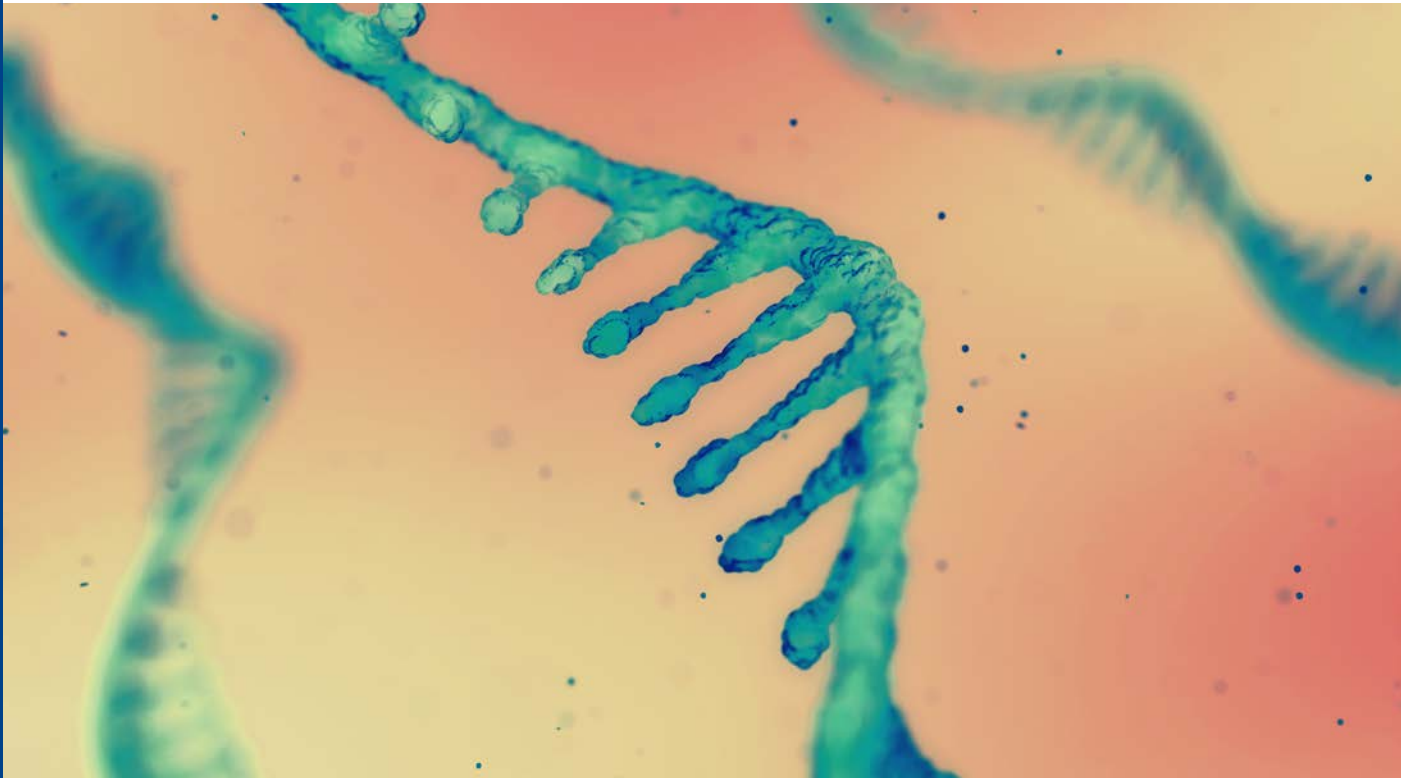


MACHEREY-NAGEL

RNA purification guide

Bioanalysis



Tailored solutions for high-grade RNA extractions

- Diverse samples and applications
- Manual and automated processing
- Flexible formats and technologies

MACHEREY-NAGEL

www.mn-net.com



RNA purification guide

RNA purification from MACHEREY-NAGEL

RNA isolation is highly complicated by the presence of ubiquitous RNases that degrade RNA samples. Furthermore, the physical and biochemical structure of sample materials makes RNA purification more difficult and even RNA extraction from tissue or blood samples can be a challenging task.

The world of RNA analysis switched to the specific detection of different RNA species, e. g., RNA, miRNA, siRNA, and new technologies such as RNA sequencing increase the demand on high quality RNA extraction kits.

Why choose MN for your RNA application?

MACHEREY-NAGEL Bioanalysis relies on over 25 years of experience in development, production, and distribution of RNA purification products. We employ a team of experts in our R&D and technical service ready to support you with your challenging, state-of-the-art RNA applications (RNA sequencing, qRT-PCR, etc.). MN provides high value RNA purification protocols in line with the requirements for demanding and expansive RNA applications.

We invite you to explore our top quality RNA purification products in this comprehensive guide. Do not hesitate to contact us to benefit from our technical service.

Icon annotation

XS Mini spin column for microcentrifuge tubes (1.5 mL or 2 mL). A funnel shaped thrust ring is holding a silica membrane of 2.0 mm diameter for xtra small elution volumes



Mini Mini spin column for microcentrifuge tubes (1.5 mL or 2 mL)



Midi Midi column for gravity-flow (NucleoBond® Xtra/ NucleoBond® PC technology) or 15 mL midi spin columns for centrifuges



Reag Liquid reagent solution



Mag Superparamagnetic beads



8-well Mini spin columns in 8-well strip format



96-well Mini spin columns in 96-well plate format



RNA purification guide

Kits for RNA isolation

Sample material	RNA size	Scale	Product	Page
Cells / tissue	> 18 nt	Mini	NucleoSpin® miRNA	9
		Flexible	NucleoZOL	7
	> 200 nt	Micro	NucleoSpin® RNA Plus XS	4
			NucleoSpin® RNA XS	5
		Mini	NucleoSpin® RNA Plus	4
			NucleoSpin® RNA	5
		Midi	NucleoSpin® RNA Midi	5
		8-well strip	NucleoSpin® 8 RNA	6
		96-well plate	NucleoSpin® 96 RNA	6
		Flexible	NucleoMag® RNA	6
Blood	> 200 nt	Mini	NucleoSpin® RNA Blood	13
		Midi	NucleoSpin® RNA Blood Midi	13
		8-well strip	NucleoSpin® 8 RNA Blood	14
		96-well plate	NucleoSpin® 96 RNA Blood	14
Plasma and biological fluids	> 18 nt	Mini	NucleoSpin® miRNA Plasma	10
Exosomes		Flexible	Exosome Precipitation Solution (Serum / Plasma)*	10
			Exosome Precipitation Solution (Urine)*	10
FFPE	> 18 nt	Micro	NucleoSpin® totalRNA FFPE XS	15
		Mini	NucleoSpin® totalRNA FFPE	15
Plant / fungi	> 200 nt	Mini	NucleoSpin® RNA Plant and Fungi	16
Soil	> 100 nt	Mini	NucleoBond® RNA Soil Mini	17
		Midi	NucleoBond® RNA Soil	17
Stool	> 18 nt	Mini	NucleoSpin® RNA Stool	18
Reaction mixtures	> 200 nt	Micro	NucleoSpin® RNA Clean-up XS	19
		Mini	NucleoSpin® RNA Clean-up	19
		Maxi	NucleoSpin® RNA Clean-up Maxi	19

RNA purification technologies

	NucleoSpin®	NucleoSpin® 8	NucleoSpin® 96	NucleoBond®	NucleoMag®
Technology	Silica membrane	Silica membrane	Silica membrane	Anion exchange	Magnetic bead
Format	XS, Mini, Midi, Maxi	8-well strip	96-well plate	Mini, Midi	Flexible
Processing	Centrifugation	Vacuum / centrifugation	Vacuum / centrifugation	Gravity flow	Magnet

RNA stabilization

Sample material	Product	Page
Cells / tissue	NucleoProtect® RNA	8



RNA from cells and tissue

NucleoSpin® RNA Plus

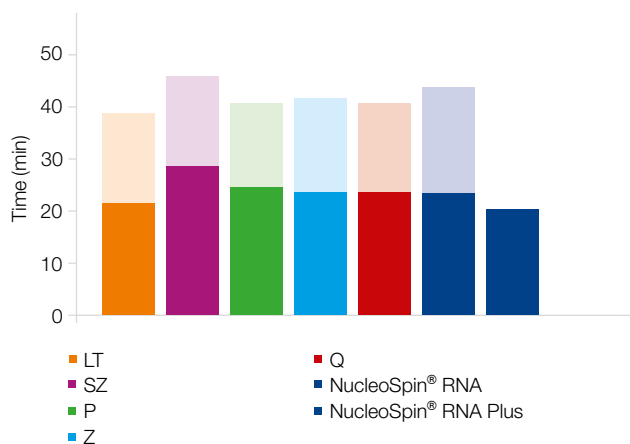
Ultrafast and convenient RNA isolation kits

- No time consuming rDNase digestion due to included gDNA removal column
- No addition of β-mercaptoethanol or other reducing agents required
- Special Micro format for extra small samples down to single cell analysis



	XS  NucleoSpin® RNA Plus XS	Mini  NucleoSpin® RNA Plus
Technology	Silica membrane technology (1. column for DNA removal and lysate clearing, 2. column for RNA isolation)	
Sample material	Cultured cells (1–10 ⁵), human/animal tissue (< 5 mg)	Cultured cells (< 10 ⁷), bacterial cells (< 10 ⁹), yeast cells (< 10 ⁸), human/animal tissue (< 30 mg)
Fragment size	≥ 100 nt	≥ 200 nt
Typical yield	HeLa cells (10 ¹): 0.05–0.02 ng, HeLa cells (10 ⁵): 0.5–2.0 µg, mouse liver (0.5 µg): 2.5–8 ng, mouse brain (0.5 µg): 0.1–0.5 ng	40–100 µg
A ₂₆₀ /A ₂₈₀	1.9–2.2	1.9–2.1
A ₂₆₀ /A ₂₃₀	1.5–2.5	1.8–2.5
Typical RIN	> 8	> 9
Elution volume	5–30 µL	30–120 µL
Theoretical binding capacity	110 µg	200 µg
Preparation time	18 min/6 preps	20 min/6 preps

Application data



Time saving RNA isolation

The prep time of the NucleoSpin® RNA Plus procedure was compared to the protocols of competitor kits (LT, S, P, Z, Q), as well as the prep time of NucleoSpin® RNA (light color: time for enzymatic DNA digestion). The NucleoSpin® RNA Plus kit is the fastest RNA isolation kit on the market due to NucleoSpin® gDNA Removal Column: high quality RNA in 20 minutes!

Ordering information




Product	Preps	REF
NucleoSpin® RNA Plus XS	10/50/250	740990.10/.50/.250
NucleoSpin® RNA Plus	10/50/250	740984.10/.50/.250

RNA from cells and tissue

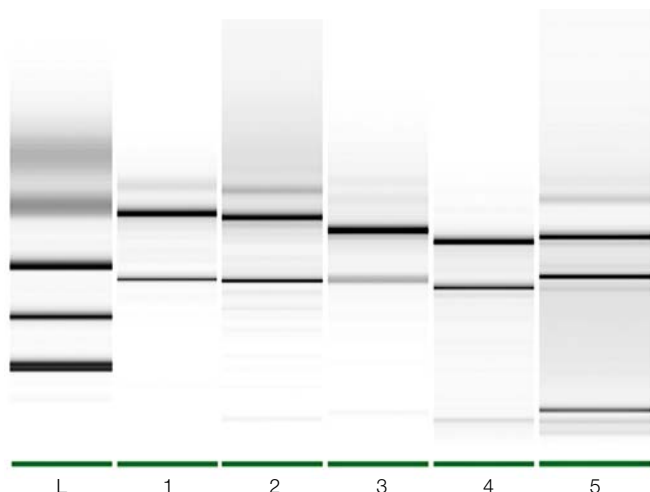
NucleoSpin® RNA

RNA isolation kits from very small to large scale

- High quality RNA from diverse sample materials
- Choose the format you need – from Micro to Midi prep

	 NucleoSpin® RNA XS	 NucleoSpin® RNA	 NucleoSpin® RNA Midi
Technology	Silica membrane technology	Silica membrane technology	Silica membrane technology
Sample material	Cultured cells ($1-10^5$), human/ animal tissue (< 5 mg)	Cultured cells (< 5×10^6) bacterial cells (< 10^9), yeast cells (< 10^8) Human/ animal tissue (< 30 mg)	Cultured cells (< 5×10^7), bacterial cells (< 10^{10}), yeast cells (< 3×10^8), human/ animal tissue (< 200 mg)
Fragment size	≥ 200 nt	≥ 200 nt	≥ 200 nt
Typical yield	HeLa cells (10^2): 0.1–1.5 ng, HeLa cells (10^5): 1–1.5 μ g	HeLa cells (10^6): 14 μ g, bacterial cells (10^9): 70 μ g	HeLa cells (4×10^7): 620 μ g
A_{260}/A_{280}	1.9–2.1	1.9–2.1	1.9–2.1
Typical RIN	> 9	> 9	> 9
Elution volume	5–30 μ L	30–120 μ L	500–1000 μ L
Theoretical binding capacity	110 μ g	200 μ g	700 μ g
Preparation time	35 min/6 preps	35 min/6 preps	80 min/4 preps

Application data



Total RNA of high integrity from a huge variety of starting materials

The RNA Integrity Number (RIN) was determined from RNA of mammalian samples. RIN from HeLa cell RNA was 9.5 and from mouse liver RNA 8.9.

Lane	Sample Material
1	HeLa cells (10^6)
2	Mouse liver (3 mg)
3	Zebrafish (1 larva)
4	Yeast cells (10^8)
5	Bacteria (10^9)

Elution volume: 50 μ L. RNA analyzed on Agilent 2100 Bioanalyzer/RNA 6000 Nano Kit.

Lane L: RNA Ladder (RNA 6000 Nano Marker; Agilent)

The figure is compiled from different gels and runs, aligned to the corresponding length markers.

Ordering information

Product	Preps	REF
NucleoSpin® RNA XS	10 / 50 / 250	740902.10 / .50 / .250
NucleoSpin® RNA	10 / 50 / 250	740955.10 / .50 / .250
NucleoSpin® RNA Midi	20	740962.20



RNA from cells and tissue

NucleoMag® RNA

Magnetic bead based RNA isolation from tissue and cells

- Reducing agent TCEP included – no β -mercaptoethanol
- Small elution volumes for highly concentrated RNA to fulfill specifications of challenging downstream applications



Technology	Magnetic bead technology
Sample material	< 2 x 10 ⁶ eukaryotic cells , < 20 mg human / animal tissue
Fragment size	≥ 200 nt
Typical yield	< 30 µg
Elution volume	50–200 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps (excl. lysis)

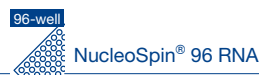
Ordering information

Product	Preps	REF
NucleoMag® RNA	1 x 96 / 4 x 96	744350.1 / .4

NucleoSpin® 8/96 RNA

Medium and high throughput kits for RNA isolation

- Efficient lysis without organic solvents
- Included rDNase for complete removal of gDNA



Technology	8-well	96-well
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 20 mg human / animal tissue; < 2 x 10 ⁶ eukaryotic cells	< 20 mg human / animal tissue; < 2 x 10 ⁶ eukaryotic cells
Fragment size	≥ 200 nt	≥ 200 nt
Typical yield	20 µg (from 20 mg mouse liver or 2 x 10 ⁶ HeLa cells)	20 µg (from 20 mg mouse liver or 2 x 10 ⁶ HeLa cells)
A ₂₆₀ /A ₂₈₀	1.9–2.1	1.9–2.1
Typical RIN	> 9	> 9
Theoretical binding capacity	100 µg	100 µg
Elution volume	50–130 µL	50–130 µL
Preparation time	45 min/6 strips	70 min/plate

Ordering information

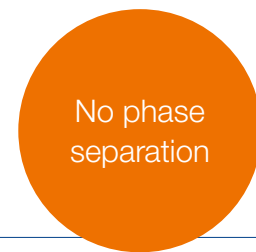
Product	Preps	REF
NucleoSpin® 8 RNA	12 x 8 / 60 x 8	740698 / .5
NucleoSpin® 8 RNA Core Kit	48 x 8	740465.4
NucleoSpin® 96 RNA	2 x 96 / 4 x 96 / 24 x 96	740709.2 / .4 / .24
NucleoSpin® 96 RNA Core Kit	4 x 96	740466.4

RNA from cells and tissue

NucleoZOL

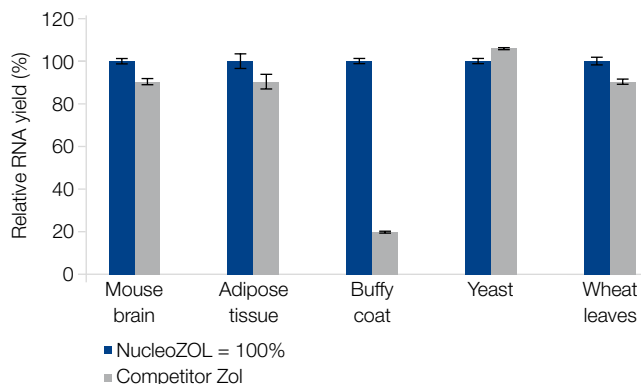
The universal RNA isolation reagent

- No chloroform, no phase separation: quick and easy procedure
- Combination with NucleoSpin® technology possible



Technology	Liquid one phase extraction
Sample material	Per mL NucleoZOL: 2×10^6 cultured bacteria/yeast cells, 100 mg human/animal/plant tissue, 0.4 mL (viral) fluids
Fragment size	> 10 nt (total RNA), >10–200 nt (small RNA), > 200 nt (large RNA)
Typical yield	Total RNA: 6–8 µg/mg (liver), 3–4 µg/mg (kidney, spleen), 0.5–1.5 µg/mg (muscle, brain), 4–10 µg/1x10 ⁶ cells (cultured cells) Large RNA: 5–7 µg/mg (liver), 3–4 µg/mg (kidney, spleen), 0.5–1.5 µg/mg (muscle, brain), 3–8 µg / 1x10 ⁶ cells (cultured cells)
A ₂₆₀ /A ₂₈₀	1.8–2.1
Elution volume	Flexible
Preparation time	<math>< 1</math> h

Application data



Market leading RNA yields

RNA was extracted from different starting materials. RNA was quantified by qRT-PCR and relative yields were calculated (NucleoZOL=100%). RNA isolation with NucleoZOL results in similar or better RNA yield compared to standard two phase extraction methods (competitor Zol).

Ordering information

Product	Preps / Preps	REF
NucleoZOL	200 mL	740404.200
NucleoSpin® RNA Set for NucleoZOL*	10 / 50	740406.10 / .50

* NucleoZOL reagent not included. The NucleoSpin® RNA Set for NucleoZOL is sufficient for 10/50 preps with 500 µL NucleoZOL/prep.

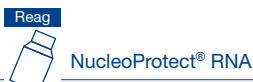


RNA from cells and tissue

NucleoProtect® RNA

RNA stabilization reagent for cells and tissues

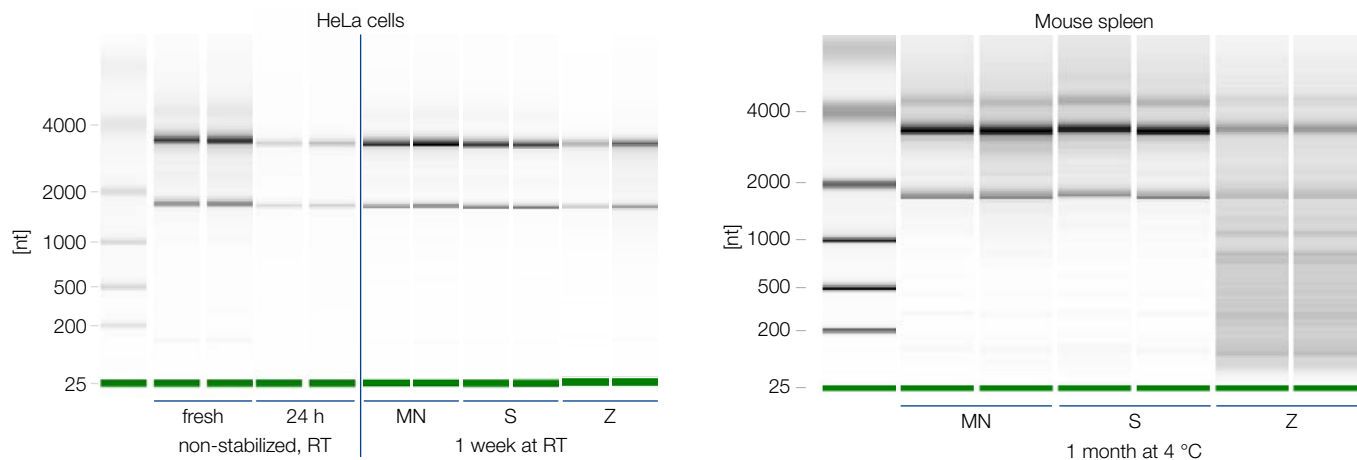
- Protect your samples from RNA degradation – isolate your RNA later
- Combine with your RNA isolation method of choice
- Also suitable for stabilization of DNA



Technology	RNA stabilization reagent
Processing	Add reagent to sample (cells) or immerse sample in reagent (tissues)
Sample material	Cells and tissues (max. 5 mm diameter)
Storage time	18–25 °C ≤ 7 days, 4 °C ≤ 1 month, -20/-80 °C long term
Typical RIN after RNA isolation*	10 for cultured mammalian cells, > 9 for mammalian tissues

* Data generated with NucleoSpin® kits; RNA integrity strongly depends on quality and handling of samples prior to stabilization

Application data



Efficient stabilization of RNA in samples prior to RNA isolation

Cell culture and mouse tissue samples (fresh, stabilized, and non-stabilized) were used for subsequent RNA isolation with the NucleoSpin® RNA Plus kit. In this experimental setup NucleoProtect® RNA preserves RNA integrity within samples as good as or better than competitor solutions (MN = NucleoProtect® RNA; S = RNAlater®; Z = DNA/RNA Shield™).

Customer testimonial

“We have tried the reagent now in multiple studies with success and will continue to use this reagent in future experiments as well.”

J. P., PhD, University Clinics Research Campus Erlangen

Ordering information

Product	Preps	REF
NucleoProtect® RNA	50 / 250 / 500 mL	740400.50 / .250 / .500

RNA from cells and tissue

NucleoSpin® miRNA

Mini spin kit for isolation of small RNA, large RNA, and proteins

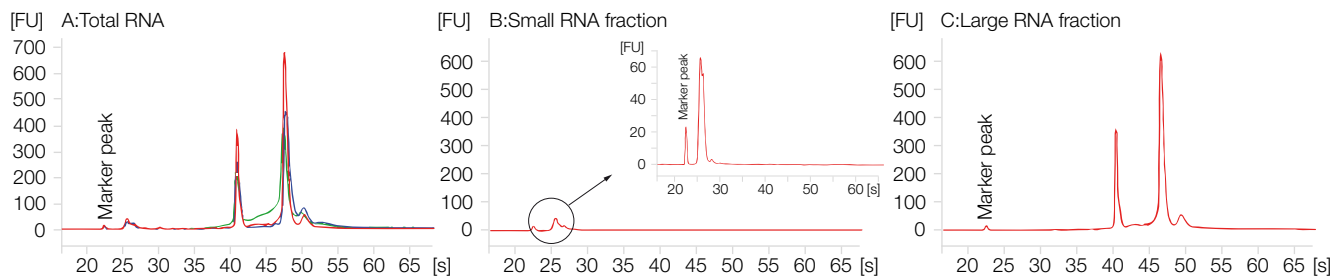
- Total RNA purification with optional size selection and DNA co-purification
- Excellent RNA recovery and purity by chaotropic salt lysis without phenol / chloroform

Isolate total RNA including miRNA



Technology	Silica membrane technology
Sample material	Cells (< 10 ⁷), human / animal tissue (< 30 mg), plant tissue (< 50 mg), reaction mixtures (< 150 µL)
Fragment size	≥ 18 nt
Typical yield	100 µg total RNA (10 ⁷ HeLa cells: 10 µg small RNA, 95 µg large RNA)
Elution volume	30–100 µL
Theoretical binding capacity	200 µg
Preparation time	< 45 min/6 preps (total RNA), 35 min/6 preps (small RNA)

Application data



Reliable RNA fractionation with highest selectivity

Total RNA was isolated from 10⁷ HeLa cells using the NucleoSpin® miRNA (●) and two competitor kits based on phenol / chloroform lysis and extraction (●) or phenol / chloroform extraction (●). Equal amounts of total RNA fractions were analyzed on an Agilent Bioanalyzer® (A). The NucleoSpin® miRNA Kit provides highest RNA yield and quality. In addition to the total RNA fraction (A), the NucleoSpin® miRNA kit allows isolation of small (B) and large RNA (C) in separate fractions.

Ordering information

Product	Preps	REF
NucleoSpin® miRNA	10 / 50 / 250	740971.10 / .50 / .250



RNA from plasma and biological fluids

NucleoSpin® miRNA Plasma

Mini spin kit for isolation of small RNA and DNA from plasma, serum, and exosomes

- Simple and fast procedure – no phenol/chloroform extraction necessary
- Includes option for parallel co-purification of cfDNA from the same sample

Mini



NucleoSpin® miRNA Plasma

Technology	Silica membrane technology
Sample material	Plasma / serum < 300 µL, (< 900 µL with multiple loading steps)
Fragment size	≥ 18 nt
Elution volume	20–50 µL
Theoretical binding capacity	200 µg
Preparation time	40 min/10 preps (without rDNase digestion), 70 min/10 preps (with rDNase digestion)

Reference

Itokawa et al. 2016 “Testing the causality between CYP9M10 and pyrethroid using the TALEN and CRISPR/Cas9 technologies”

Nature Scientific Reports

Ordering information

Product	Preps	REF
NucleoSpin® miRNA Plasma	10 / 50 / 250	740981.10 / .50 / .250
Related products		
Exosome Precipitation Solution (Serum/Plasma)*	2 mL / 12 mL / 60 mL	740398.2 / .12 / .60
Exosome Precipitation Solution (Urine)*	12 mL / 20 mL / 250 mL	740398.12 / .20 / .250

Exosome Precipitation Solution (Serum/Plasma) – (Urine)

Solution for precipitation of exosomes from serum / plasma, or urine samples

- Simple and fast exosome precipitation without tedious ultra centrifugation
- Achieve highest RNA recoveries in combination with the NucleoSpin® miRNA Plasma kit

Buffer



Exosome Precipitation Solution (Serum/Plasma)

Buffer



Exosome Precipitation Solution (Urine)

Technology	Precipitation	Precipitation
Sample material	Serum / plasma (0.1–1 mL)	Urine (1–10 mL)
Preparation time	45 min/6 preps	45 min/6 preps

Customer testimonial

“We have used the Exosome Precipitation Solution from MN to isolate exosomes from control or HCV infected sera clinical samples according to the protocol. The resulted precipitated fraction was of high yield and enriched in exosomes. The obtained fraction was pure when tested by western blotting with antibodies against HSP 90, CD9. We are very satisfied with this product and we already recommend it to other investigators.”

U. Georgopoulou (PhD), Lab. Molecular Virology, Hellenic Pasteur Institute, Athens, Greece

Ordering information

Product	Pack of	REF
Exosome Precipitation Solution (Serum / Plasma)*	2 mL / 12 mL / 60 mL	740398.2 / .12 / .60
Exosome Precipitation Solution (Urine)*	12 mL / 20 mL / 250 mL	740399.12 / .50 / .250
Related product		
NucleoSpin® miRNA Plasma	10 / 50 / 250	740981.10 / .50 / .250

*Not available in the USA

RNA, DNA, and proteins

NucleoSpin® TriPrep

Mini spin kit for parallel isolation of RNA, DNA, and proteins

- Convenient one column preparation of RNA, DNA, and proteins
- Easy and accurate protein quantification using the Protein Quantification Assay



Technology	Silica membrane technology
Sample material	Cells (< 5 x 10 ⁶), human / animal tissue (< 30 mg), plant tissue (< 100 mg)
Fragment size	RNA: ≥ 200 nt, DNA: ≤ 30 kbp, protein: 15–300 kDa
Typical yield	RNA: < 70 µg, DNA: < 6 µg, protein: < 1200 µg
Elution volume	RNA: 40–120 µL, DNA: 100 µL, protein: 10–100 µL
Theoretical binding capacity	RNA: 200 µg, DNA: 10 µg*
Preparation time	RNA: 30 min/6 preps, RNA + DNA: 45 min/6 preps, protein: 35 min/6 preps

* Theoretical binding capacity of DNA < 10 µg, strongly depending on RNA amount bound to the membrane.

Reference

Gergen at al. 2018 "Multiplex CRISPR/Cas9 system impairs HCMV replication by excising an essential viral gene"

PLOS ONE

Ordering information

Product	Preps	REF
NucleoSpin® TriPrep	10 / 50 / 250	740966.10 / .50 / .250
Related product		
Protein Quantification Assay	50 / 250	740967.50 / .250

RNA, DNA, and proteins

NucleoSpin® RNA/Protein

Mini spin kit for parallel isolation of RNA and proteins

- Convenient one column preparation of RNA and proteins from one undivided sample
- Easy and accurate protein quantification using the Protein Quantification Assay



Technology	Silica membrane technology
Sample material	Cells (< 5 x 10 ⁶), human / animal tissue (< 30 mg), plant tissue (< 100 mg)
Fragment size	RNA: ≥ 200 nt, protein: 15–300 kDa
Typical yield	RNA: < 70 µg, protein: < 1200 µg
Elution volume	RNA: 40–120 µL, protein: 10–100 µL
Theoretical binding capacity	200 µg*
Preparation time	RNA: 30 min/6 preps, RNA + protein: 35 min/6 preps

*Theoretical binding capacity of DNA < 10 µg, strongly depending on RNA amount bound to the membrane.

Reference

Edemann-Callesen et al. 2018 "Non-invasive modulation reduces repetitive behavior in a rat model through the sensorimotor cortico-striatal circuit"

Translational Psychiatry

Ordering information

Product	Preps	REF
NucleoSpin® RNA/Protein	10 / 50 / 250	740933.10 / .50 / .250
Related product		
Protein Quantification Assay	50 / 250	740967.50 / .250

NucleoSpin® RNA/DNA Buffer Set

Buffer set for parallel isolation of RNA and DNA with NucleoSpin® RNA kits

- To be used in combination with common NucleoSpin® RNA kits



Sample material	See NucleoSpin® RNA, NucleoSpin® RNA XS, NucleoSpin® miRNA, NucleoSpin® RNA Blood, NucleoSpin® RNA/Protein
Fragment size	< 30 kbp (DNA)
Typical yield	RNA yield and quality identical to NucleoSpin® RNA kits
A ₂₆₀ /A ₂₈₀	1.7–2.0
Elution volume	100 µL (DNA)

Reference

Warshan et al. 2016 "Seasonal variation in nifH abundance and expression cyanobacterial communities associated with boreal feather mosses"

The ISME Journal

Ordering information

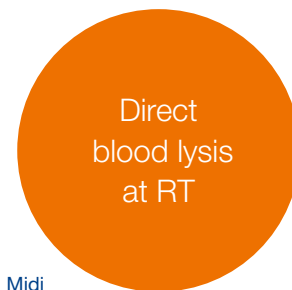
Product	Preps	REF
NucleoSpin® RNA/DNA Buffer Set	100	740944



RNA from blood

NucleoSpin® RNA Blood

Mini and Midi spin kit for RNA isolation from fresh and frozen whole blood

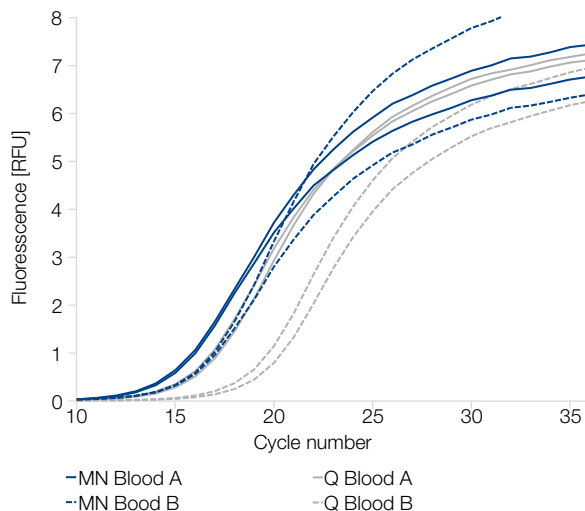
- Direct total blood lysis enables a very simple and convenient handling at room temperature
- Compatible with common blood collection tubes and anticoagulants, e. g., EDTA, citrate, and heparin



	 NucleoSpin® RNA Blood	 NucleoSpin® RNA Blood Midi
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 400 µL blood	400–1300 µL blood
Fragment size	≥ 200 nt	≥ 200 nt
Typical yield	Blood (400 µL): 1–8 µg*	Blood (1300 µL): 4–26 µg*
A ₂₆₀ /A ₂₈₀	1.9–2.1	1.9–2.1
Elution volume	40–120 µL	200–400 µL
Theoretical binding capacity	200 µg	700 µg
Preparation time	55 min/6 preps	75 min/6 preps

*RNA yield strongly depends on the leucocyte number in each individual blood sample.

Application data



Direct lysis results in higher yields compared to selective erythrocyte lysis

RNA was isolated from 400 µL blood (EDTA) from two different donors (Blood A, B) with the NucleoSpin® RNA Blood kit and a kit from Competitor Q (based on selective erythrocyte lysis). Both samples isolated by the NucleoSpin® RNA Blood kit show lower C_T values indicating a higher RNA yield. Analysis of RNA with LightCycler® RT-PCR and β-actin specific primers resulted in a 73 nt amplicon.

Reference

Bouvier-Muller et al. 2018 “Somatic cell count-based selection reduces susceptibility to energy shortage during early lactation in a sheep model”
Journal of Dairy Science

Ordering information



Product	Preps	REF
NucleoSpin® RNA Blood	10 / 50	740200.10 / .50
NucleoSpin® RNA Blood Midi	20	740210.20

RNA from blood

NucleoSpin® 8/96 RNA Blood

RNA isolation from whole blood in flexible 8-well strip or proven 96-well format

- Direct total blood lysis enables a very simple and convenient handling at room temperature
- Compatible with common blood collection tubes and anticoagulants, e. g., EDTA, citrate, and heparin

	 NucleoSpin® 8 RNA Blood	 NucleoSpin® 96 RNA Blood
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 400 µL blood	< 400 µL blood
Fragment size	≥ 200 nt	≥ 200 nt
Typical yield	1–8 µg (400 µL whole blood)	1–8 µg (400 µL whole blood)
A ₂₆₀ /A ₂₈₀	1.9–2.1	1.9–2.1
Elution volume	50–130 µL	50–130 µL
Theoretical binding capacity	100 µg	100 µg
Preparation time	60 min/6 strips	100 min/plate

Ordering information

Product	Preps	REF
NucleoSpin® 8 RNA Blood	12 x 8 / 60 x 8	740220 / .5
NucleoSpin® 96 RNA Blood	2 x 96 / 4 x 96	740225.2 / .4

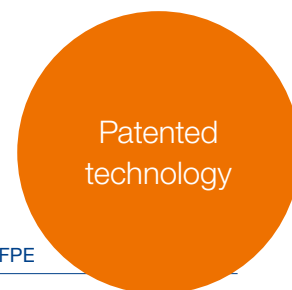




RNA from FFPE samples

NucleoSpin® totalRNA FFPE

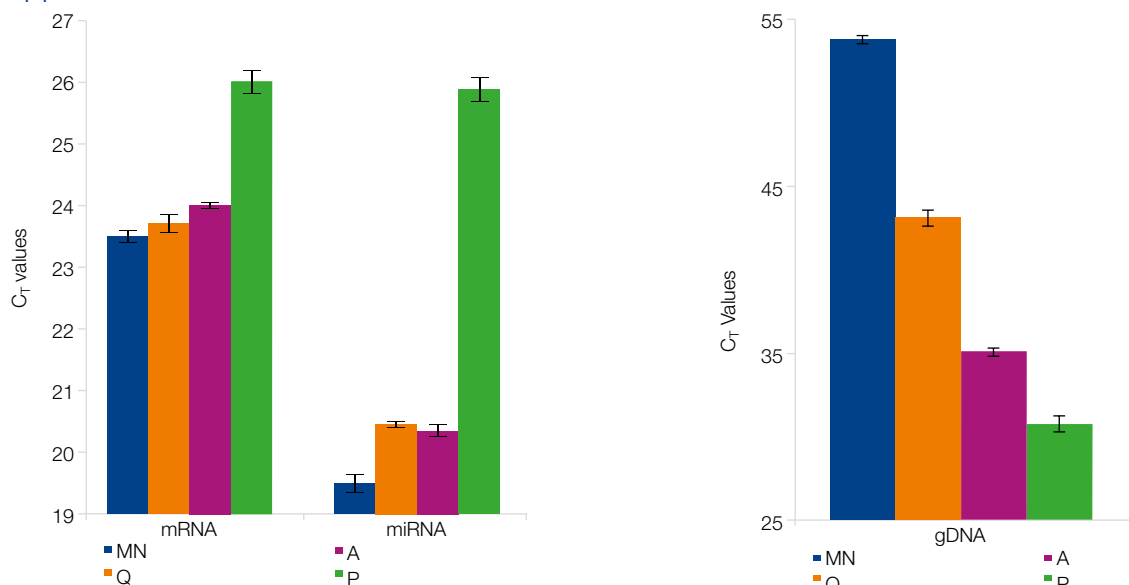
Mini and Micro spin kit for the isolation of small and large RNA from FFPE samples

- Patented blue colored Paraffin Dissolver included for convenient paraffin removal without xylene
- Efficient removal of crosslinks



	 NucleoSpin® totalRNA FFPE XS	 NucleoSpin® totalRNA FFPE
Technology	Silica membrane technology	Silica membrane technology
Sample material	≤ 10 sections (10 µm) with < 5 mg of tissue	≤ 10 sections (10 µm) with < 50 mg of tissue
Fragment size	≥ 18 nt	≥ 18 nt
Typical yield	Depending on amount and quality of the sample	Depending on amount and quality of the sample
Elution volume	5–30 µL	30–50 µL
Theoretical binding capacity	100 µg	200 µg
Preparation time	70 min/6 preps (90 min incl. optional rDNase digest)	70 min/6 preps (90 min incl. optional rDNase digest)

Application data



Excellent RT-PCR performance and most efficient gDNA removal with NucleoSpin® totalRNA FFPE

Large (e. g., mRNA) and small (e. g., miRNA) RNA was isolated from 4 x 10 µm FFPE sections of mouse brain tissue with NucleoSpin® totalRNA FFPE and compared to three other competitor kits (Q, A, P).

(A) Quantification of mRNA* and miRNA** was performed by qRT-PCR. Low C_T values indicate high RNA yields.

(B) Residual DNA was assayed by amplifying a 191 bp fragment of the mGAPDH gene. A higher C_T value indicates lower amount of residual DNA.

*Target: 230 bp fragment of the β2-microglobulin gene; **Applied Biosystems, TaqMan® MicroRNA RT Kit, hsa-miR-16 MicroRNA Assay

Reference

Dimitrakopoulos et al. 2018 “NF-kB2 Genetic Variations are Significantly Associated with Non-Small Cell Lung Cancer Risk and Overall Survival”

Nature Scientific Reports

Ordering information



Product	Preps	REF
NucleoSpin® totalRNA FFPE XS	10 / 50 / 250	740969.10 / .50 / .250
NucleoSpin® totalRNA FFPE	10 / 50 / 250	740982.10 / .50 / .250

RNA from plants and fungi

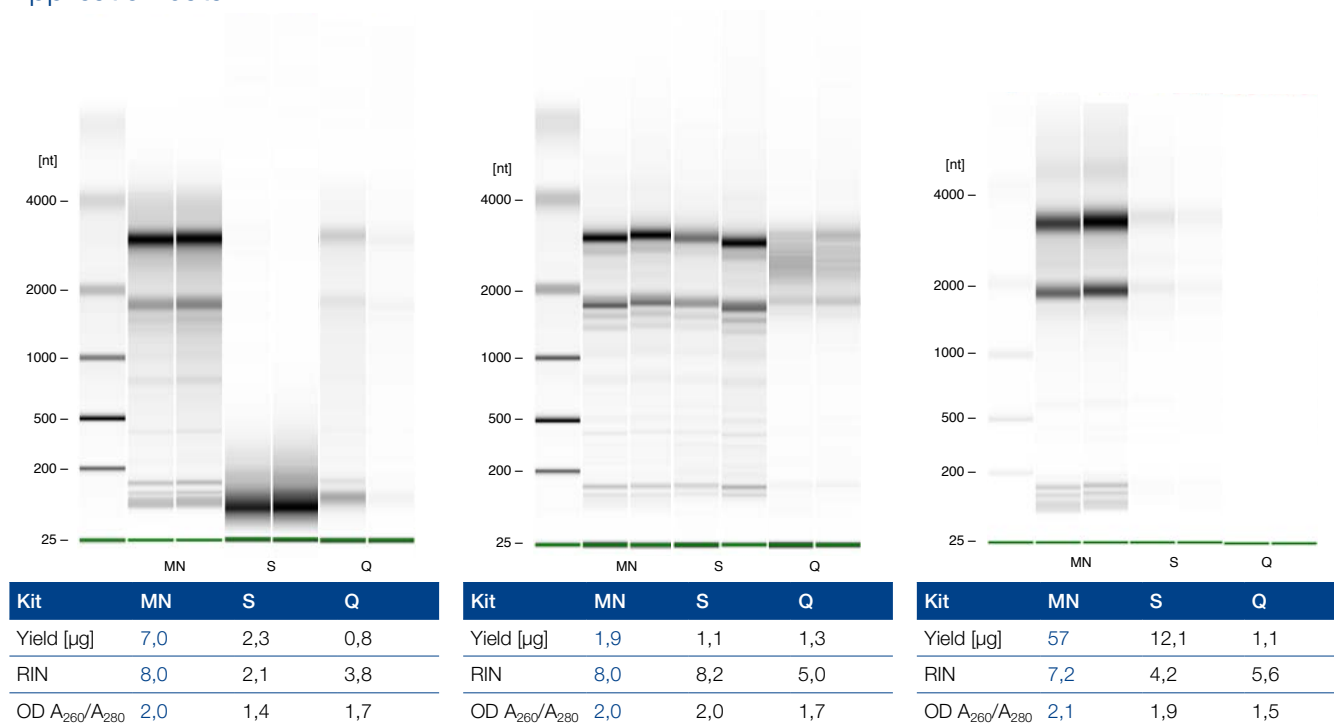
NucleoSpin® RNA Plant and Fungi · NucleoSpin® RNA Plant

For challenging and routine plant samples

- NucleoSpin® RNA Plant: Includes rDNase and NucleoSpin® Filters for easier routine extractions from standard plant samples
- NucleoSpin® RNA Plant and Fungi: Filter columns for efficient sample homogenization and reduction of viscosity included in the kit

	 NucleoSpin® RNA Plant and Fungi	 NucleoSpin® RNA Plant
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 500 mg plant / fungal material	< 100 mg tissue
Fragment size	≥ 200 nt	≥ 200 nt
Typical yield	20–70 µg	3–70 µg
A ₂₆₀ /A ₂₈₀	1.9–2.1	1.9–2.1
Elution volume	50 µL	40–60 µL
Theoretical binding capacity	200 µg	200 µg
Preparation time	25 min/6 preps	30 min/6 preps

Application data



The NucleoSpin® RNA Plant and Fungi kit enables efficient isolation of RNA from various sample types

High integrity RNA was isolated from kiwi fruit, potato tuber and spruce needles.

(A)
RNA isolation from 500 mg kiwi fruit

(B)
RNA isolation from 50 mg potato tuber

(C)
RNA isolation from 50 mg spruce needles

Ordering information

Product	Preps	REF
NucleoSpin® RNA Plant and Fungi	10 / 50 / 250	740120.10 / .50 / .250
NucleoSpin® RNA Plant	10 / 50 / 250	740949.10 / .50 / .250



RNA from soil samples

NucleoBond® RNA Soil

RNA purification from soil for e. g., metagenomic analysis

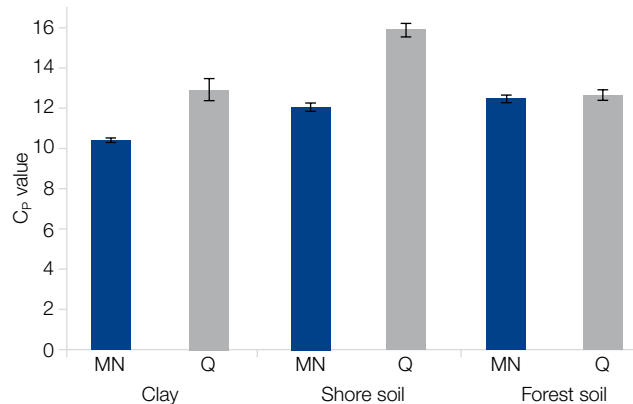
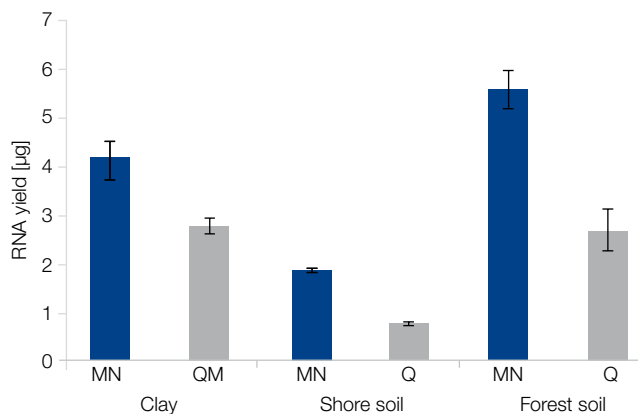
- Fast and convenient procedure
- Anion exchange technology allows high RNA yield
- Additional buffer set for parallel isolation of DNA from the same sample available

MN Bead Tubes included

	 NucleoBond® RNA Soil Mini	 NucleoBond® RNA Soil
Technology	Anion exchange technology	Anion exchange technology
Sample material	0.25–0.5 g soil	< 2 g soil
Fragment size	≥ 100 nt	≥ 100 nt
Typical yield	0.25–2.5 µg	1–10 µg
A ₂₆₀ /A ₂₈₀	1.5–2.0	1.7–2.1
RIN	> 7.0	> 8.5
Elution volume	50–100 µL	100 µL
Theoretical binding capacity	30 µg	600 µg
Preparation time	60 min/12 preps	60 min/6 preps

*For isolation of DNA, DNA Set for NucleoBond® RNA Soil is required.

Application data



Amplifiable RNA for perfect results with NucleoBond® RNA Soil kit

Duplicates of different soil samples (clay, shore soil, forest soil) were purified in duplicates according to the standard procedure from MN and Q. 4 µL of eluate was applied to the RT-PCR (amplicon: 466 bp). All MN samples showed lower C_p values compared with Q samples, indicating higher RNA yield.

Ordering information

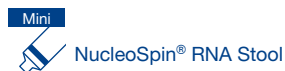
Product	Preps	REF
NucleoBond® RNA Soil Mini*	10 / 50	740142.10 / .50
NucleoBond® RNA Soil*	20	740140.20
Related products		
DNA Set for NucleoBond® RNA Soil Mini	10 / 50	740143.10 / .50
DNA Set for NucleoBond® RNA Soil	10 / 50	740141.20

RNA from stool samples

NucleoSpin® RNA Stool

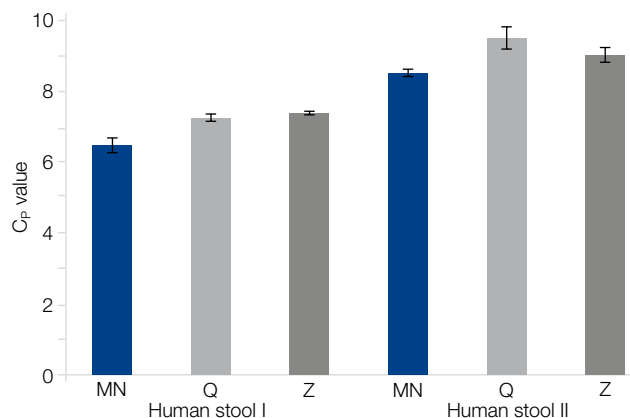
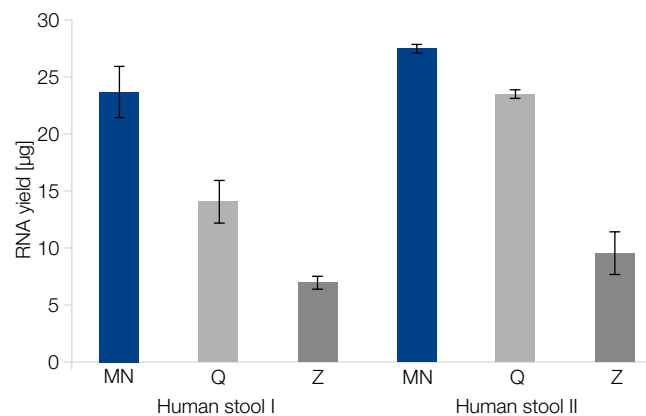
Speedy isolation of total RNA from various stool specimen

- Suitable for herbivore, omnivore, and carnivore stool samples
- Dedicated protocols for total RNA (including small RNA species) and large RNA
- DNase included



Technology	Silica membrane technology
Sample material	180–220 mg fresh or frozen stool samples
Fragment size	≥ 18 nt
Typical yield	10–30 µg (varies by sample and protocol)
A ₂₆₀ /A ₂₈₀	1.9–2.1
RIN	> 7.5 (for fresh stool samples)
Elution volume	100 µL
Theoretical binding capacity	200 µg
Preparation time	70 min/10 preps

Application data



NucleoSpin® RNA Stool shows best performance in qPCR

The NucleoSpin® RNA Stool samples as well as the Q samples were eluted with 100 µL, the Z eluate was adjusted to 100 µL to get comparable RNA concentrations in the eluate. 1 µL of eluate was used for qRT-PCR performed on a Roche LightCycler® using the SensiFAST™ SYBR® No-Rox One Step Kit (amplicon size (466 bp fragment of the 16S rRNA transcript)). NucleoSpin® RNA Stool kit showed a better performance in the qRT-PCR compared to the two competitor kits.

Ordering information




Product	Preps	REF
NucleoSpin® RNA Stool	10 / 50	740130.10 / .50

RNA clean up

NucleoSpin® RNA Clean-up

Micro, Mini, and Maxi kits for RNA clean up

- Effective removal of removal of RT-PCR inhibitors
- Time saving procedure based on NucleoSpin® RNA, without DNase digestion and homogenization steps

	 NucleoSpin® RNA Clean-up XS	 NucleoSpin® RNA Clean-up	 NucleoSpin® RNA Clean-up Maxi
Technology	Silica membrane technology	Silica membrane technology	Silica membrane technology
Sample material	RNA solution (< 300 µL incl. < 90 µg RNA)	Phenol / chloroform extract (< 200 µL), reaction mixture, cells (< 10 ⁵)	< 35 mg crude RNA
Fragment size	≥ 200 nt	≥ 200 nt	≥ 200 nt
Typical recovery	85–95 %	85–95 %	> 85–95 %
A ₂₆₀ /A ₂₈₀	1.9–2.1	1.9–2.1	1.9–2.1
Elution volume	5–30 µL	40–120 µL	3–5 mL
Theoretical binding capacity	110 µg	200 µg	35 mg
Preparation time	20 min/6 preps	20 min/6 preps	30 min/6 preps

Ordering information

Product	Preps	REF
NucleoSpin® RNA Clean-up XS	10 / 50 / 250	740903.10 / .50 / .250
NucleoSpin® RNA Clean-up	10 / 50 / 250	740948.10 / .50 / .250
NucleoSpin® RNA Clean-up Maxi	20	740910.20

RNA purification guide

Ordering information

Product	Preps / Pack of	REF
RNA from cells and tissue		
NucleoSpin® RNA Plus XS	10 / 50 / 250	740990.10 / .50 / .250
NucleoSpin® RNA Plus	10 / 50 / 250	740984.10 / .50 / .250
NucleoSpin® RNA XS	10 / 50 / 250	740902.10 / .50 / .250
NucleoSpin® RNA	10 / 50 / 250	740955.10 / .50 / .250
NucleoSpin® RNA Midi	20	740962.20
NucleoSpin® 8 RNA	12 x 8 / 60 x 8	740698 / .5
NucleoSpin® 8 RNA Core Kit	48 x 8	740465.4
NucleoSpin® 96 RNA	2 x 96 / 4 x 96 / 24 x 96	740709.2 / .4 / .24
NucleoSpin® 96 RNA Core Kit	4 x 96	740466.4
NucleoMag® RNA	1 x 96 / 4 x 96	744350.1 / .4
NucleoZOL	200 mL	740404.200
NucleoSpin® RNA Set for NucleoZOL	10 / 50	740406.10 / .50
NucleoProtect® RNA	50 / 250 / 500 mL	740400.50 / .250 / .500
MicroRNA		
NucleoSpin® miRNA	10 / 50 / 250	740971.10 / .50 / .250
NucleoSpin® miRNA Plasma	10 / 50 / 250	740981.10 / .50 / .250
Exosome Precipitation Solution (Serum / Plasma)*	2 mL / 12 mL / 60 mL	740398.2 / .12 / .60
Exosome Precipitation Solution (Urine)*	12 mL / 20 mL / 250 mL	740399.12 / .50 / .250
RNA, DNA, and protein		
NucleoSpin® TriPrep	10 / 50 / 250	740966.10 / .50 / .250
NucleoSpin® RNA/Protein	10 / 50 / 250	740933.10 / .50 / .250
NucleoSpin® RNA/DNA Buffer Set	100	740944
RNA from blood		
NucleoSpin® RNA Blood	10 / 50	740200.10 / .50
NucleoSpin® RNA Blood Midi	20	740210.20
NucleoSpin® 8 RNA Blood	12 x 8 / 60 x 8	740220 / .5
NucleoSpin® 96 RNA Blood	2 x 96 / 4 x 96	740225.2 / .4
Small and large RNA from FFPE samples		
NucleoSpin® totalRNA FFPE XS	10 / 50 / 250	740969.10 / .50 / .250
NucleoSpin® totalRNA FFPE	10 / 50 / 250	740982.10 / .50 / .250
RNA from plant		
NucleoSpin® RNA Plant and Fungi	10 / 50	740120.10 / .50
NucleoSpin® RNA Plant	10 / 50 / 250	740949.10 / .50 / .250
RNA from soil		
NucleoBond® RNA Soil	20	740140.20
NucleoBond® RNA Soil Mini	10 / 50 / 250	740142.10 / .50
RNA from stool		
NucleoSpin® RNA Stool	10 / 50	740130.10 / .50
RNA clean up		
NucleoSpin® RNA Clean up XS	10 / 50 / 250	740903.10 / .50 / .250
NucleoSpin® RNA Clean up	10 / 50 / 250	740948.10 / .50 / .250
NucleoSpin® RNA Clean up Maxi	20	740910.20

*Not available in the USA

Trademarks: NucleoBond, NucleoSpin, NucleoMag, and NucleoProtect: MACHEREY-NAGEL GmbH & Co KG

Taqman: Roche Molecular Systems Inc (USA); Lightcycler: Roche Diagnostics GmbH (Germany); Sensifast: Bioline Reagents Limited (USA); SYBR: Molecular Probes Inc. (USA)

www.mn-net.com

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