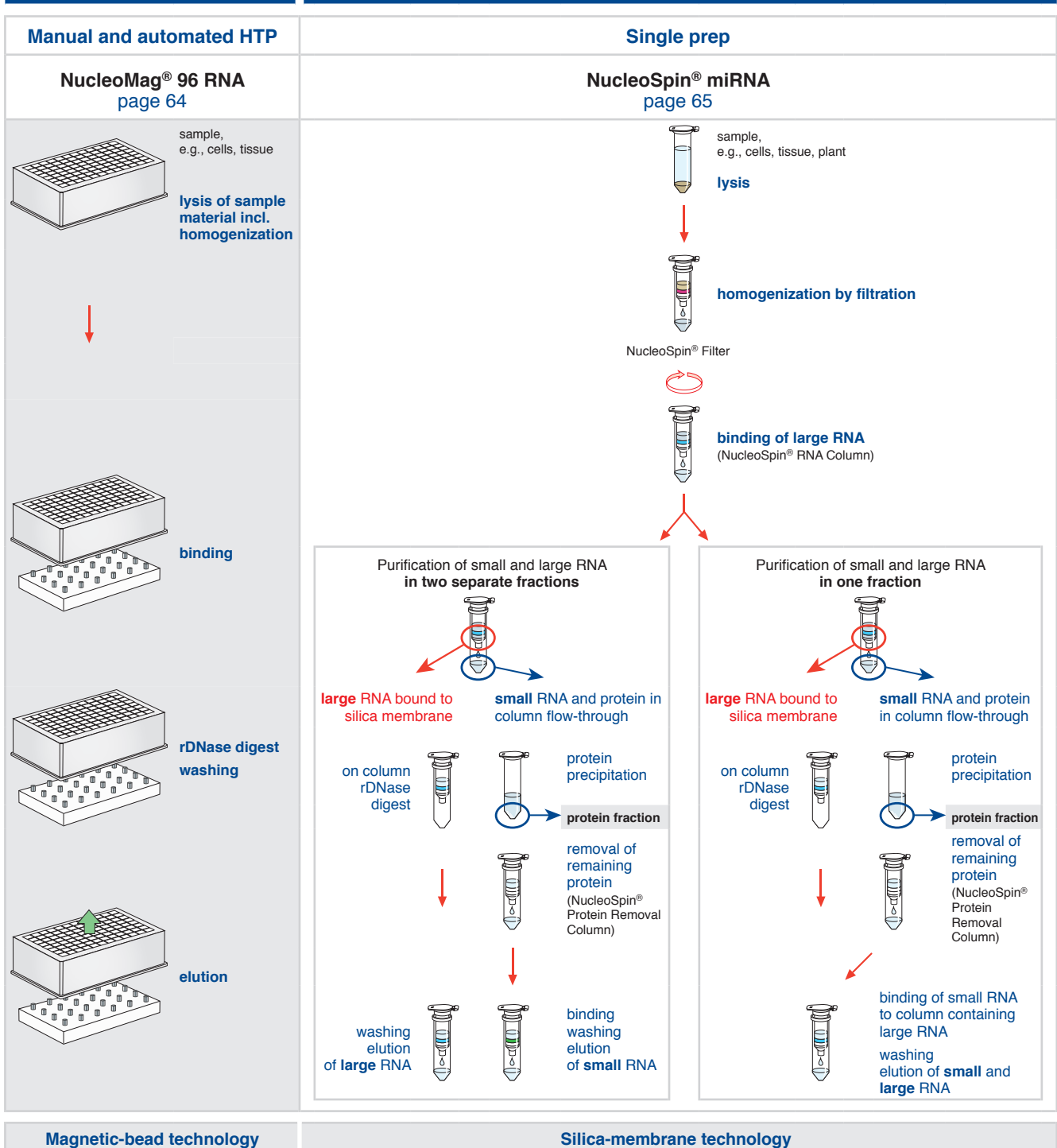
Silica-membrane technology

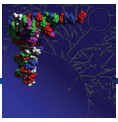


## RNA · Summary of Procedures

### Total RNA from cells + tissue

### MicroRNA, total RNA, and protein isolation





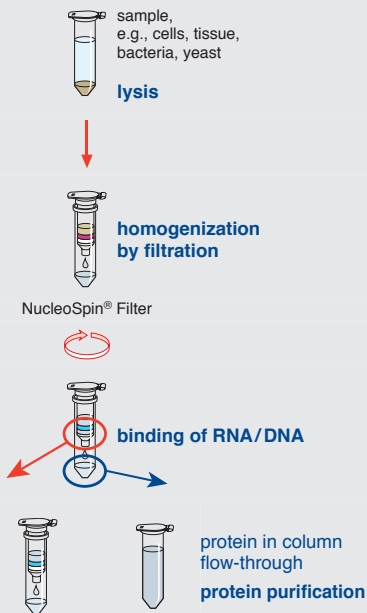
## RNA · Summary of Procedures

### Total RNA and protein isolation

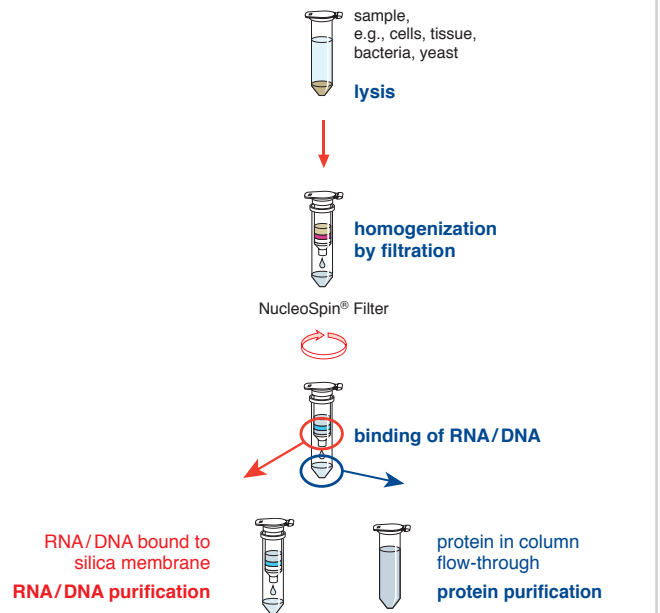
### Total RNA, DNA, and protein isolation

#### Single prep

#### NucleoSpin® RNA/Protein page 67



#### NucleoSpin® TriPrep page 66



#### DNA washing DNA elution

#### on-column rDNase digest washing

#### RNA elution in 40 – 120 µL

#### protein precipitation (special Protein Precipitator) washing of protein pellet

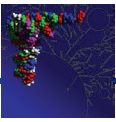
#### redissolving pellet in PSB (Protein Solving Buffer)

#### protein precipitation (special Protein Precipitator) washing of protein pellet

#### redissolving pellet in PSB (Protein Solving Buffer)

Silica-membrane technology

RNA





















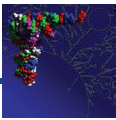
## RNA · Summary of Procedures

*Total RNA from FFPE samples*

*Total RNA from plant*

*RNA clean-up*

Single prep			
NucleoSpin® FFPE RNA page 71	NucleoSpin® RNA Plant page 70	NucleoSpin® RNA Clean-up page 73	NucleoSpin® RNA Clean-up XS page 74
 FFPE sample <b>paraffin removal</b>	 sample, e.g., plant cells, plant, tissue <b>lysis</b>	 sample, e.g., pre-purified RNA, reaction mixtures, small cell numbers	 sample, e.g., pre-purified RNA, reaction mixtures
↓	↓	↓	↓
 <b>lysis</b> <b>decrosslinking</b>	 <b>homogenization</b> <b>by filtration</b>	<b>homogenization</b> not necessary	<b>homogenization</b> not necessary
↓	NucleoSpin® Filter		
 <b>binding</b>	 <b>binding</b>	 <b>binding</b>	 <b>binding</b>
↻	↻	↻	↻
 <b>on-column</b> <b>rDNase digest</b> <b>washing</b>	 <b>on-column</b> <b>rDNase digest</b> <b>washing</b>	 <b>washing</b>	 <b>washing</b>
↻	↻	↻	↻
 <b>elution</b> in 5 – 30 µL	 <b>elution</b> in 40 – 120 µL	 <b>elution</b> in 40 – 120 µL	 <b>elution</b> in 5 – 30 µL
<b>Silica-membrane technology</b>			



# Total RNA from Cells and Tissue

<b>single prep</b>	<b>mini spin columns</b>
manual HTP	mini spin columns – XS design
automated HTP	midi spin columns
	gravity flow columns

## NucleoSpin® RNA II

*rDNase and NucleoSpin® Filters included*

### Features

#### Mini spin kit for the isolation of RNA of highest integrity

- Efficient removal of contaminating DNA – rDNase included for on-column DNA digestion
- Efficient sample homogenization and reduction of viscosity – NucleoSpin® Filters (shredders) included
- Up to 70 µg ready-to-use RNA
- Parallel purification of genomic DNA possible by using the NucleoSpin® RNA/DNA Buffer Set (page 68)



### Product at a glance

Technology	Silica-membrane technology
Format	Mini spin columns
Sample material	<5 x 10 <sup>6</sup> cultured cells, <10 <sup>9</sup> bacterial cells, <10 <sup>8</sup> yeast cells, <30 mg tissue
Fragment size	>200 b
Typical yield	14 µg from 10 <sup>6</sup> HeLa cells, 70 µg from 10 <sup>9</sup> bacterial cells
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1
Typical RIN (RNA integrity number)	>9
Elution volume	40 – 120 µL
Preparation time	30 min / 6 preps
Binding capacity	200 µg
Procedure chart see page 54	

### Applications\*

- Total RNA isolation from cultured cells, tissue (standard protocol)
- Support protocol for total RNA from < 10<sup>9</sup> bacterial cells (Gram-negative, Gram-positive) or < 10<sup>8</sup> yeast cells
- Support protocol for total RNA from ≤ 100 µL biological fluids
- Support protocol for RNA clean-up from reaction mixtures
- Support protocol for total RNA from samples stored in RNA<sub>later</sub>®
- Typical downstream applications: real-time RT-PCR, Northern blotting, primer extension, array technology, RNase protection assays

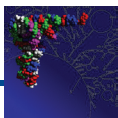
\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA II	10	NucleoSpin® RNA II Columns with Collection Tubes, Collection Tubes (2 mL), Collection Tubes (1.5 mL), NucleoSpin® Filters, buffers, RNase-free rDNase	740955.10
	50	as above	740955.50
	250	as above	740955.250

For separate kit components see “Accessories” page 137



# Total RNA from Cells and Tissue

single prep	mini spin columns
manual HTP	<b>mini spin columns – XS design</b>
automated HTP	midi spin columns
	gravity flow columns

## NucleoSpin® RNA XS

**5 µL elution volume → highly concentrated RNA**

### Features

#### Purification of highly concentrated RNA from smallest samples

- Isolation of RNA from small sample quantities like biopsy material or single cells
- Excellent RNA recovery and integrity
- Concentrated RNA for sensitive downstream applications by elution in as little as 5 µL
- rDNase included for on-column DNA removal
- Efficient homogenization and reduction of viscosity – NucleoSpin® Filters (shredders) included
- High quality RNA, ready to use for RT-PCR and other applications



### Product at a glance

Technology	Silica-membrane technology	
Format	Mini spin columns – XS design	
Sample material	Small amounts of tissue <5 mg, <100 000 cultured cells	
Fragment size	>200 b	
Typical yield	10 <sup>2</sup> HeLa cells: 0.1 – 1.5 ng	10 <sup>3</sup> HeLa cells: 10 – 15 ng
	10 <sup>4</sup> HeLa cells: 100 – 150 ng	10 <sup>5</sup> HeLa cells: 1 000 – 1 500 ng
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1	
Typical RIN (RNA integrity number)	>9 (depending on sample quality)	
Elution volume	5 – 30 µL	
Preparation time	40 min / 12 preps	
Binding capacity	110 µg	
Procedure chart	see page 54	

### Applications\*

- Total RNA isolation from cultured cells
- Total RNA isolation from tissue
- Total RNA isolation from cryosections
- Total RNA isolation from laser captured cells
- Total RNA isolation from small amounts of plant material
- Total RNA isolation from samples stored in RNA/late<sup>®</sup>
- Typical downstream applications: real-time RT-PCR, Northern blotting, primer extension, array technology, RNase protection assays

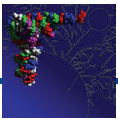
\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA XS	10	NucleoSpin® RNA XS Columns with Collection Tubes, Collection Tubes (2 mL), Collection Tubes (1.5 mL), NucleoSpin® Filters, buffers, RNase-free rDNase, Carrier RNA, Reducing Agent TCEP	740902.10
	50	as above	740902.50
	250	as above	740902.250

For separate kit components see “Accessories” page 137



# Total RNA from Cells and Tissue

single prep	mini spin columns
manual HTP	mini spin columns – XS design
automated HTP	<b>midi spin columns</b>
	gravity flow columns



## NucleoSpin® RNA L

*rDNase and NucleoSpin® Filters included*

### Features

#### Midi spin kit for the isolation of RNA of highest integrity

- Efficient removal of genomic DNA – rDNase included for on-column digestion
- Efficient sample homogenization and reduction of viscosity – NucleoSpin® Filters L (shredders) included
- Up to 600 µg ready-to-use RNA



### Product at a glance

Technology	Silica-membrane technology
Format	Midi spin columns
Sample material	<5 x 10 <sup>7</sup> cultured cells, <10 <sup>10</sup> bacterial cells, <3 x 10 <sup>8</sup> yeast cells, <200 mg tissue
Fragment size	>200 b
Typical yield	180 µg from 10 <sup>7</sup> HeLa cells, 620 µg from 4 x 10 <sup>7</sup> HeLa cells
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1
Typical RIN (RNA integrity number)	>9
Elution volume	500 µL
Preparation time	80 min / 4 preps
Binding capacity	700 µg
Procedure chart	see page 54

### Applications\*

- Total RNA isolation from cultured cells, tissue (standard protocol)
- Support protocol for total RNA from <10<sup>10</sup> bacterial cells (Gram-negative, Gram-positive) or <3 x 10<sup>8</sup> yeast cells
- Support protocol for RNA clean-up from reaction mixtures
- Support protocol for total RNA from samples stored in RNA/ater®
- Typical downstream applications: real-time RT-PCR, Northern blotting, primer extension, array technology, RNase protection assays

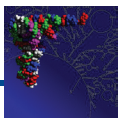
\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA L	20	NucleoSpin® RNA L Columns with Collection Tubes, Collection Tubes (15 mL), NucleoSpin® Filters L, buffers, RNase-free rDNase	740962.20

For separate kit components see "Accessories" page 137



## single prep

- manual HTP
- automated HTP

- mini spin columns
- mini spin columns – XS design
- midi spin columns
- gravity flow columns**



## NucleoBond® RNA/DNA

### Features

Anion-exchange chromatography – extra high purity for up to 400 µg total RNA

- Ultra-pure RNA from different samples
- Separate isolation of different RNA species (tRNA, rRNA, mRNA) possible
- Separate elution of genomic DNA possible

### Product at a glance

	NucleoBond® RNA/DNA 80	NucleoBond® RNA/DNA 400
Technology	Anion-exchange chromatography	
Format	Midi gravity-flow columns	Maxi gravity-flow columns
Sample material	5 x 10 <sup>6</sup> cultured eukaryotic cells 20 mg tissue 5 x 10 <sup>7</sup> bacteria/yeast cells	2 x 10 <sup>7</sup> eukaryotic cells 100 mg tissue 2 x 10 <sup>9</sup> bacteria/yeast cells
Fragment size	50 b – 300 kb	50 b – 300 kb
Typical RNA yield	70 µg from 5 x 10 <sup>6</sup> cultured cells 30 µg from 20 mg tissue 50 µg from 5 x 10 <sup>7</sup> bacteria	300 µg from 2 x 10 <sup>7</sup> cultured cells 150 µg from 100 mg tissue 200 µg from 2 x 10 <sup>9</sup> bacteria
A <sub>260</sub> /A <sub>280</sub>	1.80 – 1.95	1.80 – 1.95
Preparation time	1.5 – 2.5 h	1.5 – 2.5 h
Binding capacity	80 µg	400 µg



### Applications\*

- Total RNA from cultured cells, tissue, bacteria

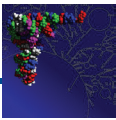
\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoBond® RNA/DNA 80	25	NucleoBond® AXR 80 Columns, buffers	740650
NucleoBond® RNA/DNA 400	10	NucleoBond® AXR 400 Columns, buffers	740651

For separate kit components see “Accessories” page 137



# Total RNA from Cells and Tissue

single prep	
manual HTP	
automated HTP	8-well strips
	96-well plates
	96-well systems

## NucleoSpin® 8/96 RNA · NucleoSpin® 8/96 RNA Core Kit

### Features

Isolation of total RNA in flexible 8-well strip format and for high throughput in approved 96-well format

- Time-saving parallel isolation of total RNA
- rDNase included for efficient removal of genomic DNA
- Processing under vacuum or by centrifugation
- Suitable for manual and automated processing
- Innovative MN Wash Plate minimizes risk of cross-contamination
- RNA ready to use for any kind of enzymatic reaction
- NucleoSpin® 8/96 RNA Core Kits:  
Kits with basic content focussed on automation platforms.  
Additional accessories can be combined as needed.



### Product at a glance

	NucleoSpin® 8 RNA NucleoSpin® 8 RNA Core Kit	NucleoSpin® 96 RNA NucleoSpin® 96 RNA Core Kit
Technology	Silica-membrane technology	
Format	8-well strips	96-well plates
Processing	Manual or automated, vacuum or centrifugation	
Sample material	< 10 <sup>7</sup> cultured cells (centrifugation), < 30 mg tissue (centrifugation), saliva (collected with Oragene®)	
Fragment size	>200 b	>200 b
Typical yield	<100 µg	<100 µg
A <sub>260</sub> /A <sub>280</sub>	1.90 – 2.10	1.90 – 2.10
Typical RIN (RNA integrity number)	>9 (cells) ≥ 7 (tissue)	>9 (cells) ≥ 7 (tissue)
RNA ratio	28S/18S ~ 2.1	28S/18S ~ 2.1
Typical concentration	50 – 200 ng/µL	50 – 200 ng/µL
Elution volume	50 – 130 µL	50 – 130 µL
Preparation time	45 min / 6 strips	70 min / plate
Binding capacity	100 µg	100 µg
Procedure chart see page 54		

### Applications\*

- Manual or automated isolation of total RNA from cultured cells and tissue
- Total RNA from saliva samples collected with Oragene® • RNA (Genotek)

\* Kits to be used for research purposes only (see page 160)

① For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)



## Total RNA from Cells and Tissue

single prep				
manual HTP				
automated HTP	<table border="1"> <tr> <td>8-well strips</td> </tr> <tr> <td><b>96-well plates</b></td> </tr> <tr> <td>96-well systems</td> </tr> </table>	8-well strips	<b>96-well plates</b>	96-well systems
8-well strips				
<b>96-well plates</b>				
96-well systems				

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® 8 RNA	12 x 8	NucleoSpin® RNA Binding Strips, MN Wash Plates, MN Square-well Block, Racks of Tube Strips, Elution Plate U-bottom, Self-adhering Foil, buffers, RNase-free rDNase	740698
	60 x 8	as above	740698.5
NucleoSpin® 8 RNA Core Kit	48 x 8	NucleoSpin® RNA Binding Strips, buffers, RNase-free rDNase	740465.4
NucleoSpin® 96 RNA	2 x 96	NucleoSpin® RNA Binding Plates, MN Wash Plates, MN Square-well Blocks, Round-well Block Low, Elution Plates U-bottom, Self-adhering Foil, buffers, RNase-free rDNase	740709.2
	4 x 96	as above	740709.4
	24 x 96	as above	740709.24
NucleoSpin® 96 RNA Core Kit	4 x 96	NucleoSpin® RNA Binding Plates, buffers, RNase-free rDNase	740466.4
Product accessories	Pack of	Specification	REF
NucleoVac 96 Vacuum Manifold	1		740681
NucleoVac Vacuum Regulator	1	for controlling of vacuum	740641
Starter Set A	1	for use of NucleoSpin® 8-well strips on the NucleoVac 96 Vacuum Manifold	740682
Starter Set C	1	for use of NucleoSpin® 8-well strips under centrifugation	740684
NucleoSpin® RNA Filter Plate	4	96-well plates for filtration of cell and tissue homogenates, for use under vacuum or centrifugation	740711
NucleoSpin® RNA Filter Strips	12	8-well strips for filtration of cell and tissue homogenates, for use under vacuum or centrifugation	740699.12F
	60	as above	740699.60F

For separate kit components see "Accessories" page 137



# Total RNA from Cells and Tissue

single prep	
manual HTP	
automated HTP	8-well strips
	96-well plates
	<b>96-well systems</b>



## NucleoMag® 96 RNA

### Features

#### Magnetic-bead based isolation of RNA from tissue and cell samples

- One-tube procedure minimizes risk of cross-contamination
- Small elution volumes  $\geq 50 \mu\text{L}$
- Suitable for manual and automated processing
- Recombinant DNase included
- Reducing agent TCEP included (no  $\beta$ -mercaptoethanol necessary)

### Product at a glance

Technology	Magnetic-bead technology
Format	Highly reactive superparamagnetic beads
Processing	Manual or automated
Sample material	$< 20 \text{ mg tissue, } < 2 \times 10^6 \text{ cells}$
Typical yield	$< 30 \mu\text{g}$
Elution volume	$\geq 50 \mu\text{L}$
Preparation time	$< 120 \text{ min / 96 preps}$
Binding capacity	Approx. $0.3 \mu\text{g} / \mu\text{L beads}$
Procedure chart	see page 55

### Applications\*

- Rapid manual and automated small-scale preparation of highly pure total RNA from tissue or cell samples

\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoMag® 96 RNA	1 x 96	NucleoMag® B-Beads, buffers, TCEP, RNase-free rDNase	744350.1
	4 x 96	as above	744350.4
<b>Material to be supplied by the user</b>			
Lysis tubes, e.g., Rack of Tube Strips	4 sets	incl. Cap Strips	740477
	24 sets		740477.24
Separation plate, e.g., Square-well Block	4		740481
	24		740481.24
Elution plate, e.g., Elution Plate U-bottom	24		740486.24
	1 set	Square-well Blocks, Deep-well Tip Combs and Elution Plates for 4 x 96 preparations	744951
<b>For use with KingFisher® 96 platform</b>			
KingFisher® 96 Accessory Kit B	1		
<b>Product accessories</b>			
	Pack of	Specification	REF
NucleoMag® SEP	1	magnetic separator	744900

For separate kit components see "Accessories" page 137



## NucleoSpin® miRNA

**No phenol/chloroform; additional protein isolation**

### Features

#### Parallel isolation of small and large RNA

- RNA purification fractionated by size:
  - Isolation of small RNA only (<200 b),
  - Isolation of small RNA (<200 b) and large RNA (>200 b) in two separate fractions
  - Isolation of total RNA (small and large RNA in one fraction)
- Additional isolation of total protein fraction ready to use for SDS-PAGE and Western blot analysis
- Excellent RNA recovery and purity by chaotropic salt lysis without phenol/chloroform
- NucleoSpin® Filters for efficient sample homogenization
- rDNase for efficient on-column removal of genomic DNA



### Product at a glance

Technology	Silica-membrane technology
Format	Mini spin columns
Sample material	<10 <sup>7</sup> cultured cells, <30 mg human / animal tissue, <50 mg plant tissue, <150 µL reaction mixture
Fragment size	Small RNA: <200 b, large RNA: >200 b
Typical yield	10 µg small RNA, 95 µg large RNA from 10 <sup>7</sup> HeLa cells
Elution volume	30 – 100 µL
Preparation time	<45 min (6 preps human / animal tissue, small and large RNA) <35 min (6 preps human / animal tissue, small RNA only)
Binding capacity	200 µg
Procedure chart	see page 55

### Applications\*

- Parallel isolation of small and large RNA from human / animal tissue and cultured cells, from plant tissue, and in combination with phenol / chloroform (e.g., TRIzol®) lysis
- Purification of siRNA and large dsRNA from DICER reactions
- Typical downstream applications: real-time RT-PCR, Northern blotting, chip hybridization

\* Kits to be used for research purposes only (see page 160)

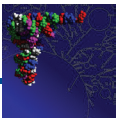
**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® miRNA	10**	NucleoSpin® RNA Columns, NucleoSpin® miRNA Columns, NucleoSpin® Protein Removal Columns, Collection Tubes (2 mL, 2 mL lid, 1.5 mL), NucleoSpin® Filters, buffers, RNase-free rDNase	740971.10
	50**	as above	740971.50
	250**	as above	740971.250

\*\* Kits for 10/50/250 preps are sufficient for 10/50/250 preps of small and large RNA when isolated in one fraction and are sufficient for 5/25/125 preps of small and large RNA when isolated separately

For separate kit components see "Accessories" page 137



## NucleoSpin® TriPrep

**NucleoSpin® Filters, rDNase, Protein Solving Buffer included**

### Features

#### Parallel isolation of RNA, DNA, and protein from undivided samples

- Convenient one-column preparation of RNA, DNA, and protein
- High quality RNA and DNA, ready to use for downstream applications
- High protein yield independent of protein size, localization, modification, etc.
- Easy protein quantification using the MACHEREY-NAGEL Protein Quantification Assay (page 69)
- Complete kit, including: NucleoSpin® Filters (shredders) for optimal lysis, rDNase for on-column DNA digestion, Protein Solving Buffer for solving all types of proteins



### Product at a glance

Technology	Silica-membrane technology		
Format	Mini spin columns		
Sample material	<5 x 10 <sup>6</sup> cultured cells, <30 mg human / animal tissue, <100 mg plant tissue		
	<b>Total RNA</b>	<b>Total DNA</b>	<b>Total protein</b>
Fragment size	>200 b	<30 kbp	15 – 300 kDa
Typical yield	<70 µg	<6 µg	<1200 µg
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1	1.7 – 1.9	–
Typical RIN (RNA integrity number)	>9	–	–
Elution volume (RNA and DNA)	40 – 120 µL	100 µL	10 – 100 µL
Resolubilization volume (protein)			
Preparation time	30 min / 6 preps	45 min / 6 preps (RNA+ DNA)	35 min / 6 preps
Binding capacity	200 µg	10 µg*	–

Procedure chart see page 56

### Applications\*\*

- Rapid purification of total RNA, DNA, and protein from small and precious samples – no sample splitting for different isolations necessary
- Gene expression profiling, analysis of transgenic organisms, drug screening, genotyping
- Reliable interpretation of RNA, DNA, and protein amounts
- Good preservation of protein primary structure and posttranslational modifications (e.g., protein phosphorylation) allows protein analysis without additional inhibitors (e.g., proteinase or phosphatase inhibitors)
- Suitable for a broad spectrum of starting materials, including cultured cells, tissue, bacteria, yeast, and plants
- RNA and DNA are ready to use for all typical downstream applications
- Proteins are ready to use for SDS-PAGE / Western blotting

\* Binding capacity of DNA ≤10 µg, strongly depending on RNA amount bound to the membrane.

\*\* Kits to be used for research purposes only (see page 160). DISTRIBUTION AND USE IN THE USA IS PROHIBITED FOR PATENT REASONS.

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® TriPrep	10	NucleoSpin® TriPrep Columns with Collection Tubes, Collection Tubes (2 mL), Collection Tubes (1.5 mL), NucleoSpin® Filters, buffers, RNase-free rDNase	740966.10
	50	as above	740966.50
	250	as above	740966.250

For separate kit components see "Accessories" page 137



## NucleoSpin® RNA/Protein

### Features

#### Parallel isolation of RNA and protein from undivided samples

- Reliable interpretation of RNA and protein extracted from the same sample  
→ direct correlation – no splitting of samples required
- High RNA yield and integrity
- High protein yield independent of protein size, localization, modification, etc.
- Easy protein quantification using the MACHEREY-NAGEL Protein Quantification Assay (page 69)
- Complete mini kit with NucleoSpin® Filters (shredders) and recombinant DNase for DNA-free RNA of high quality



### Product at a glance

Technology	Silica-membrane technology	
Format	Mini spin columns	
Sample material	<5 x 10 <sup>6</sup> cultured cells, <30 mg human / animal tissue, <100 mg plant tissue	
	<b>Total RNA</b>	<b>Total protein</b>
Fragment size	>200 b	15 – 300 kDa
Typical yield	<70 µg	<1200 µg
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1	–
Typical RIN (RNA integrity number)	>9	–
Elution volume (RNA)	40 – 120 µL	10 – 100 µL
Resolubilization volume (protein)		
Preparation time	30 min / 6 preps	35 min / 6 preps
Binding capacity	200 µg	–
Procedure chart see page 56		

### Applications\*

- Rapid purification of total RNA and protein from cultured cells and tissue
- Gene expression profiling, siRNA experiments, analysis of transgenic organisms, drug screening
- Broad spectrum of starting material tested and proteins already detected

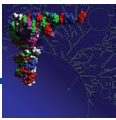
\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA/Protein	10	NucleoSpin® RNA/Protein Columns with Collection Tubes, Collection Tubes (2 mL), Collection Tubes (1.5 mL), NucleoSpin® Filters, buffers, RNase-free rDNase	740933.10
	50	as above	740933.50
	250	as above	740933.250

For separate kit components see “Accessories” page 137



## NucleoSpin® RNA/DNA Buffer Set

### Features

#### Parallel isolation of RNA and DNA from undivided samples in one working procedure

- To be used in combination with NucleoSpin® RNA II, NucleoSpin® RNA XS, NucleoSpin® miRNA, NucleoSpin® RNA Plant, NucleoSpin® RNA/Protein kits
- No need to split samples (e.g., precious, indivisible samples like biopsy material)
- High quality DNA and RNA from one sample, perfect for PCR, RT-PCR, real-time PCR
- Fast procedure

### Product at a glance

Format	Buffer set for elution of DNA in combination with RNA preparations, to be used in combination with NucleoSpin® RNA kits
Sample material	See NucleoSpin® RNA II, NucleoSpin® RNA XS, NucleoSpin® miRNA, NucleoSpin® RNA Plant, NucleoSpin® RNA/Protein
DNA size	<30 kbp
Typical DNA yield	5 µg from 10 <sup>6</sup> HeLa cells 16 µg from 30 mg pig liver 5 µg from 100 mg maize leaf
A <sub>260</sub> /A <sub>280</sub>	1.7 – 2.0
DNA elution volume	100 µL
RNA yield and purity	Identical to NucleoSpin® RNA II, NucleoSpin® RNA XS, NucleoSpin® miRNA, NucleoSpin® RNA Plant, NucleoSpin® RNA/Protein

### Applications\*

- For biopsy material: RNA for expression analysis; DNA for mutation analysis (e.g., of cancer genes)
- For ticks (*Ixodes ricinus*): RNA for analysis of RNA viruses (e.g., TBE-V, Tick-borne encephalitis virus, infectious agent of meningoencephalitis); DNA for analysis of germs (e.g., *Borrelia burgdorferi*, infective agent of the Lyme disease)
- For transgenic plants or animals: RNA for expression analysis of the transformed gene and /or other genes; DNA for analysis of integration site, integration number and sequence confirmation of the transformed gene
- For transfected cultured cells: RNA for expression analysis of the transgene or other genes of interest; DNA for analysis of methylation status of the transgene or other genes of interest

\* Kits to be used for research purposes only (see page 160). DISTRIBUTION AND USE IN THE USA IS PROHIBITED FOR PATENT REASONS.

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA/DNA Buffer Set	100	Buffers sufficient for 100 DNA isolations in combination with NucleoSpin® RNA II, NucleoSpin® RNA XS, NucleoSpin® miRNA, NucleoSpin® RNA Plant, or NucleoSpin® RNA/Protein kits	740944

For separate kit components see "Accessories" page 137



## Protein Quantification Assay

### Features

#### Fast, sensitive, and convenient assay for protein quantification

- Highest sensitivity and flexibility
- Reducing agent and detergent compatible
- Fast procedure allows protein quantification in only 40 min
- The perfect supplement for NucleoSpin® TriPrep, NucleoSpin® RNA/Protein, and NucleoSpin® miRNA

### Product at a glance

Format	Buffer and reagent set
Sample size	<600 µL containing 0.6 – 200 µg protein (BSA equivalents)
Protein concentration	Approx. 10 – 20 000 ng/µL
Sample type	Protein dissolved in Protein Solving Buffer PSB, Laemmli buffer, or equivalent, preferable free of nucleic acids
Correlation coefficient	0.97 – 1.00
Wavelength for light extinction measurement	570 nm (530 – 700 nm)
Preparation time	Approx. 40 min

### Applications

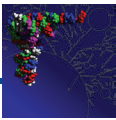
- Protein quantification assays in
  - microplates
  - microcuvettes
  - semimicrocuvettes
  - low-volume photometer (e.g., NanoDrop™)
- Protein quantification in Laemmli buffer
- Protein quantification in buffers containing up to 10% SDS
- Protein quantification in buffers containing reducing agents (e.g., β-mercaptoethanol (715 mM), TCEP (50 mM), or DTT)
- Protein quantification in buffers containing bromophenol blue (e.g., 0.02%)

**For detailed product information and application data see [www.mn-net.com/PQA](http://www.mn-net.com/PQA)**

### Ordering information

Product	Preps	Specification	REF
Protein Quantification Assay	50	Buffer PSB, Quantification Reagent, BSA	740967.50
	250	as above	740967.250

For separate kit components see “Accessories” page 137



## NucleoSpin® RNA Plant

*rDNase and NucleoSpin® Filters included*

### Features

#### Plant RNA mini spin kit – for all kinds of plant material

- Optimized lysis procedure – two alternative lysis buffers included
- Efficient removal of contaminating DNA – rDNase included for on-column digestion
- Efficient sample homogenization and reduction of viscosity – NucleoSpin® Filters (shredders) included
- Up to 70 µg ready-to-use RNA
- Parallel purification of genomic DNA possible by using the NucleoSpin® RNA/DNA Buffer Set (page 68)



### Product at a glance

Technology	Silica-membrane technology
Format	Mini spin columns
Sample material	< 100 mg tissue
Fragment size	> 200 b
Typical yield	3 – 70 µg from 100 mg plant material
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1
Elution volume	60 µL
Preparation time	30 min / 6 preps
Binding capacity	200 µg

Procedure chart see page 57

### Applications\*

- Total RNA from plant cells and tissue
- Total RNA from filamentous fungi
- Typical downstream applications: real-time RT-PCR, Northern blotting, primer extension, array technology, RNase protection assays

\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA Plant	10	NucleoSpin® RNA Plant Columns with Collection Tubes, Collection Tubes (2 mL), Collection Tubes (1.5 mL), NucleoSpin® Filters, buffers, RNase-free rDNase	740949.10
	50	as above	740949.50
	250	as above	740949.250

For separate kit components see "Accessories" page 137



## NucleoSpin® FFPE RNA

**Paraffin Dissolver: no use of xylene required**

### Features

#### Improved RNA quality from formalin-fixed, paraffin-embedded samples

- Enhanced RT-PCR performance – RNA is well decrosslinked and less fragmented
- Very easy paraffin removal – Paraffin Dissolver (patent pending) included
- Minimum number of working steps in a streamlined workflow
- Efficient on-column DNA removal, rDNase included
- Higher sensitivity with concentrated RNA – elution volume as little as 5 µL



### Product at a glance

Technology	Silica-membrane technology
Format	Mini spin columns – XS design
Sample material	≤7 sections (10 µm) of 250 mm <sup>2</sup> total area (<15 mg paraffin*)
Typical yield	Depending on amount and quality of the sample
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1
Typical RIN (RNA integrity number)	Strongly depending on sample quality (2 – 6)
Elution volume	5 – 30 µL
Preparation time	70 min / 6 preps
Binding capacity	110 µg

Procedure chart see page 57

### Applications\*\*

- Rapid isolation of RNA from formalin-fixed, paraffin-embedded samples, e.g., colon carcinoma (unstained), colon carcinoma (hematoxylin stained), colon mucosa, adenocarcinoma of colon transversum, liver (rat / human), liver carcinoma (hematoxylin stained), lymph node, spleen (rat / human), pancreas (rat / human; diabetic / non-diabetic), placenta
- Isolation of RNA from fresh and archived FFPE samples
- Isolation of RNA from specimen on object slides (stained or unstained)
- Typical downstream application: RT-PCR

\* When using the standard protocol with Paraffin Dissolver. Larger quantities of paraffin can be processed when using additional Paraffin Dissolver or the standard protocol with xylene for deparaffinization.

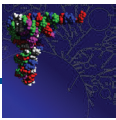
\*\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® FFPE RNA	10	NucleoSpin® FFPE Columns, Collection Tubes (2 mL), Collection Tubes (1.5 mL), Paraffin Dissolver, buffers, Proteinase K, RNase-free rDNase	740969.10
	50	as above	740969.50
	250	as above	740969.250

For separate kit components see “Accessories” page 137



## NucleoSpin® FFPE RNA/DNA

### Features

#### Parallel isolation of RNA and DNA from formalin-fixed, paraffin-embedded samples

- Get RNA and DNA from the same FFPE specimen – without sample splitting
- Save time, money, and precious sample material
- Very easy paraffin removal – Paraffin Dissolver (patent pending) included
- Enhanced RT-PCR performance – high decrosslinking efficiency
- High quality DNA – ready to use for genotyping
- Higher sensitivity with concentrated RNA – elution in as little as 5 µL



### Product at a glance

Technology	Silica-membrane technology
Format	Mini spin columns – XS design
Sample material	≤7 sections (10 µm) of 250 mm <sup>2</sup> total area (<15 mg paraffin*)
Typical yield	Depending on amount and quality of the sample
Typical RIN (RNA integrity number)	strongly depending on sample quality (2 – 6)
Elution volume RNA	5 – 30 µL
Elution volume DNA	10 – 30 µL
Preparation time	90 min / 6 preps (plus 3 h to overnight for lysis)
Binding capacity	110 µg RNA

### Applications\*\*

- Rapid isolation of RNA and DNA, or RNA only from formalin-fixed, paraffin-embedded samples, e.g., colon carcinoma (unstained), colon carcinoma (hematoxylin stained), colon mucosa, adenocarcinoma of colon transversum, liver (rat / human), liver carcinoma (hematoxylin stained), lymph node, spleen (rat / human), pancreas (rat / human; diabetic / non-diabetic), placenta
- Isolation of RNA and DNA, or RNA only from fresh and archived FFPE samples
- Isolation of RNA and DNA, or RNA only from specimen on object slides (stained or unstained)
- RNA ready to use in RT-PCR, DNA ready to use in PCR

\* When using the standard protocol with Paraffin Dissolver. Larger quantities of paraffin can be processed when using additional Paraffin Dissolver or the standard protocol with xylene for deparaffinization.

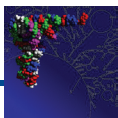
\*\* Kits to be used for research purposes only (see page 160). DISTRIBUTION AND USE IN THE USA IS PROHIBITED FOR PATENT REASONS.

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® FFPE RNA/DNA	10	NucleoSpin® FFPE Columns, Collection Tubes (2 mL), Collection Tubes (1.5 mL), Paraffin Dissolver, buffers, Proteinase K, RNase-free rDNase	740978.10
	50	as above	740978.50
	250	as above	740978.250

For separate kit components see “Accessories” page 137



## NucleoSpin® RNA Clean-up

### Features

#### Simple, fast, and convenient clean-up of RNA

- Complete removal of RT-PCR inhibitors
- Time-saving procedure based on NucleoSpin® RNA II, without DNase digestion and homogenization steps
- RNA clean-up from pre-purified RNA (phenol / chloroform), enzymatic reactions (e.g., amplification reactions, labeling reactions)



### Product at a glance

Technology	Silica-membrane technology
Format	Mini spin columns
Sample material	≤200 µL phenol / chloroform extract or reaction mixture
Fragment size	>200 b
Typical recovery	85 – 95 %
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1
Typical RIN (RNA integrity number)	Depending on sample quality (no significant loss of RIN detected)
Elution volume	40 – 120 µL
Preparation time	20 min / 6 preps
Binding capacity	200 µg
Procedure chart	see page 57

### Applications\*

RNA clean-up of:

- Pre-purified RNA (e.g., TRIzol®)
- Reaction mixtures
- Amino-allyl-mRNA
- Biotinylated RNA
- RNA isolation from up to 10<sup>5</sup> cultured cells (whenever co-purification of some genomic DNA is acceptable, kit does not contain rDNase)
- Typical downstream applications: enzymatic labeling reactions, RT-PCR, DNA/RNA-based chip hybridizations

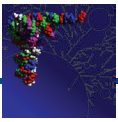
\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA Clean-up	10	NucleoSpin® RNA II Columns with Collection Tubes, Collection Tubes (2 mL), Collection Tubes (1.5 mL), buffers	740948.10
	50	as above	740948.50
	250	as above	740948.250

For separate kit components see “Accessories” page 137



## NucleoSpin® RNA Clean-up XS

**Up to 55 x concentrated RNA**

### Features

#### Highly efficient clean-up and concentration of RNA samples

- Complete removal of RT-PCR inhibitors
- Very high RNA recovery and concentration
- RNA clean-up from pre-purified RNA (phenol / chloroform), enzymatic reactions (e.g., amplification reactions, labeling reactions, DNase digestions)
- Time-saving procedure based on NucleoSpin® RNA XS technology
- Input volume up to 300 µL
- Elution in as little as 5 µL possible



### Product at a glance

Technology	Silica-membrane technology
Format	Mini spin columns – XS design
Sample material	≤300 µL RNA solution containing ≤90 µg RNA
Fragment size	>200 b
Typical recovery	85 – 95 %
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1
Typical RIN (RNA integrity number)	Depending on sample quality (no significant loss of RIN detected)
Elution volume	5 – 30 µL
Preparation time	20 min / 6 preps
Binding capacity	110 µg
Procedure chart	see page 57

### Applications\*

RNA clean-up of

- Pre-purified RNA (e.g., with TRIzol®)
- DNase digestions (e.g., with MACHEREY-NAGEL rDNase Set, page 143)
- Reaction mixtures
- Up to 55-fold increase in concentration
- Typical downstream applications: enzymatic labeling reactions, RT-PCR, DNA/RNA-based chip hybridizations

\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoSpin® RNA Clean-up XS	10	NucleoSpin® RNA XS Columns with Collection Tubes, Collection Tubes (2 mL), Collection Tubes (1.5 mL), buffers	740903.10
	50	as above	740903.50
	250	as above	740903.250

For separate kit components see “Accessories” page 137



## NucleoTrap® mRNA

### Features

#### For fast purification of poly(A) mRNA from total RNA

- High binding capacity: 5 µg poly(A) mRNA/mg oligo(dT) latex beads (20 µL bead suspension)
- Support protocol for direct mRNA isolation from cells available
- High quality poly(A) mRNA without degradation and DNA contamination
- Convenient and fast processing by microcentrifugation using NucleoTrap® Microfilters
- mRNA purification in only 30 min
- Available in mini and midi format

### Product at a glance

	NucleoTrap® mRNA Mini Kit	NucleoTrap® mRNA Midi Kit
Technology	Affinity chromatography	
Format	Oligo(dT) latex-bead suspension	
Sample material	250 µg total RNA	1 000 µg total RNA
Fragment size	50 b – 20 kb	50 b – 20 kb
Typical yield	10 µg mRNA	40 µg mRNA
A <sub>260</sub> /A <sub>280</sub>	1.9 – 2.1	1.9 – 2.1
Elution volume	10 – 20 µL	10 – 20 µL
Preparation time	30 min / 6 preps	30 min / 6 preps
Binding capacity	5 µg poly(A) mRNA / 20 µL oligo(dT) latex-bead suspension	

### Applications\*

- Poly(A) mRNA isolation from total RNA
- Clean-up of *in-vitro* transcripts
- Direct purification of poly(A) mRNA from cells (support protocol)

\* Kits to be used for research purposes only (see page 160)

**For detailed product information and application data see [www.mn-net.com/RNA](http://www.mn-net.com/RNA)**

### Ordering information

Product	Preps	Specification	REF
NucleoTrap® mRNA Mini	12	NucleoTrap® Microfilters, Microcentrifuge Tubes (2 mL), Oligo(dT) Latex Beads, buffers	740655
NucleoTrap® mRNA Midi	12	NucleoTrap® Microfilters, Microcentrifuge Tubes (2 mL), Oligo(dT) Latex Beads, buffers	740656

For separate kit components see “Accessories” page 137