MACHEREY-NAGEL

RNA purification guide

Bioanalysis

Purification, stabilization, and specialized solutions

- Fast and easy workflows
- Sample stabilization
- Special solutions – RNA co-purifications

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. We have solutions for your daily RNA work available that will allow you to overcome those challenges. RNA purification kits from MACHEREY-NAGEL offer fast and easy solutions that will make your RNA routine a real pleasure.

RNA analysis also includes the purification of different RNA species. For this we offer tailored and specialized solutions that will allow you to purify high quality RNA.

Why to 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, RNA stabilization reagents and special solutions for miRNA or RNA co-purification in this comprehensive guide. Do not hesitate to contact us to benefit from our technical service:

Phone: +49 2421 969 333
E-mail: support@mn-net.com

Icon annotation

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

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

Liquid reagent solution

Superparamagnetic beads

Mini spin columns in 8-well strip format

Mini spin columns in 96-well plate format

Cultured cells, human/animal tissue

Plant tissue

Formalin-fixed paraffin-embedded (FFPE) tissue

Yeast

Insects

Blood

Bacteria

Plasma/serum

Fungi

Difficult to lyse sample

Saliva

RNA purification guide

Kits for RNA isolation

Category	Sample material	RNA size	Scale	Product	Page
RNA	FFPE	> 18 nt	Micro	NucleoSpin® total RNA FFPE XS	7
			Mini	NucleoSpin® total RNA FFPE	7
	Cells / tissue	> 18 nt	Flexible	NucleoZOL	16
		> 200 nt	Micro	NucleoSpin® RNA Plus XS	4
				NucleoSpin® RNA XS	5
			Mini	NucleoSpin® RNA Plus	4
				NucleoSpin® RNA	3
			Midi	NucleoSpin® RNA Midi	5
			8-well strip	NucleoSpin® 8 RNA	5
			96-well plate	NucleoSpin® 96 RNA	5
	Blood	> 200 nt	Mini	NucleoSpin® RNA Blood	6
			Midi	NucleoSpin® RNA Blood Midi	6
			8-well strip	NucleoSpin® 8 RNA Blood	6
			96-well strip	NucleoSpin® 96 RNA Blood	6
	Plant and Fungi	> 200 nt	Mini	NucleoSpin® RNA Plant and Fungi	8
RNA automation	Cells / tissue	> 200 nt	Flexible	NucleoMag® RNA	9
			8-well strip	NucleoSpin® 8 RNA	5
			96-well strip	NucleoSpin® 96 RNA	5
	Blood	> 200 nt	8-well strip	NucleoSpin® 8 RNA Blood	6
			96-well strip	NucleoSpin® 96 RNA Blood	6
miRNA	Cells / tissue	> 18 nt	Mini	NucleoSpin® miRNA	10
	Plasma and biological fluids	> 18 nt	Mini	NucleoSpin® miRNA Plasma	11
	Exosomes		Flexible	Exosome Precipitation Solution (Serum / Plasma) *	12
			Flexible	Exosome Precipitation Solution (Urine) *	12
RNA co-purification	Cells / tissue	> 200 nt	Mini	NucleoSpin® RNA/Protein	14
			Mini	NucleoSpin® TriPrep	13
	Flexible	> 200 nt	Mini	NucleoSpin® RNA/DNA Buffer Set	15
RNA stabilization	Cells / tissue		Flexible	NucleoProtect® RNA	17
	Blood (S-Monovette®)	> 200 nt	Flexible	S-Monovette® RNA stabilizer combinable with all NucleoSpin® RNA Blood Kits	6

RNA purification technologies

	NucleoSpin®	NucleoSpin® 8	NucleoSpin® 96	NucleoMag®
Technology	Silica membrane	Silica membrane	Silica membrane	Magnetic bead
Format	XS, Mini, Midi, Maxi	8-well strip	96-well plate	Flexible
Processing	Centrifugation	Vacuum / centrifugation	Vacuum / centrifugation	Automation / manual

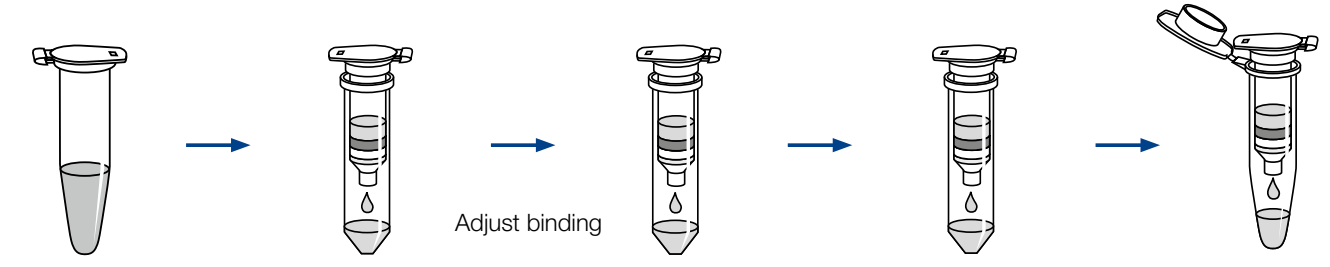
NucleoSpin® RNA Plus

Ultrafast processing

- RNA in just 20 minutes
- gDNA removal columns included
- Safe – No reducing agents (e. g. ß-mercaptoethanol)
- High yield and RIN

	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 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
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

Product workflow overview – 20 min / 6 preps



Reference

Olmedo Velarde, Alejandro et al. “First report of orchid fleck virus associated with citrus leprosis symptoms in rough lemon (Citrus jambhiri) and mandarin (C. reticulata) the United States.” Plant disease, 10.1094/PDIS-12-20-2736-PDN. 3 Mar. 2021, doi:10.1094/PDIS-12-20-2736-PDN

Product code

NucleoSpin® RNA

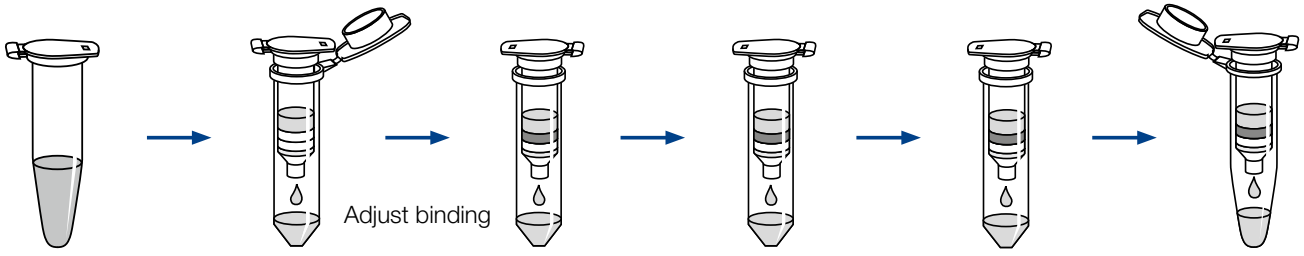
RNA isolation kits from very small to large scale

- High quality RNA from diverse sample materials
- NucleoSpin® Filters and rDNase included
- High yield and RIN

	XS NucleoSpin® RNA XS	Mini NucleoSpin® RNA	Midi NucleoSpin® RNA Midi	8-well NucleoSpin® 8 RNA	96-well NucleoSpin® 96 RNA
Technology	Silica membrane technology	Silica membrane 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), bacteria (< 10^9), yeast (< 10^8), human / animal tissue (< 30 mg)	Cultured cells (< 5 × 10^7), bacteria(< 10^{10}), yeast (< 3 × 10^8), human / animal tissue (< 200 mg)	< 20 mg human / animal tissue; < 2 × 10^6 eukaryotic cells	< 20 mg human / animal tissue; < 2 × 10^6 eukaryotic cells
Fragment size	≥ 200 nt	≥ 200 nt	≥ 200 nt	≥ 200 nt	≥ 200 nt
Typical yield	HeLa cells (10^2): 0.1 – 1.5 ng, HeLa cells (10^5): 1 – 1.5 µg	HeLa cells (10^6): 14 µg, bacteria (10^9): 70 µg	HeLa cells (4 × 10^7): 620 µg	20 µg (from 20 mg mouse liver or 2 × 10^6 HeLa cells)	20 µg (from 20 mg mouse liver or 2 × 10^6 HeLa cells)
A_{260}/A_{280}	1.9 – 2.1	1.9 – 2.1	1.9 – 2.1	1.9 – 2.1	1.9 – 2.1
Typical RIN	> 9	> 9	> 9	> 9	> 9
Elution volume	5 – 30 µL	30 – 120 µL	500 – 1000 µL	50 – 130 µL	50 – 130 µL
Theoretical binding capacity	110 µg	200 µg	700 µg	100 µg	100 µg
Preparation time	35 min/6 preps	35 min/6 preps	80 min/4 preps	45 min/6 strips	70 min/plate
				Automation possible	Automation possible

Automation of NucleoSpin® 8/96 RNA: Verified and established methods for various liquid handling platforms (e.g. Hamilton, Tecan, Eppendorf, Corbett, Integra, etc.). Automation support is available on request.
Related products: NucleoSpin® 8/96 RNA also available as Core Kit.

Product workflow overview – 35 min/6 preps



Homogenize and lyse sample | Filter lysate | Bind RNA | Desalt membrane and digest DNA | Wash and dry the membrane | Elute RNA

gDNA removal 15 min

References

Verbeelen, Tom et al. “Optimization of RNA extraction for bacterial whole transcriptome studies of low-biomass samples.” iScience vol. 25,11 105311. 9 Oct. 2022, doi:10.1016/j.isci.2022.105311

Product code

Purification

NucleoSpin® RNA Blood

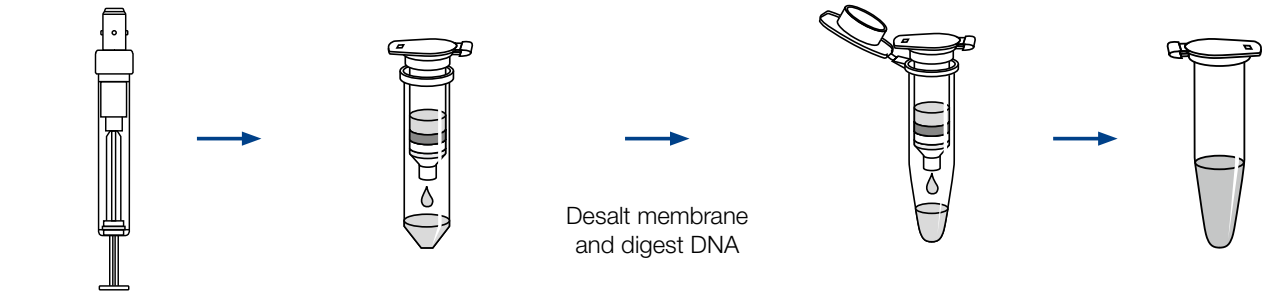
Various kits for RNA isolation from fresh and frozen whole blood

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

	Mini NucleoSpin® RNA Blood	Midi NucleoSpin® RNA Blood Midi	8-well NucleoSpin® 8 RNA Blood	96-well NucleoSpin® 96 RNA Blood
Technology	Silica membrane technology	Silica membrane technology	Silica membrane technology	Silica membrane technology
Sample material	< 400 µL blood	400 – 1300 µL blood	< 400 µL blood	< 400 µL blood
Fragment size	≥ 200 nt	≥ 200 nt	≥ 200 nt	≥ 200 nt
Typical yield	Blood (400 µL): 1 – 8 µg *	Blood (1300 µL): 4 – 26 µg *	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	1.9 – 2.1	1.9 – 2.1
Elution volume	40 – 120 µL	200 – 400 µL	50 – 130 µL	50 – 130 µL
Theoretical binding capacity	200 µg	700 µg	100 µg	100 µg
Preparation time	55 min/6 preps	75 min/6 preps	60 min/6 strips	100 min/plate
Automation of NucleoSpin® 8/96: Verified and established methods for various liquid handling platforms (e.g. Hamilton, Tecan, Eppendorf, Corbett, Integra, etc.). Automation support is available on request.			Automation possible	Automation possible

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

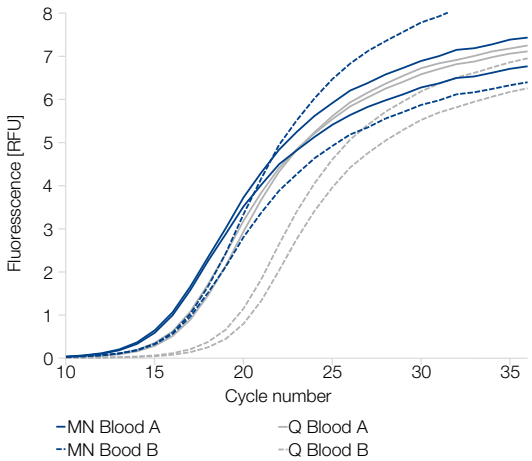
Product workflow overview



Recommended: The S-Monovette® RNA Exact (SARSTEDT)

- Developed for blood sampling
- Preserves and stabilizes the RNA
- Ideal for RNA purification using NucleoSpin® RNA Blood

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). Using the NucleoSpin® RNA Blood kit result in higher RNA yield as indicated in the application data by lower C_T values indication a higher RNA yield. Analysis of RNA with LightCycler® qRT-PCR and β-actin specific primers resulted in a 73 nt amplicon.

Reference

Yamagata, Hirotaka et al. “Optimized protocol for the extraction of RNA and DNA from frozen whole blood sample stored in a single EDTA tube.” Scientific reports vol. 11,1 17075. 23 Aug. 2021, doi:10.1038/s41598-021-96567-2

Product code

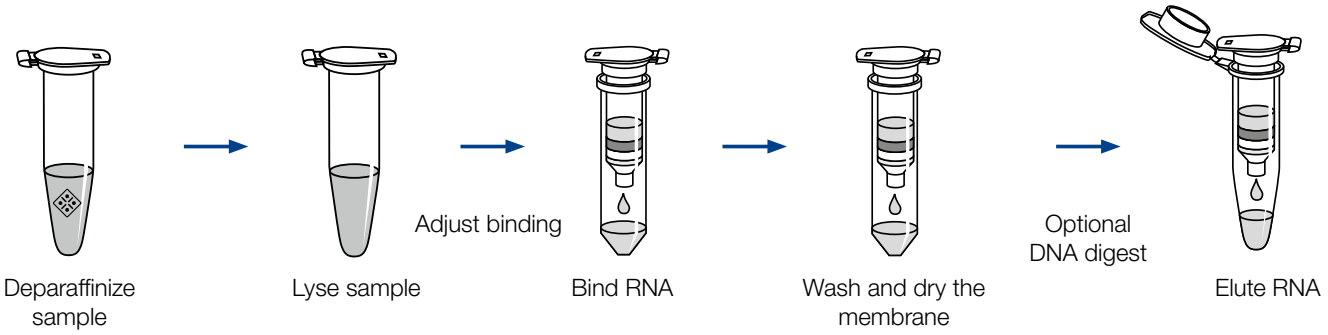
NucleoSpin® totalRNA FFPE

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

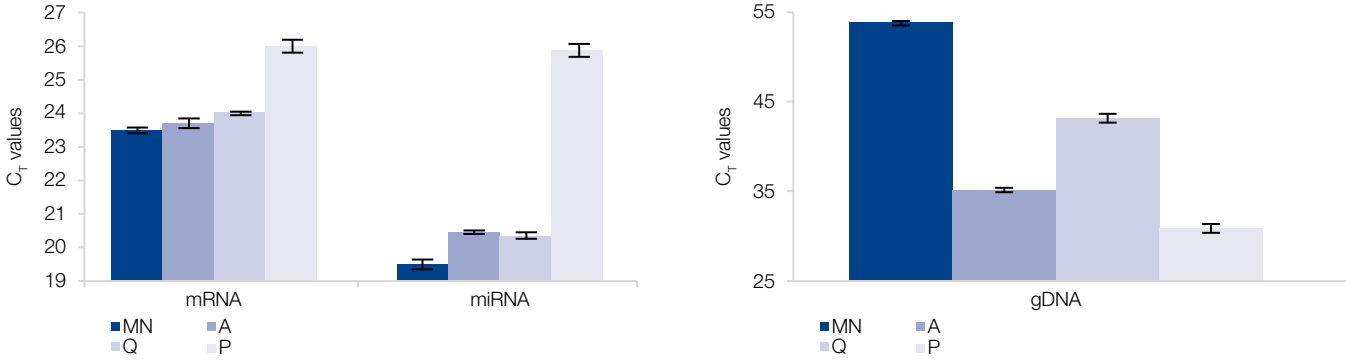
- Patented blue colored Paraffin Dissolver included for convenient paraffin removal without xylene
- Efficient removal of crosslinks

	XS NucleoSpin® totalRNA FFPE XS	Mini 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)

Product workflow overview



Application data



Excellent qRT-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 × 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

Kyriazoglou, Anastasios et al. "Ewing's sarcoma of the cervix: A case report of an unusual diagnosis in pregnancy treated with surgery, adjuvant VIDE and radiotherapy." Oncology letters vol. 17,6 (2019): 5529 – 5535. doi:10.3892/ol.2019.10267

Product code

Plant Fungi

NucleoSpin® RNA Plant and Fungi

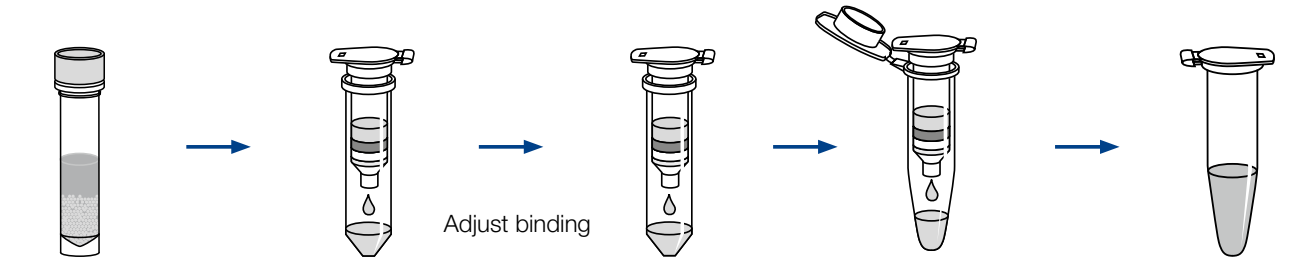
For challenging and routine plant samples

- Filter columns for efficient sample homogenization and reduction of viscosity included in the kit
- Tailored protocols for diverse starting materials

Mini

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

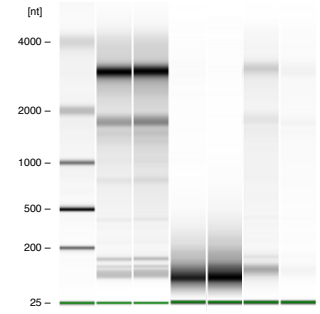
Product workflow overview



Homogenize and lyse sample | Filter lysate | Bind RNA | Wash and elute RNA | Pure RNA

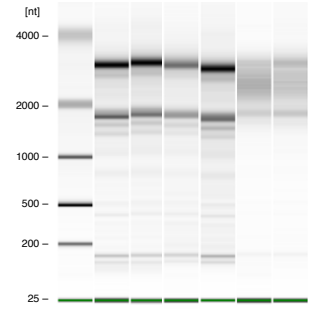
Application data

A



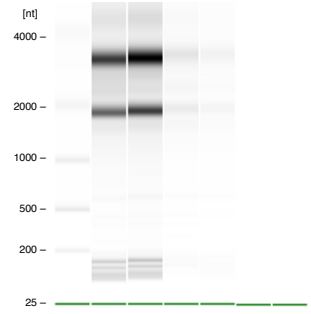
Kit	MN	S	Q
Yield [µg]	7,0	2,3	0,8
RIN	8,0	2,1	3,8
OD A_{260}/A_{280}	2,0	1,4	1,7

B



Kit	MN	S	Q
Yield [µg]	1,9	1,1	1,3
RIN	8,0	8,2	5,0
OD A_{260}/A_{280}	2,0	2,0	1,7

C



Kit	MN	S	Q
Yield [µg]	57	12,1	1,1
RIN	7,2	4,2	5,6
OD A_{260}/A_{280}	2,1	1,9	1,5

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

Reference

González-Sayer, Sandra et al. “High-quality genome assembly of Pseudocercospora ulei the main threat to natural rubber trees.” Genetics and molecular biology vol. 45,1 e50510051. 5 Jan. 2022, doi:10.1590/1678 – 4685-GMB-2021-0051

Product code

Purification

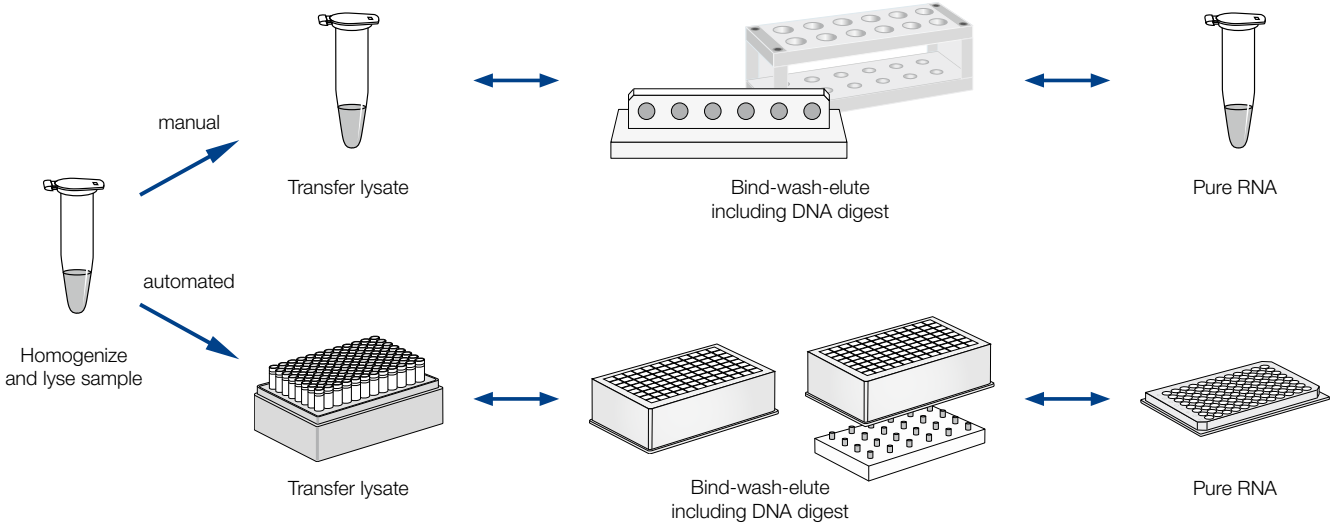
NucleoMag® RNA

Magnetic bead based RNA isolation from tissue and cells

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

	Mag NucleoMag® RNA
Technology	Magnetic bead technology
Sample material	< 2 × 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)

Product workflow overview



Available application notes of automation partners

Hamilton NIMBUS® Presto

Thermo Scientific KingFisher® Flex for Plant material

Thermo Scientific KingFisher® Flex for Cells Tissue

MASMEC Biomed OMNIA Prima

Tecan Freedom EVO®

Eppendorf epMotion® 5075

Opentrons OT-2

Reference

Geffroy, Benjamin et al. “Parental selection for growth and early-life low stocking density increase the female-to-male ratio in European sea bass.” Scientific reports vol. 11,1 13620. 30 Jun. 2021, doi:10.1038/s41598-021-93116-9

Product code

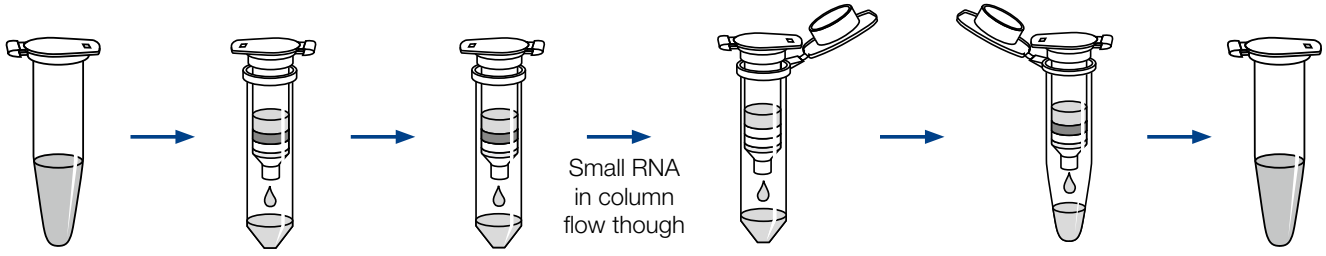
NucleoSpin® miRNA

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 w/o phenol / chloroform

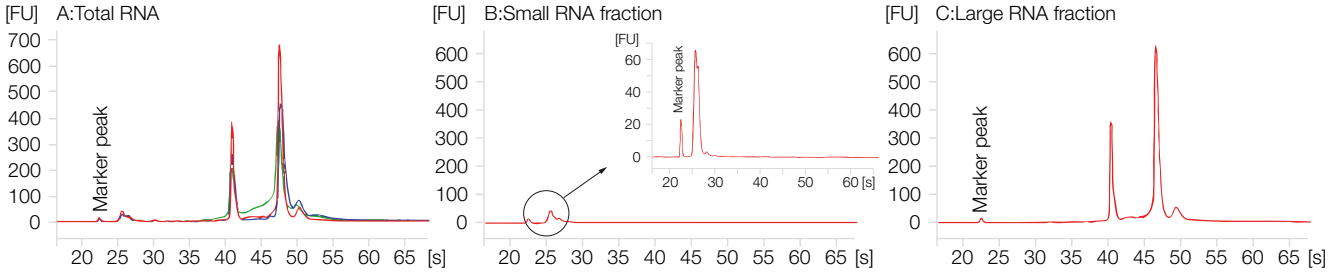
	Mini NucleoSpin® miRNA
Technology	Silica membrane technology
Sample material	Cells (< 10^7), human / animal tissue (< 30 mg), plant tissue (< 50 mg), reaction mixtures (< 150 µL)
Fragment size	≥ 18 nt
Typical yield	100 µg total RNA (10^7 HeLa cells: 10 µg small RNA, 95 µg large RNA)
Elution volume	30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

Product workflow overview



For isolation of total RNA please contact support@mn-net.com for modified instructions.

Application data



Reliable RNA fractionation with highest selectivity

Total RNA was isolated from 10^7 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.

References

Zhang, Ying et al. "Interfering Human Papillomavirus E6/E7 Oncogenes in Cervical Cancer Cells Inhibits the Angiogenesis of Vascular Endothelial Cells via Increasing miR-377 in Cervical Cancer Cell-Derived Microvesicles." OncoTargets and therapy vol. 13 4145 – 4155. 13 May. 2020, doi:10.2147/OTT.S239979

Grabmüller, Melanie et al. "Comparative evaluation of different extraction and quantification methods for forensic RNA analysis." Forensic science international. Genetics vol. 16 (2015): 195 – 202. doi:10.1016/j.fsigen.2015.01.006

Product code

Specialized solutions

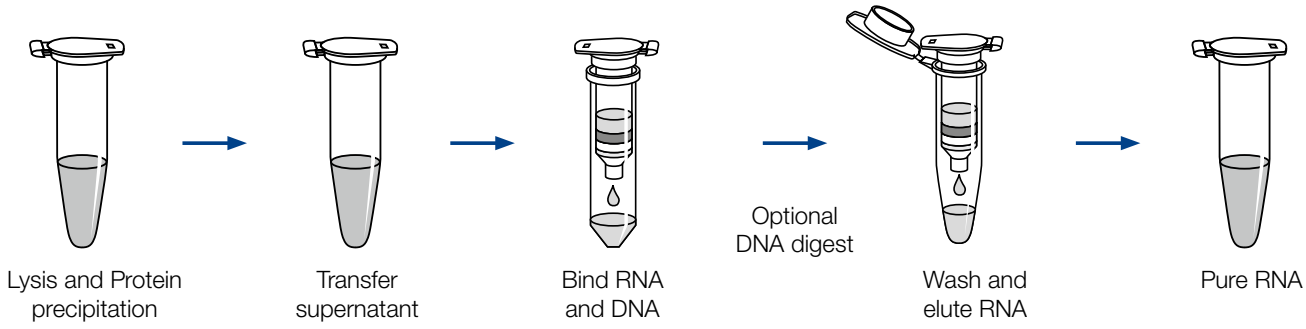
NucleoSpin® miRNA Plasma

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), exosomes
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)

Product workflow overview



Reference

Savolainen, Kalle et al. “Expression of the miR-200 family in tumor tissue, plasma and urine of epithelial ovarian cancer patients in comparison to benign counterparts.” BMC research notes vol. 13,1 311. 1 Jul. 2020, doi:10.1186/s13104-020-05155-6

Hermann, Stefanie et al. “Diagnostic potential of circulating cell-free microRNAs for community-acquired pneumonia and pneumonia-related sepsis.” Journal of cellular and molecular medicine vol. 24,20 (2020): 12054 – 12064. doi:10.1111/jcmm.15837

Shirahama, Shintaro et al. “Human U90926 orthologous long non-coding RNA as a novel biomarker for visual prognosis in herpes simplex virus type-1 induced acute retinal necrosis.” Scientific reports vol. 11,1 12164. 9 Jun. 2021, doi:10.1038/s41598-021-91340-x

Cheng, Lauren Y et al. “Direct capture and sequencing reveal ultra-short single-stranded DNA in biofluids.” iScience vol. 25,10 105046. 1 Sep. 2022, doi:10.1016/j.isci.2022.105046

Product code

Specialized solutions

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

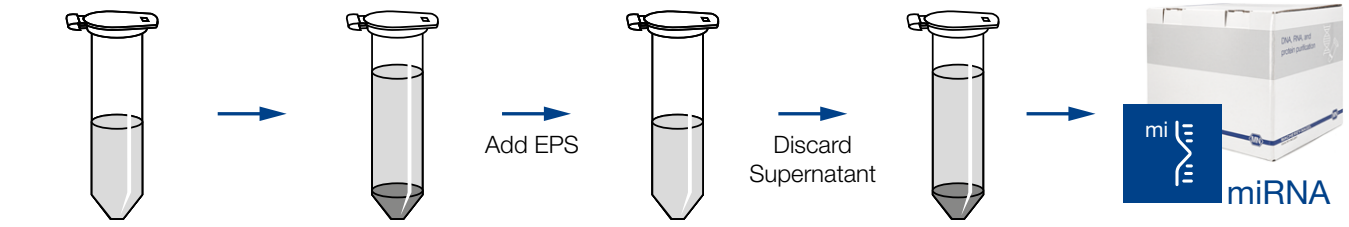
Solution for precipitation of exosomes from serum / plasma, or urine samples

- 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

* Not available in the USA

Product workflow overview



Reference

Savolainen, Kalle et al. “Expression of the miR-200 family in tumor tissue, plasma and urine of epithelial ovarian cancer patients in comparison to benign counterparts.” BMC research notes vol. 13,1 311. 1 Jul. 2020, doi:10.1186/s13104-020-05155-6

Karamichali, Eirini et al. “HCV Defective Genomes Promote Persistent Infection by Modulating the Viral Life Cycle.” Frontiers in microbiology vol. 9 2942. 3 Dec. 2018, doi:10.3389/fmicb.2018.02942

Galbiati, Silvia et al. “Small EVs-Associated DNA as Complementary Biomarker to Circulating Tumor DNA in Plasma of Metastatic Colorectal Cancer Patients.” Pharmaceuticals (Basel, Switzerland) vol. 14,2 128. 6 Feb. 2021, doi:10.3390/ph14020128

Product code

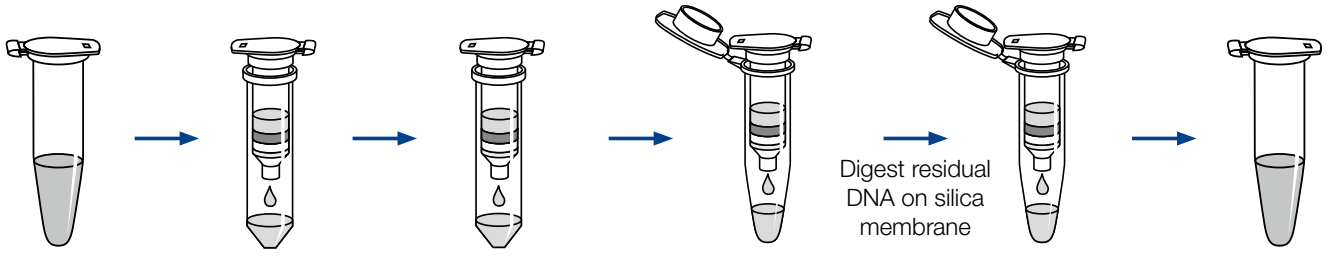
NucleoSpin® TriPrep

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

	Mini NucleoSpin® TriPrep
Technology	Silica membrane technology
Sample material	Cells (< 5 × 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

Product workflow overview



For protein purification please see kit manual for modified instructions or contact support@mn-net.com

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

Reference

Ścieżyńska, Aneta et al. "Molecular Analysis of the $ABCA_4$ Gene Mutations in Patients with Stargardt Disease Using Human Hair Follicles." International journal of molecular sciences vol. 21,10 3430. 13 May. 2020, doi:10.3390/ijms21103430

Mahmoud, Nouf N et al. "The Effect of Surface-Modified Gold Nanorods on the Early Stage of Embryonic Development and Angiogenesis: Insight into the Molecular Pathways." International journal of molecular sciences vol. 22,20 11036. 13 Oct. 2021, doi:10.3390/ijms222011036

Suzuki, Hidetaka et al. "Clinical and Tumor Characteristics of Patients with High Serum Levels of Growth Differentiation Factor 15 in Advanced Pancreatic Cancer." Cancers vol. 13,19 4842. 28 Sep. 2021, doi:10.3390/cancers13194842

Product code

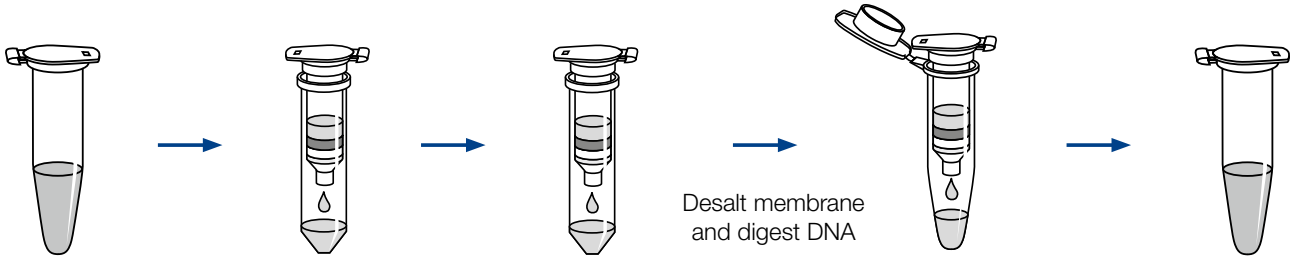
NucleoSpin® RNA/Protein

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

	Mini NucleoSpin® RNA/Protein
Technology	Silica membrane technology
Sample material	Cells (< 5 × 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

Product workflow overview



For protein purification please see kit manual for adjusted instructions or contact support@mn-net.com

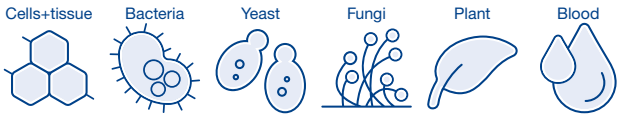
Reference

Phutinart, Sasathorn et al. “Periodontal ligament proliferation and expressions of bone biomolecules upon orthodontic preloading: Clinical implications for tooth autotransplantation.” Korean journal of orthodontics vol. 50,3 (2020): 188 – 196. doi:10.4041/kjod.2020.50.3.188

Choi, Seonju et al. “Suppression of Foxo3-Gatm by miR-132-3p Accelerates Cyst Formation by Up-Regulating ROS in Autosomal Dominant Polycystic Kidney Disease.” Biomolecules & therapeutics vol. 29,3 (2021): 311 – 320. doi:10.4062/biomolther.2020.197

Napp, L Christian et al. “Normal endothelial but impaired arterial development in MAP-Kinase activated protein kinase 2 (MK2) deficient mice.” Vascular cell vol. 8 4. 21 Oct. 2016, doi:10.1186/s13221-016-0038-2

Product code



NucleoSpin® RNA/DNA Buffer Set

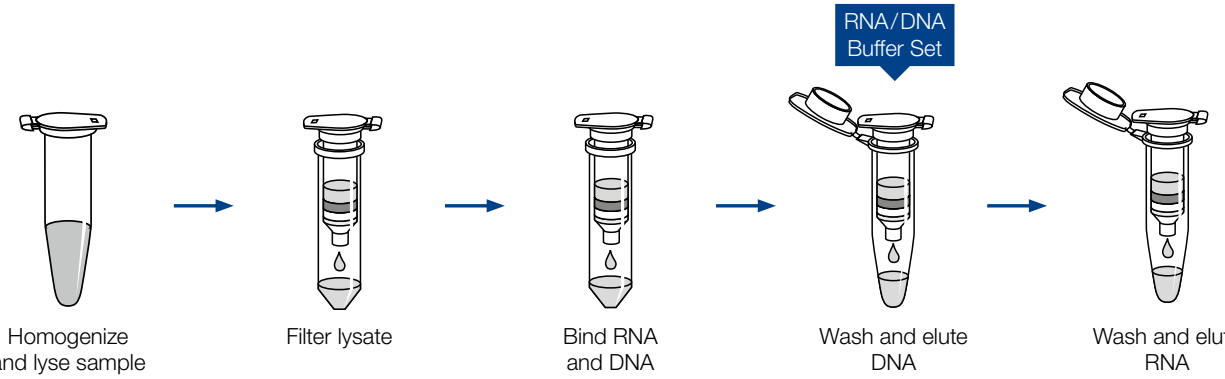
Buffer set for parallel isolation of RNA and DNA with NucleoSpin® RNA kits

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

	Buffer NucleoSpin® RNA/DNA Buffer Set
Compatible kits	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)

Product workflow overview

NucleoSpin® RNA Kit combined with RNA / DNA Buffer Set



Reference

Shirahama, Shintaro et al. “Long noncoding RNA U90926 is crucial for herpes simplex virus type 1 proliferation in murine retinal photoreceptor cells.” Scientific reports vol. 10,1 19406. 10 Nov. 2020, doi:10.1038/s41598-020-76450-2

Pareyn, Myrthe et al. “Evaluation of a pan-Leishmania SL RNA qPCR assay for parasite detection in laboratory-reared and field-collected sand flies and reservoir hosts.” Parasites & vectors vol. 13,1 276. 1 Jun. 2020, doi:10.1186/s13071-020-04141-y

Sadaoka, Tomohiko et al. “Human stem cell derived sensory neurons are positioned to support varicella zoster virus latency” BioRxiv (2020) bioRxiv 2020.01.24.919290; doi:10.1101/2020.01.24.919290

Product code

Stabilization

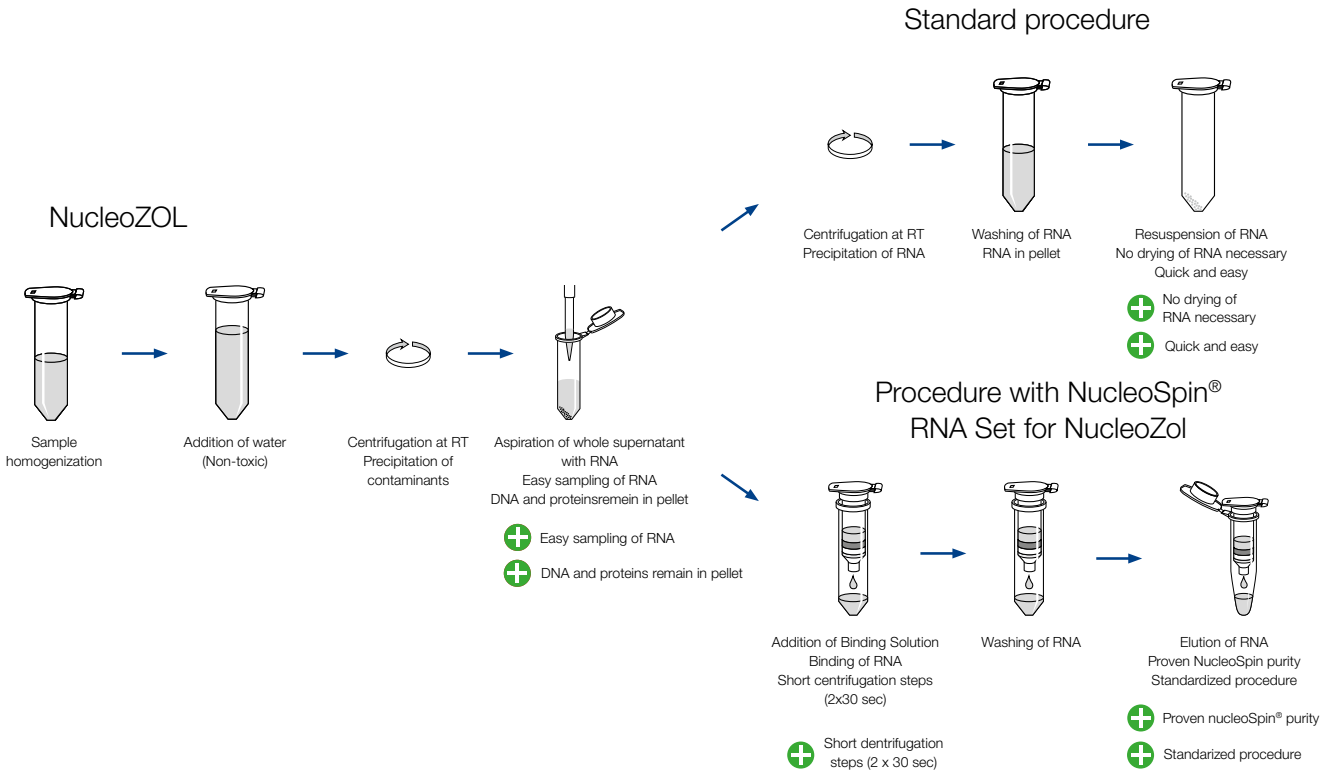
NucleoZOL

The universal RNA isolation reagent

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

	Reag NucleoZOL
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/1 × 10^6 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 / 1 × 10^6 cells (cultured cells)
A_{260}/A_{280}	1.8 – 2.1
Elution volume	Flexible
Preparation time	< 1 h
Related product	NucleoSpin® RNA Set for NucleoZOL

Product workflow overview



Reference

Yu, Fengying et al. “Decreased Serum miR-1296 may Serve as an Early Biomarker for the Diagnosis of Non-Alcoholic Fatty Liver Disease.” Clinical laboratory vol. 65,10 (2019): 10.7754/Clin.Lab.2019.190335. doi:10.7754/Clin.Lab.2019.190335

Product code

Stabilization

NucleoProtect® RNA

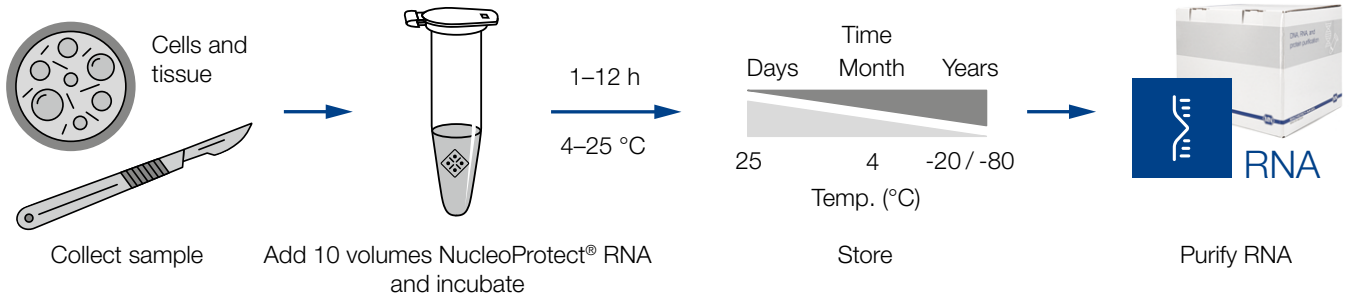
RNA stabilization reagent for cells and tissue

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

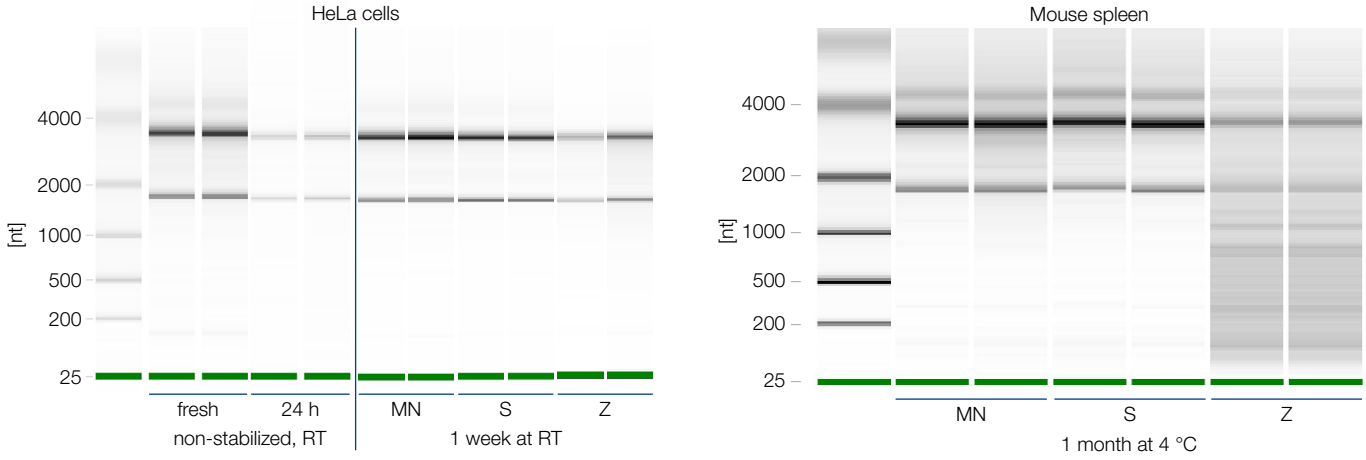
	Reag NucleoProtect® RNA
Technology	RNA stabilization reagent
Processing	Add reagent to sample (cells) or immerse sample in reagent (tissues)
Sample material	Cells, human and animal tissues (max. 5 mm diameter), bacteria, yeast, insects, plant tissue, buffy coat and leukocytes
Storage time	18 – 25 °C ≤ 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

Product workflow overview



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

Reference

Poyntner, Caroline et al. "Transcriptome profiling of Paraburkholderia aromaticivorans AR20 – 38 during ferulic acid bioconversion." AMB Express vol. 12,1 148. 26 Nov. 2022, doi:10.1186/s13568-022-01487-7

Product code

Ordering information

Product	Sample material	Preps / Pack of	REF	Page
RNA from cells and tissue				
NucleoSpin® RNA Plus XS	Cultured cells, human / animal tissue	10 / 50 / 250	740990.10 / .50 / .250	4
NucleoSpin® RNA Plus	Cultured cells, human / animal tissue, bacteria, yeast	10 / 50 / 250	740984.10 / .50 / .250	4
NucleoSpin® RNA XS	Cultured cells, human / animal tissue	10 / 50 / 250	740902.10 / .50 / .250	5
NucleoSpin® RNA	Cultured cells, human / animal tissue, bacteria, yeast	10 / 50 / 250	740955.10 / .50 / .250	5
NucleoSpin® RNA Midi	Cultured cells, human / animal tissue, bacteria, yeast	20	740962.20	5
NucleoSpin® 8 RNA	Cultured cells, human / animal tissue, eukaryotic cells, Saliva (collected with Oragene)	12 × 8 / 60 × 8	740698 / .5	5
NucleoSpin® 8 RNA Core Kit	Cultured cells, human / animal tissue, eukaryotic cells, Salica (collected with Oragene)	48 × 8	740465.4	5
NucleoSpin® 96 RNA	Cultured cells, human / animal tissue, eukaryotic cells, Saliva (collected with Oragene)	2 × 96 / 4 × 96 / 24 × 96	740709.2 / .4 / .24	5
NucleoSpin® 96 RNA Core Kit	Cultured cells, human / animal tissue, eukaryotic cells, Saliva (collected with Oragene)	4 × 96	740466.4	5
NucleoMag® RNA	Cultured cells, human / animal tissue	1 × 96 / 4 × 96	744350.1 / .4	9
NucleoZOL	Cultured cells, human / animal tissue, bacteria, yeast, plant tissue, viral fluid	200 mL	740404.200	16
NucleoSpin® RNA Set for NucleoZOL	NucleoZOL sample	10 / 50	740406.10 / .50	16
NucleoProtect® RNA	Cultured cells, human / animal tissue, bacteria, yeast, insects, plant tissue, buffy coat, leukocytes	50 / 250 / 500 mL	740400.50 / .250 / .500	17
miRNA				
NucleoSpin® miRNA	Cultured cells, human / animal tissue, plant tissue	10 / 50 / 250	740971.10 / .50 / .250	10
NucleoSpin® miRNA Plasma	Blood plasma and serum	10 / 50 / 250	740981.10 / .50 / .250	11
Exosome Precipitation Solution (Serum / Plasma) *	Blood plasma and serum	2 mL / 12 mL / 60 mL	740398.2 / .12 / .60	12
Exosome Precipitation Solution (Urine) *	Urine	12 mL / 20 mL / 250 mL	740399.12 / .50 / .250	12
RNA co-purification				
NucleoSpin® TriPrep	Cultured cells, human / animal tissue, plant tissue	10 / 50 / 250	740966.10 / .50 / .250	13
NucleoSpin® RNA/Protein	Cultured cells, human / animal tissue, bacteria, yeastplant tissue	10 / 50 / 250	740933.10 / .50 / .250	14
NucleoSpin® RNA/DNA Buffer Set	Cultured cells, human / animal tissue, bacteria, yeast, blood, plant tissue, fungi	100	740944	15
RNA from blood				
NucleoSpin® RNA Blood	Fresh or frozen whole blood (e. g., stabilized with EDTA, citrate, or heparin), S-Monovette® recommended	10 / 50	740200.10 / .50	6
NucleoSpin® RNA Blood Midi	Fresh or frozen whole blood (e. g., stabilized with EDTA, citrate, or heparin), S-Monovette® recommended	20	740210.20	6
NucleoSpin® 8 RNA Blood	Fresh or frozen whole blood (e. g., stabilized with EDTA, citrate, or heparin)	12 × 8 / 60 × 8	740220 / .5	6
NucleoSpin® 96 RNA Blood	Fresh or frozen whole blood (e. g., stabilized with EDTA, citrate, or heparin)	2 × 96 / 4 × 96	740225.2 / .4	6
Small and large RNA from FFPE samples				
NucleoSpin® totalRNA FFPE XS	FFPE-and formalin-fixed tissue samples	10 / 50 / 250	740969.10 / .50 / .250	7
NucleoSpin® totalRNA FFPE	FFPE-and formalin-fixed tissue samples	10 / 50 / 250	740982.10 / .50 / .250	7
RNA from plant				
NucleoSpin® RNA Plant and Fungi	Diverse plant tissue, filamentous fungi samples rich in starch, sugar or secondary metabolites	10 / 50	740120.10 / .50	8

* Not available in the USA

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