Bioanalysis

MACHEREY-NAGEL

Guide for high throughput applications



Tailored solutions for parallel processing of multiple samples

High throughput (HTP) processing with MACHEREY-NAGEL

- Products for DNA, RNA, and protein purification
- Flexible formats
- Direct support from technical experts

MACHEREY-NAGEL
www.mn-net.com

ADIS INTERNATIONAL

MN Since 1911

Automated DNA, RNA, and protein purification

MACHEREY-NAGEL – your partner for automated low to high throughput solutions

MN offers a variety of kits for low (LTP), medium (MTP), and high throughput (HTP) nucleic acid and protein purification. Our solutions are based on different technologies.

For RNA and DNA purification, we offer

- NucleoSpin®: silica membrane technology
- NucleoMag®: magnetic bead technology
- NucleoBond®: anion exchange chromatography
- NucleoFast®: ultrafiltration

For protein purification, we offer

- Protino®: affinity chromatography

Kits for all applications are available for both manual and automated use on common laboratory robotic platforms. The NucleoSpin® 8 / 96 kits are offered as ready to go solutions including all consumables, but are also available as "Core Kits" containing no plastic material in order to provide a high flexibility for automation.

Personal support by MACHEREY-NAGEL experts

For more than 20 years MN develops and produces a large portfolio of purification technologies and formats to meet your everyday needs. During this time, we gained a lot of experience and and created a large knowledge data base to resort to. Thus, we offer an extensive troubleshooting by our MN experts in case special support is needed for your application.

Furthermore, we supply validated and released basic scripts on request. Our specialists from R&D assist you to generate customized scripts for different robotic platforms if needed.

MN experts help you to optimize or adjust your existing scripts on request e.g., to process new sample material.

Contact our Technical Support and Customer Service or Product Management:

Technical Support and Customer Service

Tel.: +49 24 21 969-270 or -271

E-mail: tech-bio@mn-net.com

Product Management HTP

Tel.: +49 24 21 969-286

E-mail: pm-bio@mn-net.com

Application notes by MACHEREY-NAGEL

MN offers a broad range of application notes. These application notes contain detailed descriptions on how to use low, medium, and high throughput kits from MN on different robotic platforms. The number of available application notes increases continuously. For detailed information please visit:

www.mn-net.com/bioanalysis/htp-information

Technologies

Kits based on silica membrane technology

Technology	Application	Sample material	Scale	Product	Page
NucleoSpin®	Plasmid		8-well	NucleoSpin® 8 Plasmid / Core* Kit	6
			96-well	NucleoSpin® 96 Plasmid / Core* Kit	6
				NucleoSpin® 96 Plasmid Transfection-grade / Core* Kit	7
				NucleoSpin® 96 Flash	8
	Clean up		8-well	NucleoSpin® 8 PCR Clean-up / Core* Kit	9
			96-well	NucleoSpin® 96 PCR Clean-up / Core* Kit	9
	RNA	Tissue and cells	8-well	NucleoSpin® 8 RNA / Core* Kit	10
			96-well	NucleoSpin® 96 RNA / Core* Kit	10
		Blood	8-well	NucleoSpin® 8 RNA Blood	11
			96-well	NucleoSpin® 96 RNA Blood	11
	DNA	Blood	8-well	NucleoSpin® 8 Blood / Core* Kit	12
				NucleoSpin® 8 Blood QuickPure	13
			96-well	NucleoSpin® 96 Blood / Core* Kit	12
				NucleoSpin® 96 Blood QuickPure	13
			Midi	NucleoSpin® Blood L Vacuum	14
		Plasma	96-well	NucleoSpin® 96 cfDNA / Core* Kit	15
			Midi	NucleoSpin® cfDNA Midi	15
		Tissue	8-well	NucleoSpin® 8 Tissue / Core* Kit	17
			96-well	NucleoSpin® 96 DNA RapidLyse	16
				NucleoSpin® 96 Tissue / Core* Kit	17
		FFPE	8-well	NucleoSpin® 8 DNA FFPE	18
			96-well	NucleoSpin® 96 DNA FFPE	18
		Forensic	8-well	NucleoSpin® 8 Trace	18
			96-well	NucleoSpin® 96 Trace	18
		Plant	8-well	NucleoSpin® 8 Plant II / Core* Kit	19
			96-well	NucleoSpin® 96 Plant II / Core* Kit	19
		Soil	8-well	NucleoSpin® 8 Soil	20
			96-well	NucleoSpin® 96 Soil	20
		Food	8-well	NucleoSpin® 8 Food	21
			96-well	NucleoSpin® 96 Food	21
	Viral RNA / DNA	Serum, plasma, biological fluids	8-well	NucleoSpin® 8 Virus	22
			96-well	NucleoSpin® 96 Virus	22

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

Kits based on magnetic bead technology

Technology	Application	Sample material	Scale	Product	Page
NucleoMag®	Clean up		Flexible	NucleoMag® PCR	26
				NucleoMag® NGS Clean-up and Size Select	27
	RNA	Tissue and cells	Flexible	NucleoMag® RNA	28
	DNA	Blood	Flexible	NucleoMag® Blood 200 µL	29
			Flexible	NucleoMag® Blood 3 mL	29
		Plasma	Flexible	NucleoMag® cfDNA	30
		Tissue	Flexible	NucleoMag® Tissue	31
		Swab	Flexible	NucleoMag® DNA Swab	32
		FFPE	Flexible	NucleoMag® DNA FFPE	33
		Forensic	Flexible	NucleoMag® DNA Forensic	34

Technologies

Technology	Application	Sample material	Scale	Product	Page
		Plant	Flexible	NucleoMag® Plant	37
			Flexible	NucleoMag® 384 Plant	37
		Microorganism and insect	Flexible	NucleoMag® DNA Bacteria	35
		Water	Flexible	NucleoMag® DNA/RNA Water	36
		Food	Flexible	NucleoMag® DNA Food	38
		Biological fluids	Flexible	NucleoMag® Virus	39
		Clinical samples	Flexible	NucleoMag® Pathogen	40
		Veterinary samples	Flexiblee	NucleoMag® VET	41

Kit based on anion exchange chromatography

Technology	Application	Sample material	Scale	Product	Page
NucleoBond®	Plasmid		96-well	NucleoBond® 96 Xtra EF	44

Kit based on ultrafiltration

Technology	Application	Sample material	Scale	Product	Page
NucleoFast®	Clean up		96-well	NucleoFast® 96 PCR	25

Kit based on immobilized metal ion affinity chromatography

Technology	Application	Tag	Scale	Product	Page
Protino®	Protein	His	96-well	Protino® 96 Ni-NTA	46
				Protino® 96 Ni-IDA	47

Medium and high throughput technologies

	NucleoSpin®	NucleoMag®	NucleoBond®	NucleoFast®	Protino®
Technology	Silica membrane	Magnetic bead	Anion exchange chromatography	Ultrafiltration	Immobilized metal ion affinity chromatography
Format	Midi, 8-well strip, 96-well plate	Flexible	96-well plate	96-well plate	96-well plate
Processing	Vacuum / centrifugation / positive pressure	Magnet	Gravity flow	Vacuum / centrifugation / positive pressure	Vacuum / gravity flow

Icon annotation



Midi columns for vacuum



Mini spin columns in 8-well strip format



Mini spin or gravity flow columns in 96-well plate format



Superparamagnetic beads

Automation partners

Eppendorf

- Easy and reliable Plug'n'Prep® solution for nucleic acid extraction or protein purification
- Flexible processing of NucleoMag® kits (1 to 96 samples) using ep*Motion*® 5073m or 5073t (low to medium throughput) or the ep*Motion*® 5075t (high throughput).
- Vacuum based extraction for NucleoSpin® 8/96 kits using the ep*Motion*® 5075v, minimized risk of cross-contamination due to eppendorf's channeling plate
- Vacuum or gravity flow based 96-well protein purification using the Protino® 96 Ni-NTA or Ni-IDA kit
- Easy implementation of ready to use methods due to standardized configurations
- Optimized Plug'n'Prep® scripts or flexible customization available on request for NucleoSpin®, NucleoBond®, NucleoMag® and Protino® kits

Hamilton

- Preinstalled application packages and configurations for Genomic STARlet™ validated together with Hamilton
- Intuitive graphical interface setup with predefined protocols for e.g. NucleoSpin® and NucleoFast® kits
- Optimized configurations to save time and minimize tip consumption.
- Protocols and application packages can be provided by Hamilton
- Automated processing of NucleoSpin® 96 kits using the [MPE]^2 positive pressure module eliminating the possibility of uneven flow through by maintaining equal pressure across the NucleoSpin® Plates
- High speed, walk-away processing of NucleoMag® kits on the NIMBUS® Presto workstation

Tecan

- Flexible and versatile nucleic acid extraction and protein purification on the Tecan Freedom EVO® or related platforms
- Vacuum based extraction using the Te-VacS™ for NucleoSpin® 8/96 kits
- Minimized risk of cross-contamination due to unique MN Wash Plate
- Suitable for higher sample volumes using the NucleoSpin® L/Midi kits
- Magnetic bead based extraction with NucleoMag® kits using the NucleoMag® SEP and the Te-Shake™
- Vacuum or gravity flow based 96-well protein purification using the Protino® 96 Ni-NTA or Ni-IDA kit
- Optimized basics scripts and protocols for several NucleoSpin®, NucleoMag® and Protino® kits

Thermo Fisher Scientific

- Fast and flexible nucleic acid extraction using NucleoMag®
- Magnetic bead based isolation of RNA/DNA from a broad spectrum of samples
- Suitable for low to high throughput extractions
- Convenient processing of high sample volumes (e.g., NucleoMag® Blood 3 mL)
- Validated and optimized scripts available for all NucleoMag® kits (e.g., NucleoMag® Blood 3 mL or NucleoMag® cfDNA)
- Scripts available for different KingFisher® systems
- Flexible customization of scripts can be requested at MN Technical Support

Others

MN low to high throughput kits are widely applicable and can be adapted to most types automation platforms. NucleoSpin®, NucleoFast®, and Protino® kits can be processed on platforms using vacuum or positive pressure modules. NucleoMag® kits can be automated on platforms with automated magnetic separators or with static magnetic pins combined with a suitable shaker.

Get an overview about suitable platforms and refer to the application notes at www.mn-net.com.

Contact MN Technical Support and benefit from our expertise

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Silica membrane technology – Plasmid DNA

NucleoSpin® 8 / 96 Plasmid

Plasmid purification for sequencing and cloning

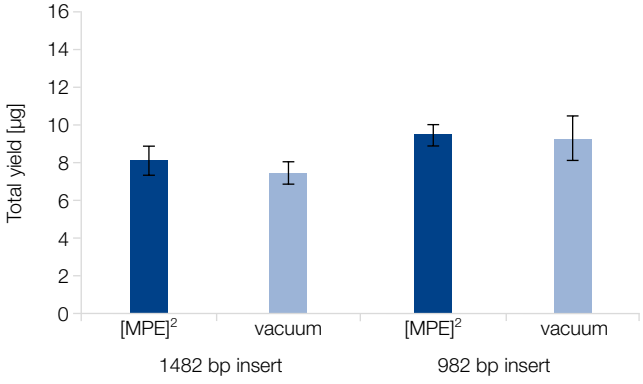
- NucleoSpin® Plasmid Filter Strips / Plate for convenient filtration of bacterial lysates

Product at a glance

	8-well NucleoSpin® 8 Plasmid	96-well NucleoSpin® 96 Plasmid
Technology	Silica membrane technology	Silica membrane technology
Sample material	1–5 mL	1–5 mL
Vector size	< 25 kbp	< 25 kbp
Typical yield	4–30 µg	4–30 µg
Endotoxin level	>> 50 EU/µg*	>> 50 EU/µg*
Elution volume	75–150 µL	75–150 µL
Theoretical binding capacity	20 µg	20 µg
Preparation time	45 min/6 strips	45 min/plate

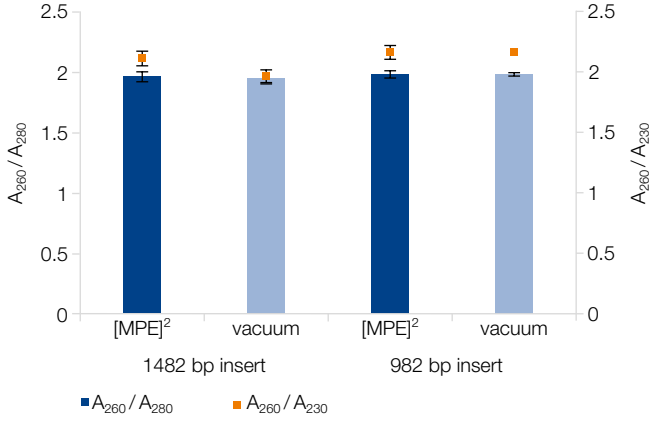
*EU = Endotoxin Units, please refer to the information box below

Application data



Isolation of plasmid DNA from bacterial cultures on Hamilton [MPE]²

Plasmid DNA of two different bacterial strains, transformed with plasmids containing either a 1482 bp or a 982 bp inserts, was isolated from 1.5 mL of bacterial cultures (*E. coli* DH 5α™, high-copy plasmid pGEM®-T Easy; n=24) using the NucleoSpin® 96 Plasmid kit on a [MPE]² positive pressure module (dark blue) or a manual vacuum manifold (light blue). Total yield was determined by UV spectrometry showing comparable yields between positive pressure or vacuum processed samples.



Purity of isolated plasmid DNA from bacterial cultures

Plasmid DNA of two different bacterial strains, transformed with plasmids containing either a 1482 bp or a 982 bp inserts, was isolated from 1.5 mL of bacterial cultures (*E. coli* DH 5α, high copy plasmid pGEM®-T Easy; n=24) using the NucleoSpin® 96 Plasmid kit on a [MPE]² positive pressure module (A_{260}/A_{280}: dark blue bars; A_{260}/A_{230}: orange squares) or a manual vacuum manifold (A_{260}/A_{280}: light blue bars; A_{260}/A_{230}: orange squares). Purity was determined by UV spectrometry revealing comparable quality of positive pressure or vacuum processed samples.

Ordering information

Product	Preps	REF
NucleoSpin® 8 Plasmid	12 x 8 / 60 x 8	740621 / .5
NucleoSpin® 8 Plasmid Core* Kit	48 x 8	740461.4
NucleoSpin® 96 Plasmid	1 x 96 / 4 x 96 / 24 x 96	740625.1 / .4 / .24
NucleoSpin® 96 Plasmid Core* Kit	4 x 96	740616.4

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

Silica membrane technology – Plasmid DNA

NucleoSpin® 96 Plasmid Transfection-grade

Plasmid purification for transfection of common cells

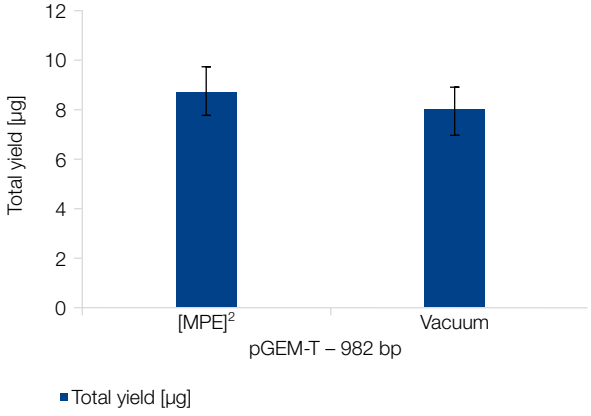
- Novel technology to diminish endotoxin content
- NucleoSpin® Plasmid Filter Plate for filtration of bacterial lysates in HTP format

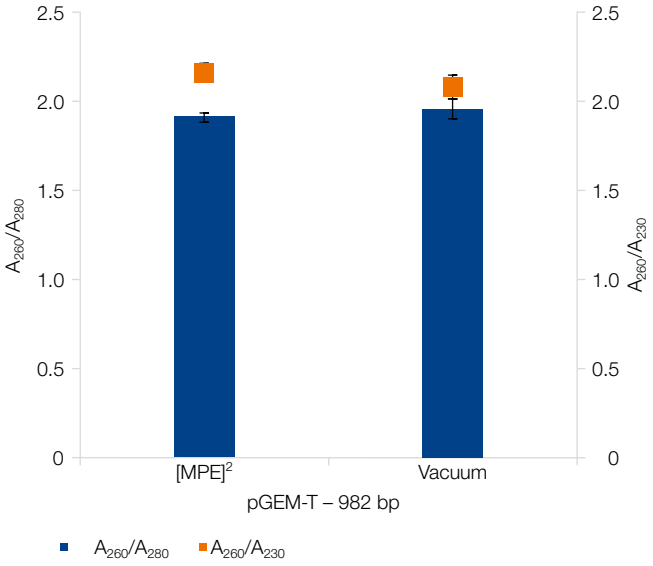
Product at a glance

	96-well NucleoSpin® 96 Transfection-grade
Technology	Silica membrane technology
Sample material	< 5 mL bacterial culture
Vector size	< 25 kbp
Typical yield	5–20 µg
Endotoxin level	Typical yield 5–20 µg
Elution volume	100–200 µL
Theoretical binding capacity	20 µg
Preparation time	45 min/plate

*EU = Endotoxin Units, please refer to the information box below

Application data





Reliable yields across purification platforms

NucleoSpin® 96 Plasmid Transfection-grade was used to isolate plasmid DNA from 1.5 mL of bacterial cultures (*E. coli* DH5α™, carrying a high copy plasmid pGEMR-T Easy, n=24, with a 982 bp insert) on a positive pressure module ([MPE]^2) or a manual vacuum manifold (vacuum). Regardless of the technology applied, NucleoSpin® 96 Plasmid Transfection-grade kit delivered reliably high yields with low variation.

Reliable purity both with vacuum chamber and a positive pressure unit

NucleoSpin® 96 Plasmid Transfection-grade was used to isolate plasmid DNA from 1.5 mL of bacterial cultures (*E. coli* DH5α™, carrying a high copy plasmid pGEMR-T Easy, n=24, with a 982 bp insert) on a positive pressure module ([MPE]^2) or a manual vacuum manifold (Vacuum). Very similar purity levels as indicated by the A_{280}/A_{260} and A_{260}/A_{260} optical measurements indicate the reliably high purity of plasmid preparations with the kit, even when combined with two different technologies.

Ordering information

Product	Preps	REF
NucleoSpin® 96 Plasmid Transfection-grade	1 x 96 / 4 x 96 / 24 x 96	740491.1 / .4 / .24
NucleoSpin® 96 Plasmid Transfection-grade Core* kit	4 x 96 / 24 x 96	740492.4 / .24

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

NucleoSpin® 96 Flash

Purification of large constructs

- Cost efficient purification of large constructs like cosmids or BACs in HTP format

Product at a glance

	 NucleoSpin® 96 Flash
Technology	Alkaline lysis and filtration
Sample material	< 1.3 mL *E. coli* culture (high copy), < 3.9 mL *E. coli* culture (BAC)
Vector size	< 250 kbp
Typical yield	8 µg (1.3 mL *E. coli* culture, high-copy), 1 µg (1.3 mL *E. coli* culture, BAC)
Preparation time	90 min/2 plates

Reference

Crucello et al., 2015 “Analysis of Genomic Regions of Trichodermaharzianum IOC-3844 Related to Biomass Degradation”

PLoS One

Ordering information

Product	Preps	REF
NucleoSpin® 96 Flash	2 x 96 / 4 x 96 / 24 x 96	740618.2 / .4 / .24

Silica membrane technology – Clean up

NucleoSpin® 8 / 96 PCR Clean up

Clean up for sensitive enzymatic reactions

- Efficient removal of primers and primer-dimers
- Purification of both small and large fragments

Product at a glance

	8-well NucleoSpin® 8 PCR Clean up	96-well NucleoSpin® 96 PCR Clean up
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 100 µL PCR reaction mixture	< 100 µL PCR reaction mixture
Fragment size	50 bp–10 kbp	50 bp–10 kbp
Recovery	75–95 %	75–95 %
Elution volume	75–150 µL	75–150 µL
Theoretical binding capacity	15 µg	15 µg
Preparation time	30 min/6 strips	45 min/plate

Reference

Guimaraes et al., 2016 “A cost-effective high throughput metabarcoding approach powerful enough to genotype ~44,000 year-old rodent remains from Northern Africa”

Molecular Ecology

Ordering information

Product	Preps / Pack of	REF
NucleoSpin® 8 PCR Clean up	12 x 8 / 60 x 8	740668 / .5
NucleoSpin® 8 PCR Clean up Core* Kit	48 x 8	740463.4
NucleoSpin® 96 PCR Clean up	1 x 96 / 2 x 96 / 4 x 96 / 24 x 96	740658.1 / .2 / .4 / .24
NucleoSpin® 96 PCR Clean up Core* Kit	4 x 96	740464.4

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.



Silica membrane technology – RNA

NucleoSpin® 8 / 96 RNA

Medium and high throughput kits for RNA isolation

- Efficient lysis without organic solvents
- Efficient removal of gDNA by an included rDNase

Product at a glance

	 NucleoSpin 8 RNA	 NucleoSpin® 96 RNA
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 2 x 10^6 eukaryotic cells, < 20 mg human/animal tissue	< 2 x 10^6 eukaryotic cells, < 20 mg human/animal tissue
Fragment size	> 200 nt	> 200 nt
Typical yield	20 µg (from 2 x 10^6 HeLa cells, 20 mg mouse liver)	20 µg (from 2 x 10^6 HeLa cells, 20 mg mouse liver)
Elution volume	50–130 µL	50–130 µL
Theoretical binding capacity	100 µg	100 µg
Preparation time	45 min/6 strips	70 min/plate

References

Zanconato et al., 2018, “Transcriptional addiction in cancer cells is mediated by YAP/TAZ through BRD4”

Nature Medicine

Voicheck et al., 2018 “Epigenetic Control of Expression Homeostasis during Replication Is Stabilized by the Replication Checkpoint”

Molecular Cell

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

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

Silica membrane technology – RNA

NucleoSpin® 8 / 96 RNA Blood

Patented technology

Medium and high throughput kits for RNA isolation from blood

- Direct blood lysis by patented lysis buffer – no selective erythrocyte lysis required
- Compatible with common blood collection tubes and anticoagulants (EDTA, citrate, and heparin)

Product at a glance

	8-well NucleoSpin® 8 RNA Blood	96-well NucleoSpin® 96 RNA Blood
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 400 µL whole blood (fresh or frozen)	< 400 µL whole blood (fresh or frozen)
Fragment size	> 200 nt	> 200 nt
Typical yield	1–8 µg (400 µL whole blood)	1–8 µg (400 µL whole blood)
Elution volume	50–130 µL	50–130 µL
Theoretical binding capacity	100 µg	100 µg
Preparation time	60 min/6 strips	100 min/plate

Reference

Jégou et al., 2016 “Whole Blood Transcriptomics Is Relevant to Identify Molecular Changes in Response to Genetic Selection for Feed Efficiency and Nutritional Status in the Pig”

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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



Silica membrane technology – DNA from blood

NucleoSpin® 8 / 96 Blood

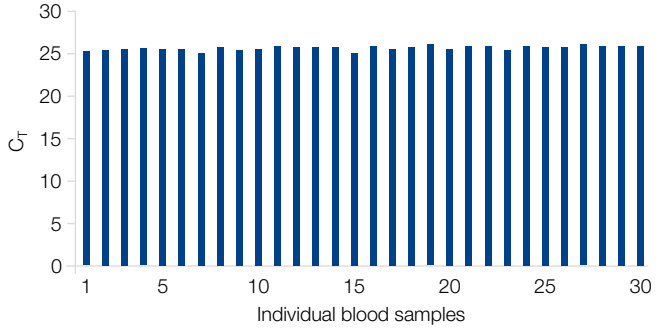
Medium and high throughput kits for DNA isolation from blood

- Compatible with common blood collection tubes and anticoagulants (EDTA, citrate, CPDA, and heparin)e
- Improved flow rates minimize risk of clogging when processing under vacuum

Product at a glance

	 NucleoSpin® 8 Blood	 NucleoSpin® 96 Blood
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 200 µL blood / serum / plasma, 2 x 10^6 human / animal cells	< 200 µL blood / serum / plasma, 2 x 10^6 human / animal cells
Fragment size	300 bp–50 kbp	300 bp–50 kbp
Typical yield	4–6 µg (200 µL blood)	4–6 µg (200 µL blood)
Elution volume	100 µL	100 µL
Theoretical binding capacity	20 µg	20 µg
Preparation time	35 min/6 strips	70 min/plate

Application data



Highly uniform yields ensure a reliable prep

DNA was extracted from 30 different blood samples and analyzed by qPCR for β-actin. With an average amplification cycle of 25.7 and a standard deviation of only 0.29 C_T, the results demonstrate the reliably high quality of DNA extraction with NucleoSpin® 96 Blood.

References

Prechl et al. 2016 “Serological and Genetic Evidence for Altered Complement System Functionality in Systemic Lupus Erythematosus: Findings of the GAPAID Consortium.”

PLOS ONE

Secq et al. 2014 “Triple negative breast carcinoma EGFR amplification is not associated with EGFR, Kras or ALK mutations.”

British Journal of Cancer

Ordering information

Product	Preps	REF
NucleoSpin® 8 Blood	12 x 8 / 60 x 8	740664 / .5
NucleoSpin® 8 Blood Core* Kit	48 x 8	740455.4
NucleoSpin® 96 Blood	1 x 96 / 4 x 96 / 24 x 96	740665.1 / .4 / .24
NucleoSpin® 96 Blood Core* Kit	4 x 96	740456.4

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

Silica membrane technology – DNA from blood

NucleoSpin® 8 / 96 Blood QuickPure

Fast isolation of DNA from blood in medium to high throughput

- Minimized hands-on time
- Perfect solution for low quality blood samples (e.g., clotted samples)
- Compatible with common blood collection tubes and anticoagulants (EDTA, citrate, CPDA, and heparin)

Product at a glance

	 NucleoSpin 8 Blood QuickPure	 NucleoSpin 96 Blood QuickPure
Technology	Silica membrane technology	Silica membrane technology
Sample material	200 µL blood / serum / plasma / body fluids, 5 x 10^6 human / animal cells	200 µL blood / serum / plasma / body fluids, 5 x 10^6 human / animal cells
Fragment size	300 bp–50 kbp	300 bp–50 kbp
Typical yield	4–6 µg (200 µL blood)	4–6 µg (200 µL blood)
Elution volume	75–100 µL	75–100 µL
Theoretical binding capacity	60 µg	60 µg
Preparation time	60 min/12 strips	60 min/2 plates

Reference

Fels et al., 2014, “Identification and Validation of Quantitative Trait Loci (QTL) for Canine Hip Dysplasia (CHD) in German Shepherd Dogs”

PLoS One

Ordering information

Product	Preps	REF
NucleoSpin® 8 Blood QuickPure	12 x 8 / 60 x 8	740666 / .5
NucleoSpin® 96 Blood QuickPure	2 x 96 / 4 x 96 / 24 x 96	740667.2 / .4 / .24

Silica membrane technology – DNA from blood

NucleoSpin® Blood L Vacuum

Large scale DNA isolation from whole blood

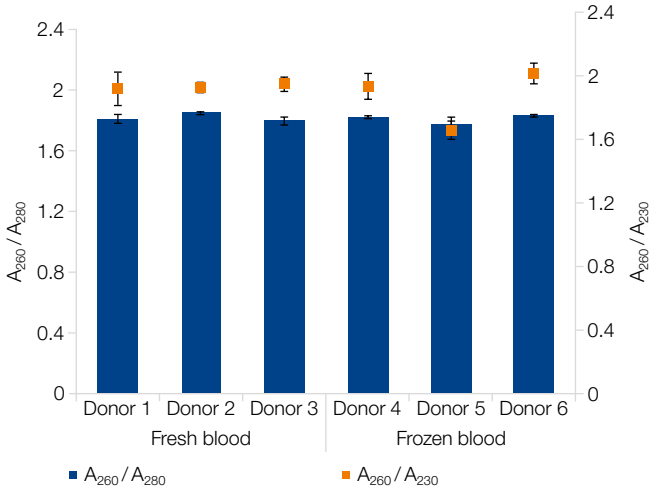
- Large volume processing for maximal sensitivity in HTP format
- Parallel purification of 24 samples in 75 min

Product at a glance

	Midi NucleoSpin® Blood L Vacuum
Technology	Silica membrane technology
Sample material	1–2 mL whole blood
Compatibility	Samples treated with EDTA or citrate, fresh or frozen
Fragment size	200 bp–50 kbp
Typical yield	50–80 µg (2 mL blood)
Elution volume	2 x 300 µL
Theoretical binding capacity	250 µg
Preparation time	75 min/24 preps

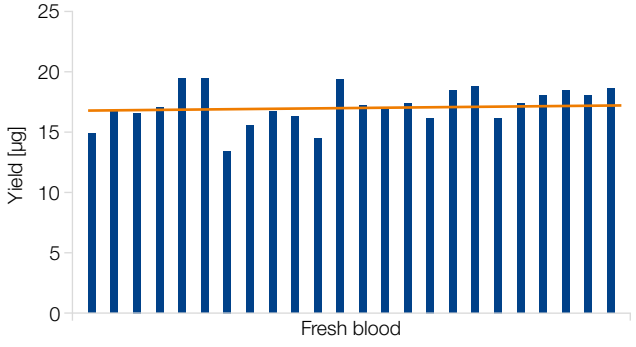


Application data



Highly pure DNA from large blood volumes

DNA was isolated from 1 mL fresh and frozen human blood samples (n=4) using the NucleoSpin® Blood L Vacuum kit on an ep*Motion*® 5075vt worktable. The high purity of the DNA isolates was confirmed by UV spectroscopy (A_{260}/A_{280}, A_{260}/A_{230}).



Reliable DNA purification with consistent yields

DNA was isolated from a fresh human blood sample pool (1 mL; n=24) using the NucleoSpin® Blood L Vacuum kit on a ep*Motion*® 5075vt platform. The total yield was determined by UV spectrometry (blue bars), resulting in an average yield of 17.14 µg ± 1.56 (orange line).

Ordering information

Product	Preps	REF
NucleoSpin® Blood L Vacuum	24	740954.24
Related products		
Starter Set Midi	1	740744
NucleoVac Vacuum Regulator	1	740641
NucleoVac 96 Vacuum Manifold	1	740681

Silica membrane technology – Cell-free DNA from plasma

NucleoSpin® cfDNA Midi · NucleoSpin® 96 cfDNA

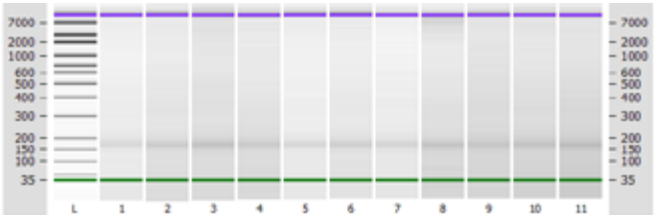
Small to large scale cfDNA isolation from plasma

- Silica membrane based isolation of cfDNA from plasma samples
- Purification of cfDNA down to 50 bp
- Midi format for large volume processing of up to 5 mL sample
- 96-well plate format for processing of up to 2 mL sample

Product at a glance

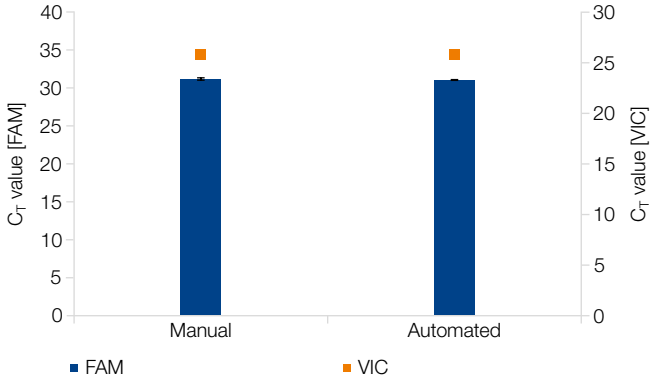
	Midi NucleoSpin® cfDNA Midi	96-well NucleoSpin® 96 cfDNA
Technology	Silica membrane technology	Silica membrane technology
Sample material	1–5 mL plasma (EDTA, Cell-Free DNA BCT®)	0.5–2 mL plasma
Fragment size	> 50 bp	> 50 bp
Elution volume	200 µL	100 µL
Preparation time	90 min/24 preps	90 min/plate

Application data



Consistent cfDNA recovery

The isolation of cfDNA from 1 mL human EDTA plasma using the NucleoSpin® 96 cfDNA kit on the ep*Motion*® 5075vt platform shows the characteristic peak at approx. 170 bp after measurement by capillary gel electrophoresis using the Agilent Bioanalyzer™ 2100 system with the High Sensitivity DNA kit.



Proven automation concept without performance losses

DNA was isolated from human plasma (n=8; 1 mL each) using the NucleoSpin® 96 cfDNA kit automated on the ep*Motion*® 5075vt platform or via manual purification using the NucleoVac 96 Vacuum Manifold (MN). The final cfDNA recovery was determined by quantitative real time PCR, using the Quantifiler® Human DNA Quantification kit. The TaqMan® probe for detecting the target region (human telomerase reverse transcriptase gene) of interest is labeled with a FAM™ reporter dye (blue bars). VIC® dye was used for detecting the amplified Internal PCR control DNA (orange squares), enabling verification that the polymerase, the assay, and the detection instrumentation are working correctly.

Ordering information

Product	Preps	REF
NucleoSpin® cfDNA Midi	48	740303.48
NucleoSpin® cfDNA Midi Core* Kit	48	740302.48
NucleoSpin® 96 cfDNA	1 x 96 / 4 x 96	740873.1 / .4
NucleoSpin® 96 cfDNA Core* Kit	1 x 96 / 4 x 96	740874.1 / .4

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

Silica membrane technology – DNA from tissue and cells

NucleoSpin® 96 DNA RapidLyse

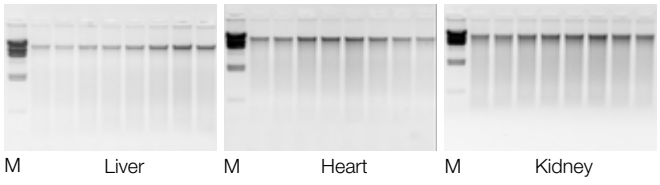
High throughput DNA isolation from tissues and cells

- Unique lysis chemistry for rapid release of DNA (< 1 h)
- Manual or automated processing by vacuum, positive pressure, or centrifugation
- Easy automation on all common robotic platforms

Product at a glance

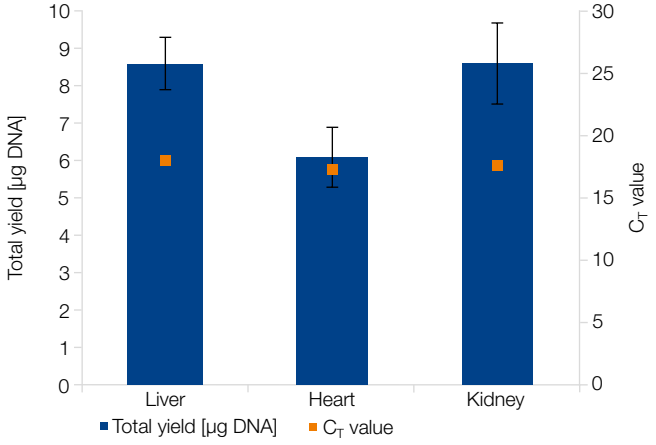
	96-well NucleoSpin® 96 DNA RapidLyse
Technology	Silica membrane technology
Sample material	< 30 mg fresh weight, < 10^6 cells
Typical yield	1–30 µg (depending on sample source)
Elution volume	Elution volume 100 µL
Theoretical Binding capacity	40 µg
Preparation time	60 min/plate (excl. lysis)

Application data



High integrity of DNA isolated from mouse organs

DNA was isolated from various mouse tissue samples (n=8, 30 mg each) using the NucleoSpin® 96 DNA RapidLyse kit on a Freedom EVO® 150 platform from TECAN. The integrity of the isolated nucleic acids from mouse organ samples was analyzed by gel electrophoresis (2 µL per eluate; 1 % TAE gel; M: Lambda DNA/Hind III – Thermo Scientific)



Reliable DNA yield and performance in downstream assays

DNA was isolated from various mouse tissue samples (n=8, 30 mg each) using the NucleoSpin® 96 DNA RapidLyse kit on a Freedom EVO® 150 platform. Total yield was determined by UV spectrometry (dark blue bars) and varied depending on the organ used. DNA from all sample types used performed equally well in a qPCR assay targeting the GAPDH gene.

Ordering information

Product	Preps	REF
NucleoSpin® 96 DNA RapidLyse	1 x 96 / 4 x 96	740110.1 / .4

Silica membrane technology – DNA from tissue and cells

NucleoSpin® 8 / 96 Tissue

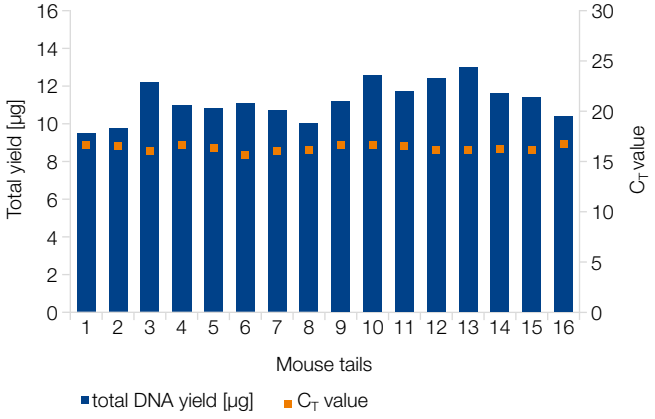
Medium to high throughput DNA isolation from tissues and cells

- Efficient lysis allows for processing of challenging sample materials
- Numerous support protocols for a broad range of sample materials

Product at a glance

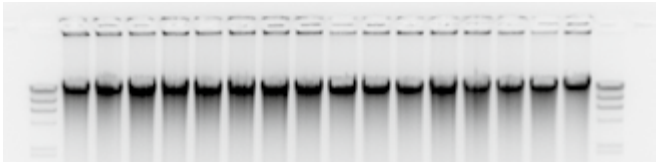
	8-well NucleoSpin® 8 Tissue	96-well NucleoSpin® 96 Tissue
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 20 mg human / animal tissue; < 10^6 human / animal cells; bacterial pellets	< 20 mg human / animal tissue; < 10^6 human / animal cells; bacterial pellets
Fragment size	300 bp–50 kbp	300 bp–50 kbp
Typical yield	15–25 µg (20 mg human / animal tissue)	15–25 µg (20 mg human / animal tissue)
Elution volume	100–200 µL	100–200 µL
Theoretical binding capacity	40 µg	40 µg
Preparation time	20 min/6 strips (excl. lysis)	60 min/plate (excl. lysis)

Application data



High yields and excellent performance in downstream assays

DNA was isolated from mouse tail samples (n= 16, 20 mg each) using the NucleoSpin® 96 Tissue kit on a positive pressure module [MPE]^2 from Hamilton. The total yield was determined by UV spectrometry (dark blue bars). The results demonstrate high DNA yield for all tested samples. Independent from the yield, all DNA isolates performed equally well in a qPCR assay targeting the GAPDH gene (orange squares).



High integrity of isolated DNA

The integrity of the isolated nucleic acids from mouse tail samples was analyzed by gel electrophoresis (7.5 µL per eluate; 0.7 % TAE gel; M: Lamda DNA/Hind III – Thermo Scientific).

Ordering information

Product	Preps	REF
NucleoSpin® 8 Tissue	12 x 8 / 60 x 8	740740 / .5
NucleoSpin® 8 Tissue Core* Kit	48 x 8	740453.4
NucleoSpin® 96 Tissue	2 x 96 / 4 x 96 / 24 x 96	740741.2 / .4 / .24
NucleoSpin® 96 Tissue Core* Kit	4 x 96	740454.4

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

Silica membrane technology – DNA from FFPE

NucleoSpin® 8 / 96 DNA FFPE

Xylene-free, medium to high throughput isolation of DNA from FFPE samples

- Patented, xylene-free paraffin dissolver included for convenient processing
- Special de-crosslinking buffer ensures high DNA yields from formalin fixed samples

Patented technology

Product at a glance

	8-well NucleoSpin® 8 DNA FFPE	96-well NucleoSpin® 96 DNA FFPE
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 10 mg tissue/7 sections (10 µm) of 250 mm^2 total area (<15 mg paraffin)	< 10 mg tissue / 7 sections (10 µm) of 250 mm^2 total area (<15 mg paraffin)
Fragment size	50 bp–5 kbp	50 bp–5 kbp
Elution volume	100 µL	100 µL
Theoretical binding capacity	20 µg	20 µg
Preparation time	60 min/6 strips (excl. lysis)	60 min/plate (excl. lysis)

Ordering information

Product	Preps	REF
NucleoSpin® 8 DNA FFPE	12 x 8 / 60 x 8	740242 / .5
NucleoSpin® 96 DNA FFPE	1 x 96 / 4 x 96	740240.1 / .4

NucleoSpin® 8 / 96 Trace

DNA isolation from forensic samples

- Flexible processing under vacuum or by centrifugation
- DNA ready to use for any kind of enzymatic reaction, e.g., STR analysis

Product at a glance

	8-well NucleoSpin® 8 Trace	96-well NucleoSpin® 96 Trace
Technology	Silica membrane technology	Silica membrane technology
Sample material	Casework samples, contract traces (e.g., dried blood spots, cigarette filters, swabs)	Casework samples, contract traces (e.g., dried blood spots, cigarette filters, swabs)
Fragment size	200 bp–50 kbp	200 bp–50 kbp
Elution volume	50–100 µL	50–100 µL
Theoretical binding capacity	20 µg	20 µg
Preparation time	30 min/6 strips (excl. lysis)	70 min/plate (excl. lysis)

Ordering information

Product	Preps	REF
NucleoSpin® 8 Trace	12 x 8 / 60 x 8	740722.1 / .5
NucleoSpin® 96 Trace	2 x 96 / 4 x 96	740726.2 / .4

Silica membrane technology – DNA from plant

NucleoSpin® 8 / 96 Plant II

DNA isolation from plant material

- An adaptable lysis buffer chemistry allows for processing of all common plant materials
- Numerous support protocols facilitate processing of challenging sample material

Product at a glance

	8-well NucleoSpin® 8 Plant II	96-well NucleoSpin® 96 Plant II
Technology	Silica membrane technology	Silica membrane technology
Sample material	20–100 mg (wet weight) plant tissue	20–100 mg (wet weight) plant tissue
Fragment size	50 bp–50 kbp	50 bp–50 kbp
Typical yield	1–30 µg (100 mg plant tissue, wet weight)	1–30 µg (100 mg plant tissue, wet weight)
Elution volume	100–200 µL	100–200 µL
Theoretical binding capacity	30 µg	30 µg
Preparation time	60 min/6 strips (excl. lysis)	60 min/plate (excl. lysis)

Reference

Floate et al., 2015 “Plant-herbivore interactions in a trispecific hybrid swarm of Populus: assessing support for hypotheses of hybrid bridges, evolutionary novelty and genetic similarity”

New Phytologist

Ordering information

Product	Preps	REF
NucleoSpin® 8 Plant II	12 x 8 / 60 x 8	740669 / .5
NucleoSpin® 8 Plant II Core* Kit	48 x 8	740467.4
NucleoSpin® 96 Plant II	2 x 96 / 4 x 96 / 24 x 96	740663.2 / .4 / .24
NucleoSpin® 96 Plant II Core* Kit	4 x 96	740468.4

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.



Silica membrane technology – DNA from soil and stool

NucleoSpin® 8 / 96 Soil

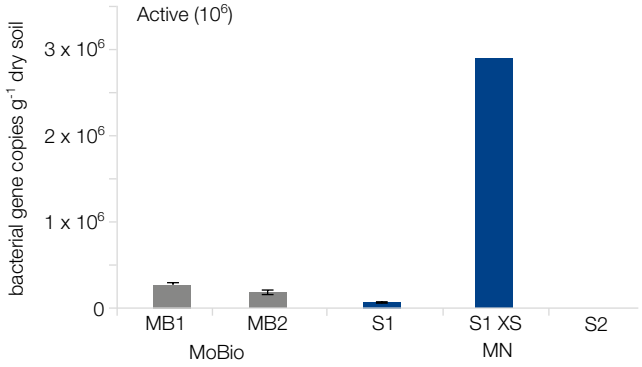
DNA isolation from stool and soil samples

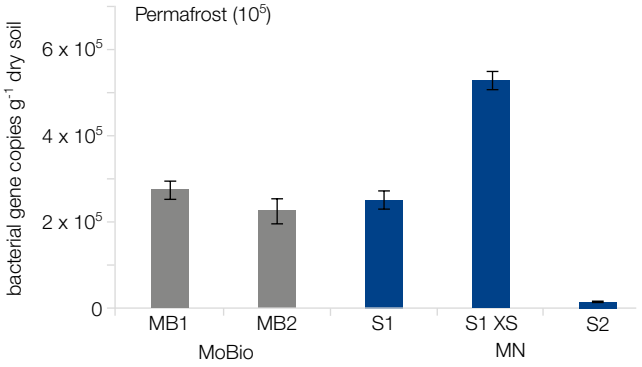
- NucleoSpin® Bead Tubes for a thorough mechanical disruption of stool samples included
- NucleoSpin® Inhibitor Removal Strips / Plate for convenient inhibitor removal in HTP format
- DNA suitable for metagenomic studies

Product at a glance

	8-well NucleoSpin® 8 Soil	96-well NucleoSpin® 96 Soil
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 500 mg soil, sludge, or sediment	< 500 mg soil, sludge, or sediment
Fragment size	50 bp–50 kbp	50 bp–50 kbp
Typical yield	2–10 µg (500 mg soil)	2–10 µg (500 mg soil)
Elution volume	100–200 µL	100–200 µL
Theoretical binding capacity	50 µg	50 µg
Preparation time	150 min/6 strips (excl. lysis)	150 min/plate (excl. lysis)

Application data





Superior yields through adaptable buffer systems

DNA was isolated from a highly challenging soil sample (Alaskan gelisol). The two lysis buffers of competitor MoBio were compared to the buffer combinations of NucleoSpin® 96 Soil. The three-buffer system of NucleoSpin® 96 Soil provided an option for highly effective isolation of DNA.

High yields even from permafrost

DNA was isolated from Alaskan permafrost. The three-buffer system of NucleoSpin® 96 Soil provides mutliple options for optimizing soil extraction protocols, one of the combination significantly surpassing the competitor product (MoBio).

References

Valentin et al., 2014 “Loss of diversity in wood-inhabiting fungal communities affects decomposition activity in Norway spruce wood”

Frontiers in Microbiology

Ordering information

Product	Preps	REF
NucleoSpin® 8 Soil	12 x 8	740779
NucleoSpin® 96 Soil	2 x 96 / 4 x 96	740787.2 / .4

Silica membrane technology – DNA from food

NucleoSpin® 8 / 96 Food

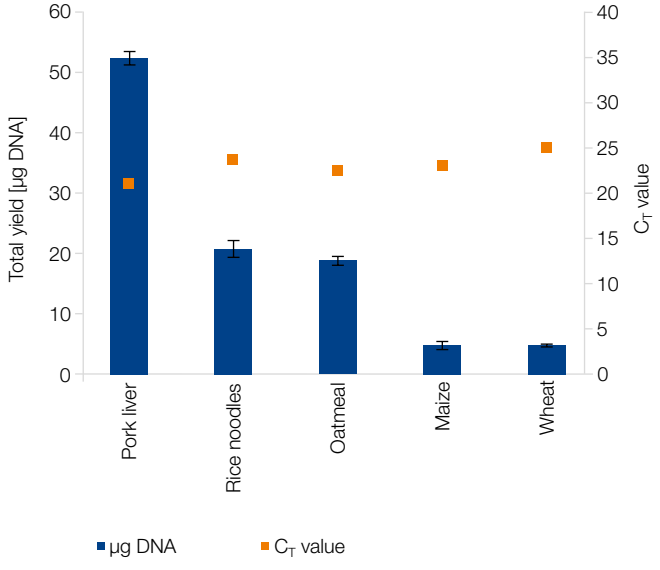
Medium to high throughput DNA isolation from food and feed

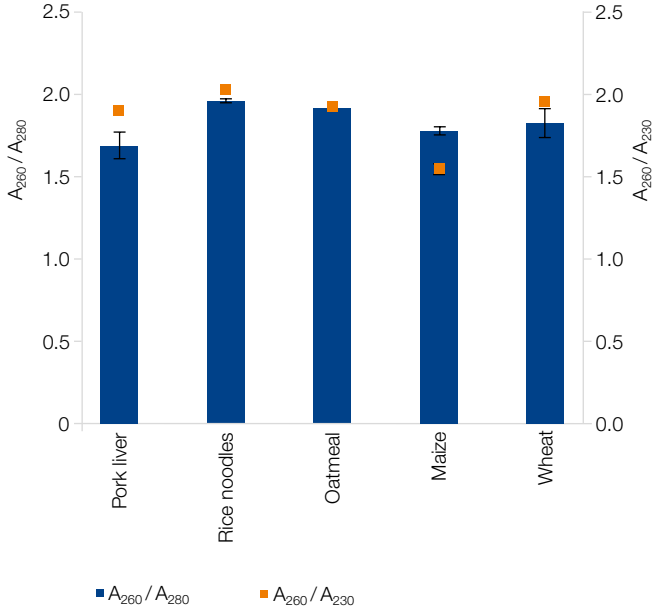
- Efficient lysis allows for processing of a broad range of starting materials
- DNA is directly suitable for GMO identification or for sample purity analyses or for foodborne pathogens

Product at a glance

	8-well NucleoSpin® 8 Food	96-well NucleoSpin® 96 Food
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 200 mg food / feed	< 200 mg food / feed
Fragment size	300 bp–50 kbp	300 bp–50 kbp
Typical yield	0.1–10 µg (200 mg food)	0.1–10 µg (200 mg food)
Elution volume	100–200 µL	100–200 µL
Theoretical binding capacity	30 µg	30 µg
Preparation time	60 min/6 strips (excl. lysis)	60 min/plate (excl. lysis)

Application data





Reliably good results from diverse food matrices

DNA was isolated from different food samples using the NucleoSpin® 96 Food kit on the [MPE]^2 unit from Hamilton®. Starting material was 100 mg/prep for oatmeal and 200 mg/prep for pork liver, rice noodles, maize, and wheat. All of the samples yielded DNA amounts expected for the given matrix and sample amount. Subsequent PCR results were proportional to the amount of isolated DNA, indicating no issues with inhibition.

Purity of isolated genomic DNA from different food and feed samples

DNA was isolated from different food samples using the NucleoSpin® 96 Food kit on the [MPE]^2 unit from Hamilton®. Starting material was 100 mg/prep for oatmeal and 200 mg/prep for pork liver, rice noodles, maize and wheat. The purity was determined by measuring A_{260}/A_{280} and A_{260}/A_{230} values via UV spectrometry. All of the samples above yielded DNA with ratios >1.5, indicating efficient contaminant removal by NucleoSpin® 96 Food

Ordering information

Product	Preps	REF
NucleoSpin® 8 Food	12 x 8	740975/.5
NucleoSpin® 96 Food	2 x 96 / 4 x 96	740976.2 / .4

Silica membrane technology – Viral RNA / DNA

NucleoSpin® 8 / 96 Virus

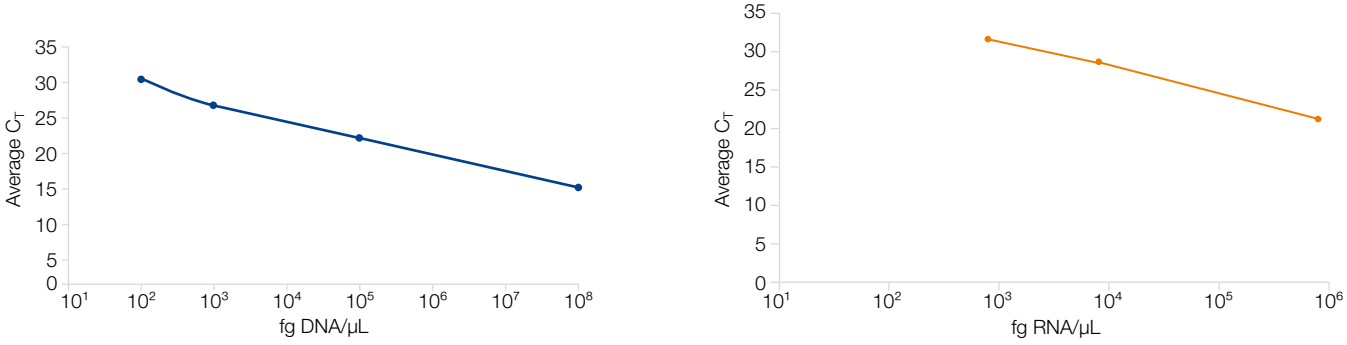
Medium to high throughput isolation of viral RNA/DNA from biological fluids

- Allows isolation of both viral RNA and viral DNA
- High sensitivity even for low viral titers

Product at a glance

	8-well NucleoSpin® 8 Virus	96-well NucleoSpin® 96 Virus
Technology	Silica membrane technology	Silica membrane technology
Sample material	< 150 µL serum / plasma / cell-free biological fluid	< 150 µL serum / plasma / cell-free biological fluid
Fragment size	100 bp–50 kbp	100 bp–50 kbp
Typical yield	Depending on sample amount and quality	Depending on sample amount and quality
Elution volume	70–100 µL	70–100 µL
Theoretical binding capacity	40 µg	40 µg
Preparation time	60 min/6 strips	60 min/plate

Application data



Proportional detectability of viral DNA/RNA even at low titers

Nucleic acids were extracted from dilution series of DNA (blue) and RNA (orange) viruses and quantified by qPCR. Both viral DNA and viral RNA were detected with high sensitivity (down to 100 viral particles/µL for DNA; down to 800 viral particles/µL for viral RNA).

References

Abdelnabi et al. 2019, “A novel druggable interprotomer pocket in the capsid of rhino and enteroviruses”

PLoS Biology

Gallian et al. 2017 “Zika virus in asymptomatic blood donors in Martinique”

American Sociecty of Hematology

Ordering information

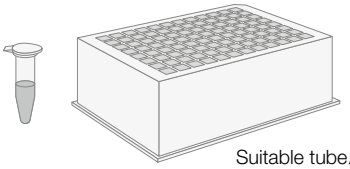
Product	Preps	REF
NucleoSpin® 8 Virus	12 x 8 / 60 x 8	740643 / .5
NucleoSpin® 8 Virus Core* Kit	48 x 8	740451.4
NucleoSpin® 96 Virus	2 x 96 / 4 x 96	740691.2 / .4
NucleoSpin® 96 Virus Core* Kit	4 x 96	740452.4

* Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

Silica membrane technology – Vacuum processing

NucleoSpin® 8 – Vacuum processing

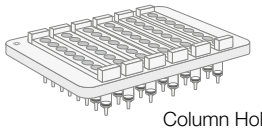
Sample lysis/pretreatment/adjust binding conditions



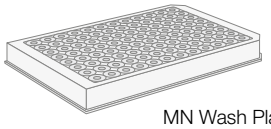
Suitable tube/plate

Binding/washing

NucleoSpin® 8 Binding Strips,
Respectively NucleoSpin® Dummy Strips
to seal unused slots

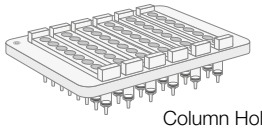


Column Holder A



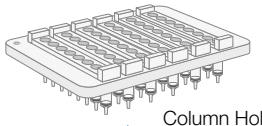
MN Wash Plate
For preventing cross-contamination

Drying

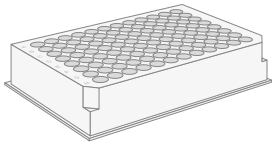


Column Holder A

Elution

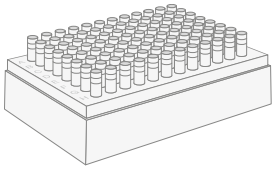


Column Holder A



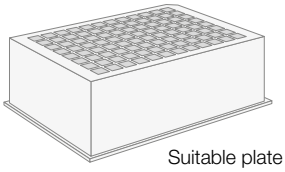
Round-well Block Low U-bottom

or

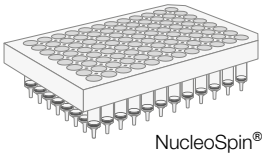


Rack of Tube Strips

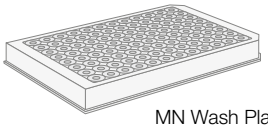
NucleoSpin 96 – Vacuum Processing



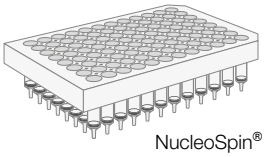
Suitable plate



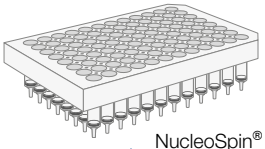
NucleoSpin® 96 Binding Plates



MN Wash Plate
For preventing cross-contamination

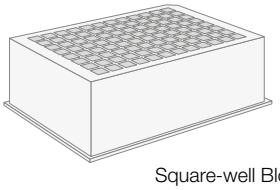


NucleoSpin® 96 Binding Plates



NucleoSpin® 96 Binding Plates

or



Square-well Block

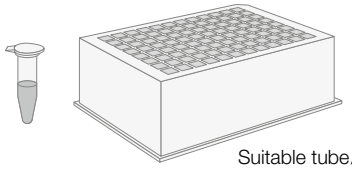
Or other suitable plates for eluate collection

Please check the corresponding user manual for the individual combination of HTP equipment.

Silica membrane technology – Centrifugation

NucleoSpin® 8 – Centrifugation

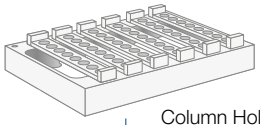
Sample lysis/pretreatment/adjust binding conditions



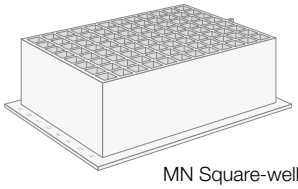
Suitable tube/plate

Binding/washing/drying

NucleoSpin® 8 Binding Strips,
Respectively NucleoSpin® Dummy Strips
to seal unused slots

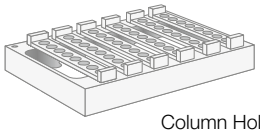


Column Holder C

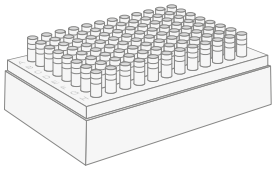


MN Square-well Block

Elution

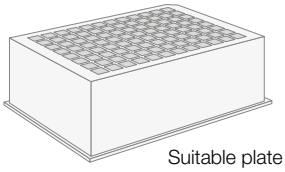


Column Holder C

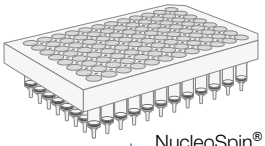


Rack of Tube Strips

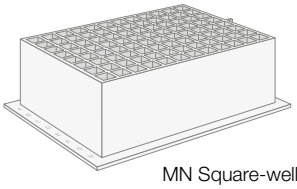
NucleoSpin® 96 – Centrifugation



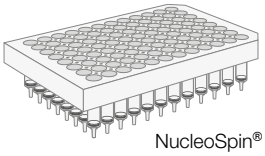
Suitable plate



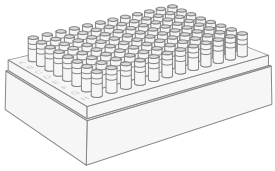
NucleoSpin® 96 Binding Plates



MN Square-well Block

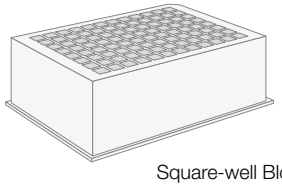


NucleoSpin® 96 Binding Plates



Rack of Tube Strips

or



Square-well Block

Or other suitable plates for eluate collection

Please check the corresponding user manual for the individual combination of HTP equipment.

Equipment for silica membrane technology

Product	Pack of	Specification	REF
Equipment for centrifuge processing of NucleoSpin® 8 Strips			
Starter Set C	1	For processing NucleoSpin 8-well strips under centrifugation, contains 2 Column Holders C, 2 MN Square-well Blocks, 2 Rack of Tube Strips	740684
MN Square-well Block	4 24	96-well blocks with 2.1 mL square wells	740476 740476.24
Rack of Tube Strips	5 sets	1 set consists of 1 rack, 12 strips with 8 tubes each	740637
Rack of Tube Strips with Cap Strips	4 sets 24 sets	1 set consists of 1 rack, 12 strips with 8 tubes each, 12 cap strips	740477 740477.24
Equipment for centrifuge processing of NucleoSpin® 96 Plates			
MN Wash Plate	4 24	96-well plates with funnel shaped wells	740479 740479.24
Square-well Block	4 24	96-well blocks with 2.1 mL u-bottom square wells	740481 740481.24
MN Square-well Block	4 24	96-well blocks with 2.1 mL square wells	740476 740476.24
Rack of Tube Strips	5 sets	1 set consists of 1 rack, 12 strips with 8 tubes each	740637
Rack of Tube Strips with Cap Strips	4 sets 24 sets	1 set consists of 1 rack, 12 strips with 8 tubes each, 12 cap strips	740477 740477.24
Equipment for vacuum processing of NucleoSpin® L / Midi			
Starter Set Midi	1	For processing NucleoSpin® Midi / L Columns under vacuum on NucleoVac 96 Vacuum Manifold or similar manifolds; contains 1 Column Holder Midi, 1 Wash Plate Midi, 1 Elution Tube Holder Midi, 24 Dummy Columns Midi	740684
NucleoVac 96 Vacuum Manifold	1	Vacuum manifold; consists of manifold base and lid, a spacer set, and a waste container set	740681
NucleoVac Vacuum Regulator		For adjusting of vacuum	740641
Equipment for vacuum processing of NucleoSpin® 8 Strips			
Starter Set A	1	For processing NucleoSpin 8-well strips under vacuum on NucleoVac 96 Vacuum manifold or similar manifolds, contains 2 Column Holders A, 12 NucleoSpin® Dummy Strips	740684
NucleoVac 96 Vacuum Manifold	1	Vacuum manifold; consists of manifold base and lid, a spacer set, and a waste container set	740681
NucleoVac Vacuum Regulator		For adjusting of vacuum	740641
Round-well Block	20	96-well blocks with 1.2 mL round wells	740671
Round-well Block with Cap Strips	4 sets 24 sets	1 set consists of 1 Round-well Block with 96 1.2 mL round wells and 12 Cap Strips	740475 740475.24
Square-well Block	4 24	96-well blocks with 2.1 mL u-bottom square wells	740481 740481.24
Round-well Block Low	4	96-well blocks with 0.8 mL v-bottom round wells	740485
Equipment for vacuum processing of NucleoSpin® 96 Plates			
NucleoVac 96 Vacuum Manifold	1	Vacuum manifold; consists of manifold base and lid, a spacer set, and a waste container set	740681
NucleoVac Vacuum Regulator		For adjusting of vacuum	740641
MN Wash Plate	4 24	To facilitate washing and drying of NucleoSpin® 96-well plates	740479 740479.24
Round-well Block	20	96-well blocks with 1.2 mL round wells	740671
Round-well Block with Cap Strips	4 sets 24 sets	1 set consists of 1 Round-well Block with 96 1.2 mL round wells and 12 Cap Strips	740475 740475.24
Square-well Block	4 24	96-well blocks with 2.1 mL u-bottom square wells	740481 740481.24
Round-well Block Low	4	96-well blocks with 0.8 mL v-bottom round wells	740485

Magnetic bead technology – Clean up

NucleoMag® PCR

PCR clean up for highest flexibility

- PCR fragment recovery up to 95 %
- Small elution volumes for high nucleic acid concentrations

Product at a glance

	Mag NucleoMag® PCR
Technology	Magnetic bead technology
Sample material	< 50 µL PCR reaction mixture
Fragment size	150 bp–approx. 10 kbp
Typical recovery	80–95 %
Elution volume	25–100 µL
Theoretical binding capacity	0.3 µg/µL beads
Preparation time	40–120 min/96 preps

Ordering information

Product	Preps / Pack of	REF
NucleoMag® PCR	1 x 96 / 4 x 96 / 24 x 96	744100.1 / .4 / .24



Magnetic bead technology – Clean up

NucleoMag® NGS Clean-up and Size Select

NGS clean up with size selection

- Elution in minimal volume to meet concentration specifications for NGS
- Tunable size selection 150–800 bp
- Protocol for simple clean up of DNA fragments

Product at a glance

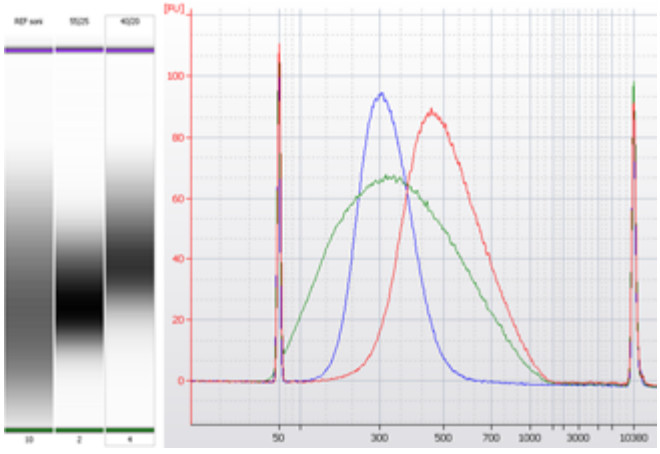
	Mag NucleoMag® NGS Clean-up and Size Select
Technology	Magnetic bead technology
Sample material	Reaction mixtures from common NGS library kits
Input amount	17.5 pg–5 µg nucleic acids in NGS reaction mixture
Input volume	50–150 µL
Fragment size	Tunable (150–800 bp)
Recovery	> 80 %
Elution volume	10–100 µL
Preparation time	40–120 min/96 preps

Reference

Bell et al., 2016 “A Diverse Soil Microbiome Degrades More Crude Oil than Specialized Bacterial Assemblages Obtained in Culture”

Applied and Environmental Microbiology

Application data



Size selection with NucleoMag® NGS Clean-up and Size Select

Many applications for DNA analysis (especially in the field of NGS) require a finely tuned size of DNA fragments. This is most precisely achieved by double size selection. In short, the NGS beads are mixed with the sample of interest in a ratio that allows for selective binding of fragments larger than the size of the fragment size range of interest (right side selection). Afterwards, this first batch of beads with the bound, unwanted DNA is discarded and fresh beads are added in a ratio that allows for binding of the fragment of choice (left size selection). The smaller DNA fragments are discarded with the supernatant and the DNA of interest is washed and eluted from the beads. In this experiment, total mouse tissue DNA was subjected to shearing, creating a broad range of fragment sizes (green curve). This mix was afterwards subjected to two different double-size selection procedures, a right 0.4 ratio / left 0.6 ratio pair selecting for fragments sizes of 460 bp (red peak) and a right 0.55 / left 0.8 pair selecting for 240 bp (blue peak), respectively. Many more ratio pairs are possible, allowing for size selection of other fragment sizes.

green: DNA fragment size distribution from mouse tissue after fragmentation without size selection

red: DNA fragment size distribution after double sided size selection with dilution ratios of 0.4 (right) and 0.6 (left); mean fragment size: 460 bp

blue: DNA fragment size distribution after double sided size selection with dilution ratios of 0.55 (right) and 0.8 (left); mean fragment size: 340 bp

Ordering information

Product	Preps / Pack of	REF
NucleoMag® NGS Clean up and Size Select	5 mL / 50 mL / 500 mL	744970.5 / .50 / .500

Magnetic bead technology – RNA

NucleoMag® RNA

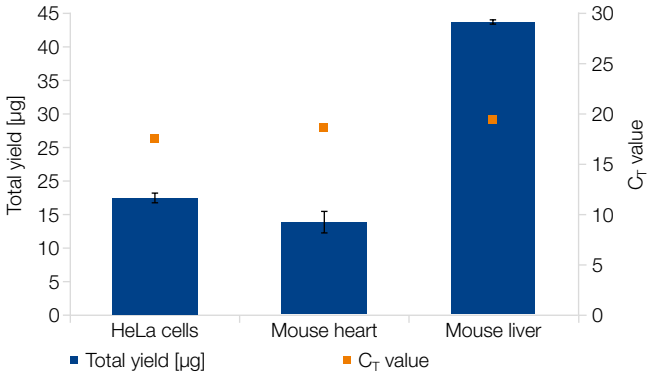
RNA isolation from tissue and cells

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

Product at a glance

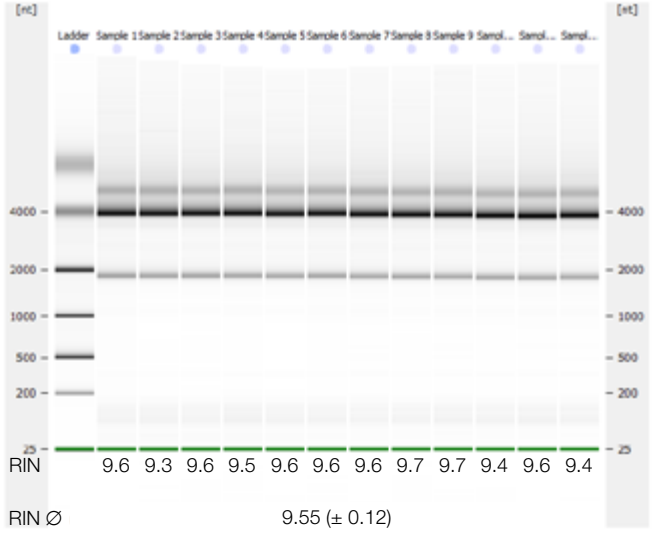
	Mag NucleoMag® RNA
Technology	Magnetic bead technology
Sample material	< 2 x 10^6 eukaryotic cells, < 20 mg human / animal tissue
Fragment size	> 200 nt
Typical yield	< 20 µg (2 x 10^6 eukaryotic cells, < 20 mg mouse liver)
Elution volume	50–200 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps

Application data



Isolation of RNA from human cells and animal tissue

Total RNA was isolated from 1 x 10^6 HeLa cells and different tissue samples stored in RNA*later*™ solution using the NucleoMag® RNA kit on a KingFisher® Flex platform. The total yield was determined by UV spectrometry (dark blue bars). Subsequent qRT-PCR analysis (orange squares) was performed with a probe for a 130 bp actin amplicon. The target was detected with high reproducibility in all samples.



High integrity RNA isolated from cultured human cells

After total RNA isolated from twelve individual 1 x 10^6 HeLa cell samples, the total RNA integrity was determined. RNA was isolated using the NucleoMag® RNA kit on a KingFisher® Flex platform. The quality of the isolated RNA was determined by using the Bioanalyzer® 2100 and the total RNA 6000 Nano kit. The results demonstrate the isolation of high quality RNA with an average RIN value of 9.55 (± 0.12).

Ordering information

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

Magnetic bead technology – DNA from blood

NucleoMag® Blood

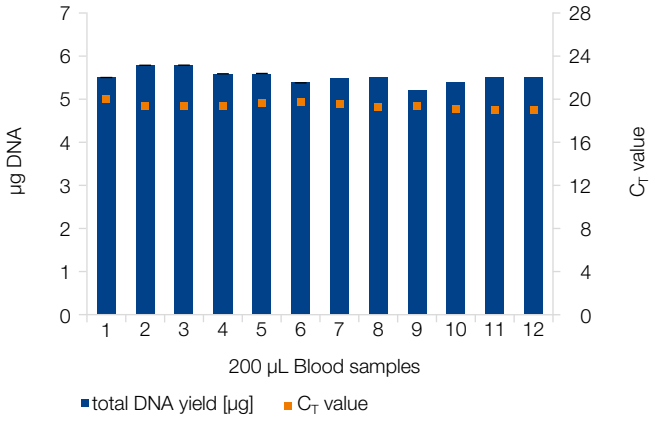
Small to large scale isolation of DNA from whole blood

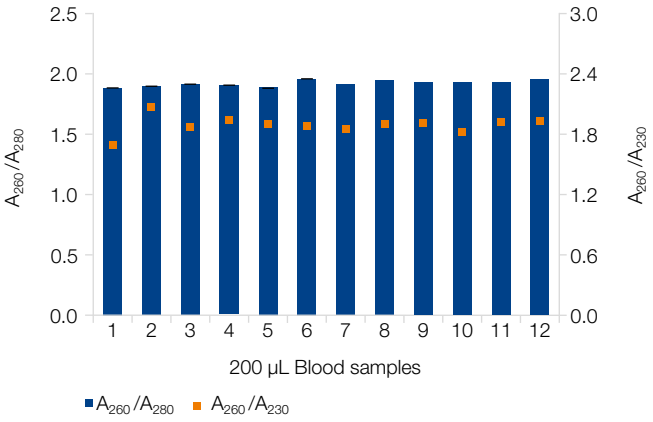
- Complete processing at room temperature facilitates automation
- Small elution volumes for highly concentrated DNA

Product at a glance

	Mag NucleoMag® Blood 200 µL	Mag NucleoMag® Blood 3 mL
Technology	Magnetic bead technology	Magnetic bead technology
Sample material	< 200 µL blood (fresh or frozen, EDTA, or citrate)	< 3 mL blood (fresh or frozen, EDTA, or citrate)
Fragment size	300 bp–50 kbp	300 bp–50 kbp
Typical yield	2–8 µg (200 µL)	100–130 µg (3 mL)
Elution volume	50–100 µL	1000 µL
Theoretical binding capacity	0.4 µg/µL beads	0.4 µg/µL beads
Preparation time	40–120 min/96 preps*	60 min/24 preps*

Application data





Robust yields and excellent performance in downstream applications

DNA was isolated from fresh 200 µL human blood samples (n=12) using the NucleoMag® Blood 200 µL kit on an ep*Motion*® 5073m workstation. The DNA concentration of all 12 samples was determined by UV spectroscopy, dark blue bars). Performance in downstream applications was evaluated by conducting qPCR for a 250 bp sequence in the ß-actin gene. The target sequence was successfully amplified in all samples (orange squares = C_T values).

Highly pure nucleic acids from human blood samples

DNA was isolated from fresh 200 µL human blood samples (n=12) using the NucleoMag Blood 200 µL kit on a ep*Motion*® 5073m workstation. The purity was determined by UV spectroscopy. DNA quality analysis resulted in an average A_{260}/A_{280} value of 1.92 +/- 0.02 and in an average A_{260}/A_{230} value of 1.86 +/- 0.06.

Ordering information

Product	Preps	REF
NucleoMag® Blood 200 µL	1 x 96 / 4 x 96	744501.1 / .4
NucleoMag® Blood 3 mL	1 x 96	744502.1



Magnetic bead technology – cfDNA from plasma

NucleoMag® cfDNA

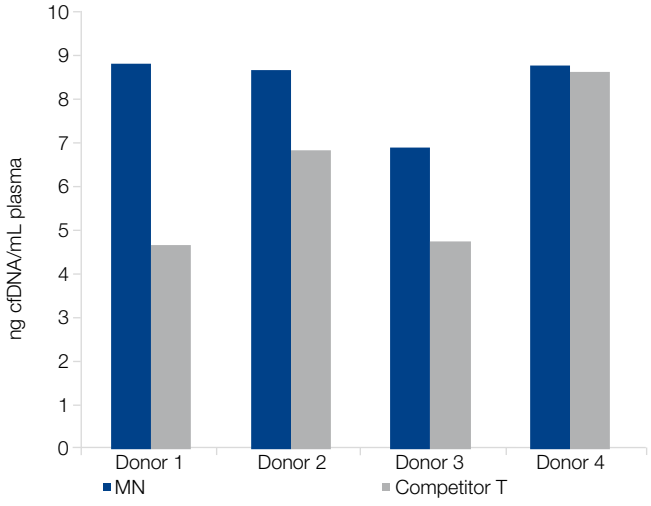
Isolation of cell-free DNA from flexible sample volumes

- Consistent cfDNA recovery from 1–10 mL plasma samples
- Efficient purification of fragmented DNA as small as 50 bp

Product at a glance

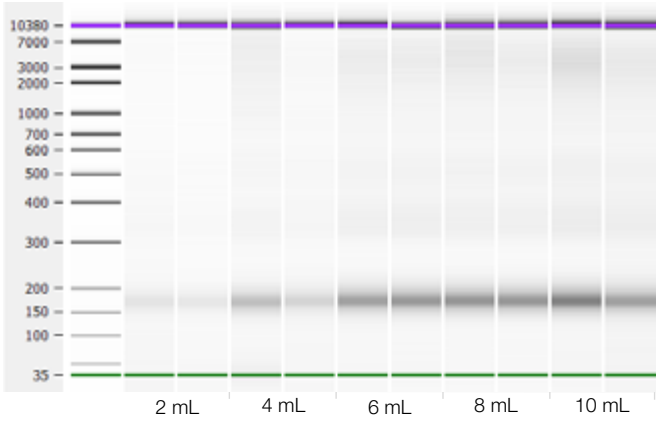
	Mag NucleoMag® cfDNA
Technology	Magnetic bead technology
Sample material	1–10 mL human plasma (EDTA,cell-free DNA BCT®)
Fragment size	≥ 50 bp
Typical yield	Depending an sample source, storage, and quality
Elution volume	50–200 µL
Theoretical binding capacity	0.3 µg/µL beads
Preparation time	60 min/24 preps (excl. lysis)

Application data



Competitive cfDNA recovery from challenging samples

Total cfDNA from 2 mL human EDTA plasma derived from 4 challenging donor samples with low abundance cfDNA (< 10 ng cfDNA/mL Plasma) was purified. Isolation with the NucleoMag® cfDNA kit results in higher and more consistent total cfDNA yields with less deviations in comparison to the competitor T. The final total DNA recovery was quantified using the Qubit™ dsDNA High Sensitivity kit (ThermoFisher Scientific) on a Qubit™ fluorometer (ThermoFisher Scientific).



Consistent cfDNA recovery regardless of plasma volumes

cfDNA was isolated from plasma samples of different volumes (2 / 4 / 6 / 8 / 10 mL) using the NucleoMag® cfDNA kit. Capillary gel electrophoresis using the Agilent Bioanalyzer™ 2100 system shows a linear increase in cfDNA yields in accordance with the increased sample volumes.

Ordering information

Product	Preps	REF
NucleoMag® cfDNA	1 x 96 / 4 x 96	744550.1 / .4

Magnetic bead technology – DNA from cells and tissue

NucleoMag® Tissue

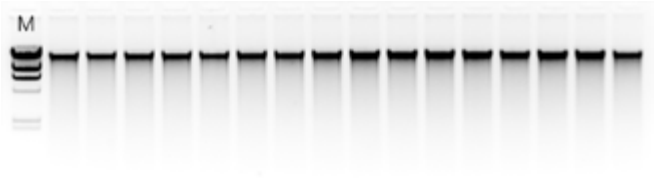
Isolation of DNA from tissue and cells

- Efficient lysis allows for processing of a broad range of starting materials
- Small elution volumes for highly concentrated DNA to fulfill specifications of challenging downstream applications

Product at a glance

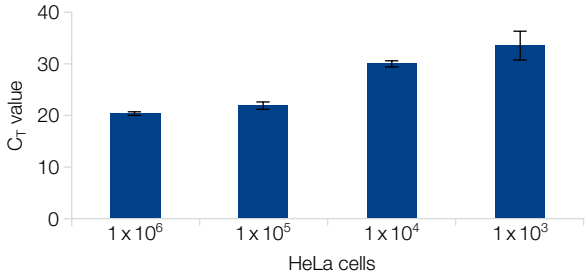
	Mag NucleoMag Tissue
Technology	Magnetic bead technology
Sample material	< 20 mg human/animal tissue; < 1 x 10^6 eukaryotic cells, bacteria
Fragment size	300 bp–50 kbp
Typical yield	10–20 µg (20 mg human / animal tissue)
Elution volume	50–200 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps (excl. lysis)

Application data



High integrity of DNA isolated from mouse tail samples

DNA was isolated from Mouse tail samples (20 mg; n=32) using the NucleoMag® Tissue kit on a KingFisher® Flex platform. The integrity of the isolated nucleic acids from exemplary mouse tail samples was analyzed by gel electrophoresis (5 µl per eluate; 0.7 % TAE gel; M: Lambda DNA/Hind III – Thermo Scientific).



Downstream use of DNA isolated from even smallest samples

DNA was isolated from different amounts of HeLa cells using the NucleoMag® Tissue kit on a KingFisher® Flex platform. A subsequent qPCR analysis (dark blue bars) was performed with a Taqman® Probe for a 250 bp ß-actin amplicon The qPCR results demonstrate a reliable detection of gDNA, even from low amounts of cells.

Ordering information

Product	Preps	REF
NucleoMag® Tissue	1 x 96 / 4 x 96 / 24 x 96	744300.1 / .4 / .24



Magnetic bead technology – DNA from swabs

NucleoMag® DNA Swab

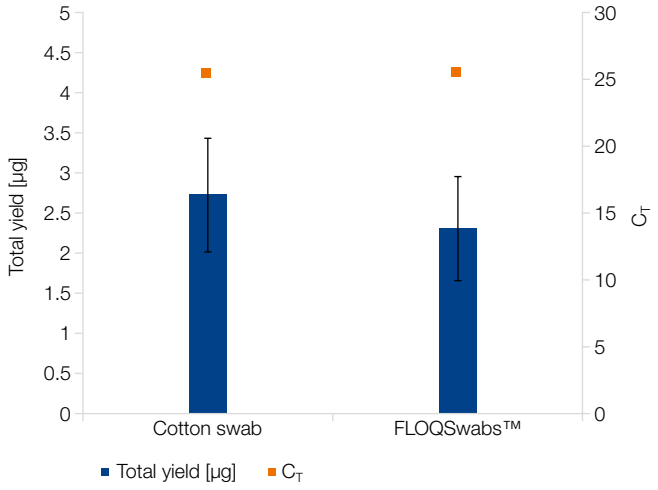
Isolation of genomic DNA from swabs

- High throughput DNA isolation for genetic testing
- Developed for cotton as well as synthetic swabs
- Combine with NucleoSpin® Forensic Filters for convenient sample prep

Product at a glance

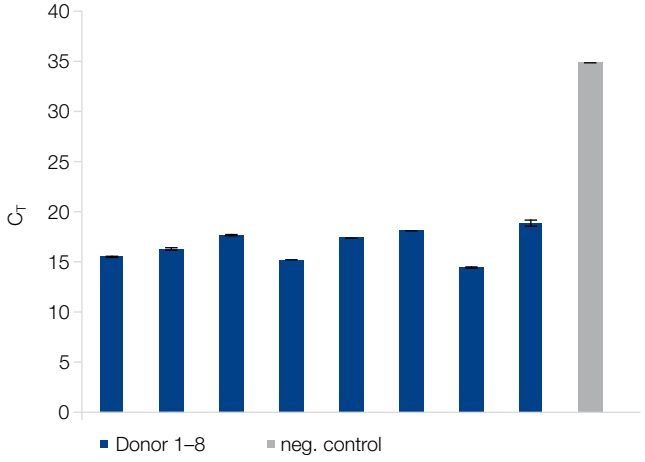
	Mag NucleoMag® DNA Swab
Technology	Magnetic bead technology
Sample material	300 µL reconstituted swab lysate (cotton or synthetic swabs)
Fragment size	> 300 bp–approx. 50 kbp; depending on sample processing
Elution volume	50–100 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	120 min/96 preps with manual preparation, 30 min/96 preps on KingFisher® Flex (excl. lysis)

Application data



Human genomic DNA yield and qPCR performance from different swab types

Buccal swabs (standard cotton swabs and COPAN FLOQSwabs™) were collected from > 6 individuals. Lysates were prepared using NucleoSpin® Forensic Filters. DNA was isolated on a KingFisher® Flex platform according to the NucleoMag® DNA Swab standard protocol. qPCR performance was evaluated using the Quantifiler® Human DNA Quantification assay.



Sensitive detection of bacterial DNA in human specimens

DNA was isolated from mouth swabs on a KingFisher® Flex platform. qPCR targeting a bacterial 16S RNA gene demonstrates the sensitive detection of bacteria from swab specimens.

Ordering information

Product	Preps	REF
NucleoMag® DNA Swab	1 x 96 / 4 x 96 / 24 x 96	744601.1 / .4 / .24

Magnetic bead technology – DNA from FFPE

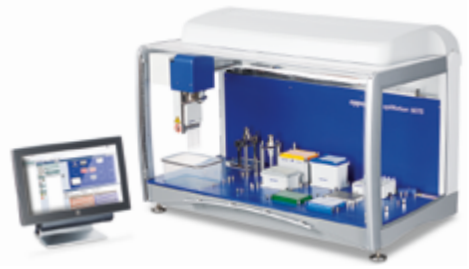
NucleoMag® DNA FFPE

DNA isolation from FFPE samples

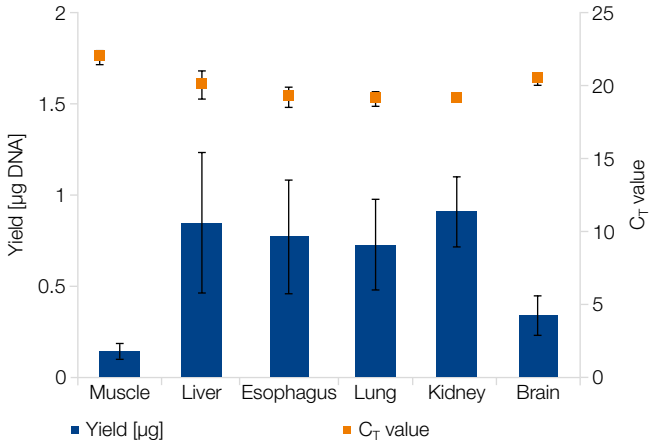
- Patented, xylene-free paraffin dissolver included for convenient processing
- Special de-crosslinking buffer ensures high DNA yields from formalin fixed samples
- Support protocol for isolation of RNA available

Product at a glance

	Mag NucleoMag® DNA FFPE
Technology	Magnetic bead technology
Sample material	≤ 5 mg tissue (≤ 15 mg paraffin)
Fragment size	50 bp–5 kbp
Typical yield	Depending on amount and quality of sample
Elution volume	> 25 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps (excl. lysis)

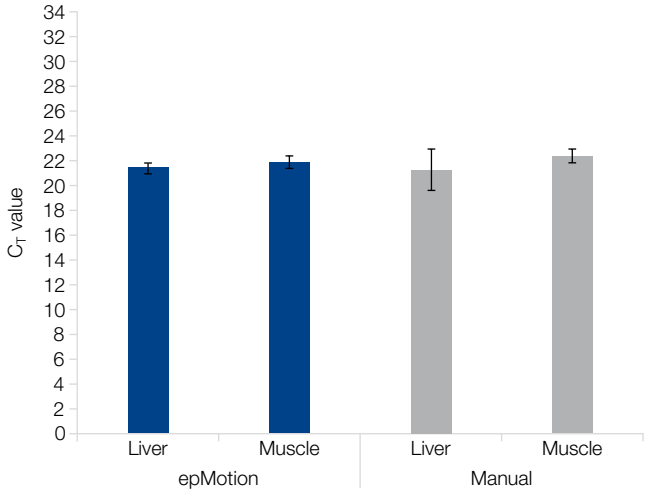


Application data



Automated isolation of DNA from various mouse FFPE samples

DNA was isolated from various mouse FFPE samples (n = 4; approximate section size muscle: 1 mm²; liver: 12 mm²; esophagus: 3 mm²; lung: 5 mm²; kidney: 8 mm²; brain: 4.5 mm²) using the NucleoMag® DNA FFPE kit on an ep*Motion*® 5075t system. The total yield was determined by UV spectrometry (dark blue bars). A subsequent qPCR analysis was performed with a Taqman® Probe for a GAPDH amplicon. The results demonstrate a reliable qPCR-performance for all tested mouse FFPE samples.



Comparison of automated and manual processing

DNA was isolated from mouse FFPE samples (n=4; approximate 10 mg paraffin each) using the NucleoMag® DNA FFPE kit in an automated manner on an ep*Motion*® 5075t system (dark blue bars) or manually (grey bars). A subsequent qPCR analysis was performed with a Taqman® Probe for a GAPDH amplicon. The results demonstrate a reliable performance of the established, automated method with a smaller standard deviation than with manual processing.

Ordering information

Product	Preps	REF
NucleoMag® DNA FFPE	1 x 96 / 4 x 96	744320.1 / .4

Magnetic bead technology – DNA from forensic samples

NucleoMag® DNA Forensic

DNA isolation from forensic samples

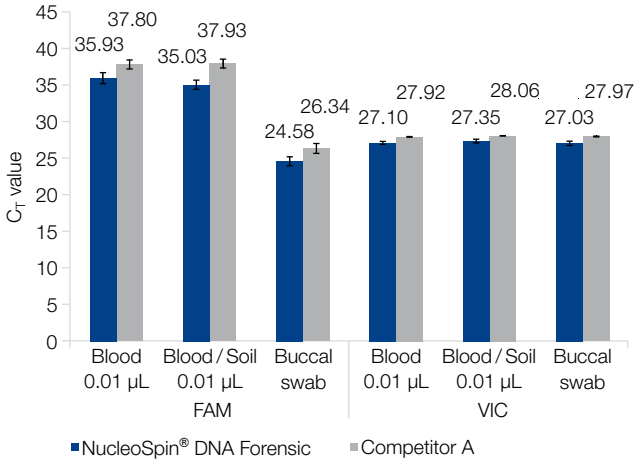
- Excellent DNA purity from all casework samples
- Conformity to ISO 18385 for doubtless profiling

Product at a glance

	Mag NucleoMag® DNA Forensic
Technology	Magnetic bead technology
Sample material	Casework samples, contact traces (e.g., dried blood spots, cigarette filters, swabs)
Typical yield	1–3 µg from buccal swab
Elution volume	25–50 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps (excl. lysis)

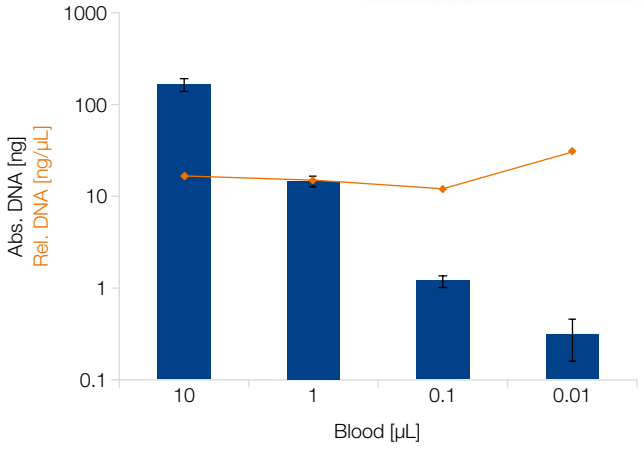


Application data



NucleoMag® DNA Forensic is suitable for diverse sample materials

DNA was purified from diverse sample materials using NucleoMag® DNA Forensic and competitor kit „A“. Final DNA recovery was quantified using the Quantifiler® Human DNA Quantification kit. Analysis was performed with: FAM™ dye for detecting the amplified human telomerase reverse transcriptase gene sequence and VIC® dye for detecting the amplified Internal PCR Control (IPC) DNA.



Consistent gDNA recovery relative to sample amount

NucleoMag® DNA Forensic was used to isolate DNA from increasing blood volumes added to swab material. The performance of kit was not affected by sample volume as there is a consistent correlation of DNA amount and sample volume (orange line).

Ordering information

Product	Preps	REF
NucleoMag® DNA Forensic	1 x 96 / 4 x 96	744660.1 / .4

Magnetic bead technology – DNA from bacteria and yeast

NucleoMag® DNA Bacteria

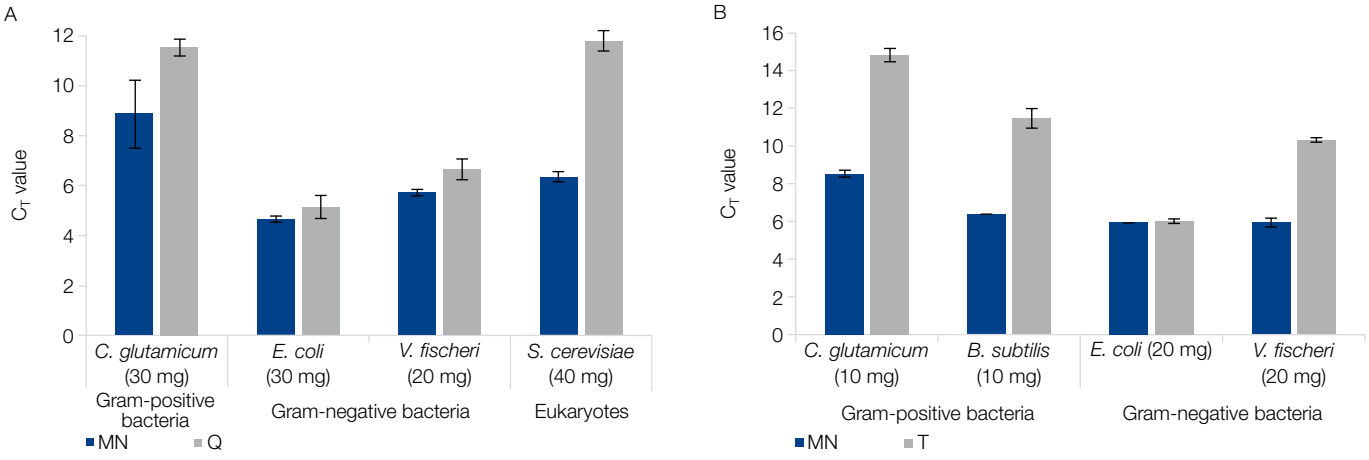
Automation friendly solution for microbial samples

- Environmentally friendly buffer chemistry free of chaotropic salts
- Compatible with the novel MN 96 Bead Plates for high throughput sample disruption
- Liquid Proteinase K and Liquid RNase A included

Product at a glance

	Mag NucleoMag® DNA Bacteria
Technology	Magnetic bead technology
Sample material	Microbial cell culture pellets of Gram-positive and Gram-negative bacteria and yeasts, molds
Typical yield	Varies by sample and disruption device
Elution volume	50–200 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	30 min for KingFisher® Flex (excl. lysis)

Application data



Competitive detection of microbial DNA

DNA was isolated from Gram-positive and Gram-negative bacteria as well as yeast using the NucleoMag® DNA Bacteria kit (MN, blue bars) as well as competitor kits Q and T (grey bars). All procedures were performed according to manufacturer's recommendations. In comparison to competitors Q (A) and T (B) the PCR results show significantly earlier amplification (lower C_T values), demonstrating superior extraction of microbial DNA. The qPCR was performed for 16s rRNA and 18s rRNA for bacteria and yeast, respectively, using the Maxima SYBR® Green kit from Thermo Scientific on Applied Biosystems® 7500 Real-Time PCR System.

Ordering information

Product	Preps	Pack of	REF
NucleoMag® DNA Bacteria	1 x 96 / 4 x 96		744310.1 / .4
Related products			
MN Bead Tubes Type A	2 mL screw cap micro tubes prefilled with 0.6–0.8 mm ceramic beads, recommended for yeast samples	50	740786.50
MN Bead Tubes Type B	2 mL screw cap micro tubes prefilled with 40–400 µm glass beads, recommended for Gram positive and -negative bacteria	50	740812.50
MN Bead Tubes Type D	2 mL screw cap micro tubes prefilled with 3 mm steel beads, recommended for insects, crustaceans and lipid rich samples	50	740814.50
MN 96 Bead Plate Type B	Rack of prefilled tube strips (12 strips with 8 tubes each) containing 40–400 µm glass beads. Suitable in conjunction with mixer mill. Recommended for Gram positive and -negative bacteria	1 / 4 / 24	740851.1 / 4 / .24
MN 96 Bead Plate Type D	Rack of prefilled tube strips (12 strips with 8 tubes each) containing 3 mm steel beads. Suitable in conjunction with mixer mill. Recommended for insects, crustaceans and lipid-rich samples	1 / 4 / 24	740853.1 / 4 / .24

Magnetic bead technology – DNA from water

NucleoMag® DNA/RNA Water

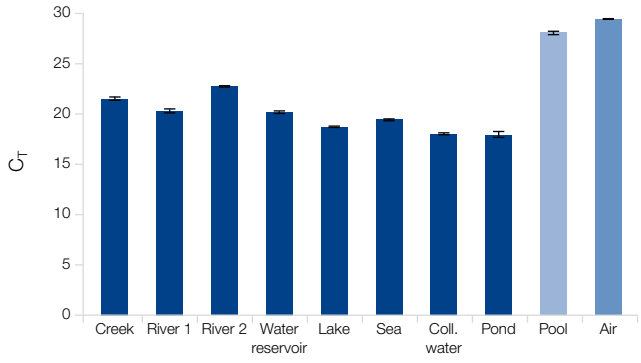
Isolation of microbial DNA, RNA, or both from diverse water and air samples

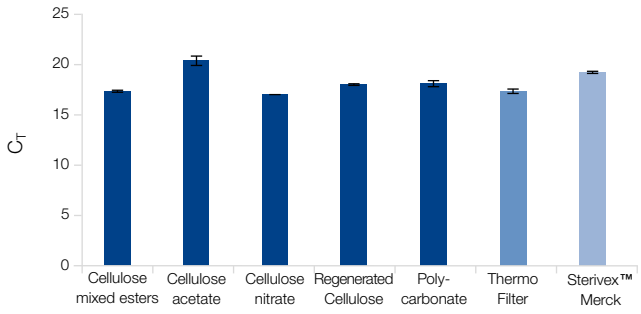
- Suitable for diverse salty and fresh water samples, ranging from turbid to clear as well as with air filters
- Minimized inhibition for reliable results
- Compatible with a variety of filters and filtration systems

Product at a glance

	Mag NucleoMag® DNA/RNA Water
Technology	Magnetic bead technology
Sample material	Water and air samples
Fragment size	300 bp-approx. 50 kbp
Elution volume	50–200 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40 min/96 preps (excl. lysis)

Application data





Efficient detection for different water and air samples

Various water samples and an air sample were filtered and the extracted DNA was analyzed by PCR. Microbial DNA could be efficiently measured for all of the samples, demonstrating the versatility of the NucleoMag® DNA/RNA Water kit.

Compatibility with different filtration systems

A qPCR was performed with nucleic acids isolated from round filters and a filtration cartridge system, demonstrating reliable results across different filtration systems.

Ordering information

Product	Preps	REF
NucleoMag® DNA/RNA Water	1 x 96 / 4 x 96	744220.1 / .4

Magnetic bead technology – DNA from plant

NucleoMag® Plant

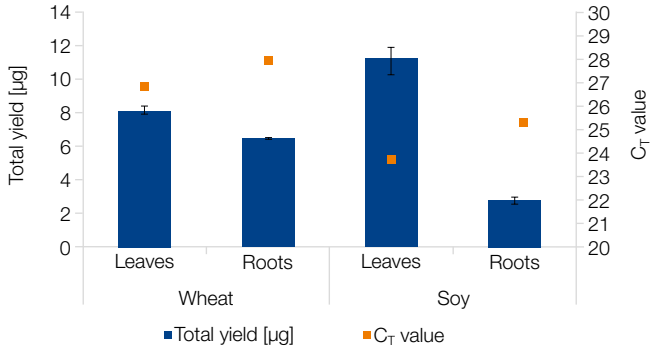
DNA isolation from plant material

- Small elution volumes for highly concentrated DNA to fulfill specifications of challenging downstream applications
- Numerous support protocols facilitate processing even of challenging sample material

Product at a glance

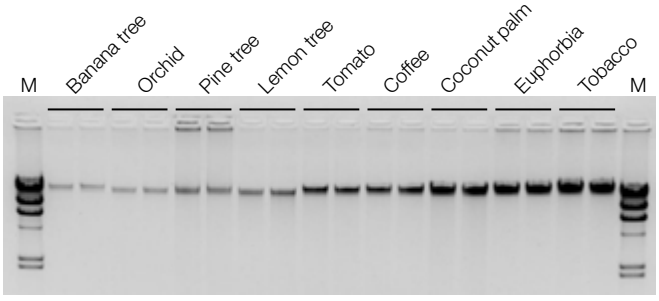
	Mag NucleoMag® Plant	Mag NucleoMag® 384 Plant
Technology	Magnetic bead technology	Magnetic bead technology
Sample material	20–50 mg (wet weight) plant tissue	30 mg (wet weight) plant tissue
Fragment size	300 bp–50 kbp	300 bp–50 kbp
Typical yield	10–20 µg (50 mg plant tissue, wet weight)	Depending on sample source
Elution volume	50–200 µL	50–200 µL
Binding capacity	0.4 µg/µL beads	0.2 µg/µL beads
Preparation time	40–120 min/96 preps (excl. lysis)	40–120 min/96 preps, 60 min/384 preps (excl. lysis)

Application data



Automated isolation of genomic DNA from different parts of commercially valuable plant species

DNA was isolated from 20 mg fresh leaves or 40 mg fresh roots from different plant species using the NucleoMag® Plant kit on a KingFisher® Flex (Thermo Scientific) platform. The total yield (as determined by UV spectrometry, dark blue bars) indicate successful extraction from different plant organs and species while subsequent qPCR results (orange squares) proportional to the optically measured yields indicate the absence of any inhibition problems.



Reliably high integrity of genomic DNA from various plant species

DNA was isolated from 40 mg leaf material derived from different plant species using the NucleoMag® Plant kit on a KingFisher® Flex (Thermo Scientific) platform. The integrity was exemplarily analyzed by gel electrophoresis (15 µL per eluate; 1 % TAE gel; M: Lambda DNA/Hind III – Thermo Scientific). All samples yielded high integrity DNA as indicated by a strong band running high on the gel.

Ordering information

Product	Preps	REF
NucleoMag® Plant	1 x 96 / 4 x 96 / 24 x 96	744400.1 / .4 / .24
NucleoMag® 384 Plant	1 x 384 / 4 x 384	744402.1 / .4



Magnetic bead technology – DNA from food

NucleoMag® DNA Food

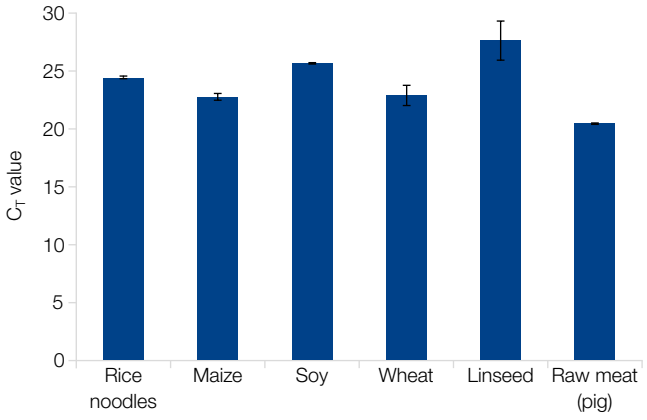
DNA isolation from food and feed samples

- Efficient removal of PCR inhibitors for enhanced results
- Get even low amounts of partially degraded DNA from complex matrices

Product at a glance

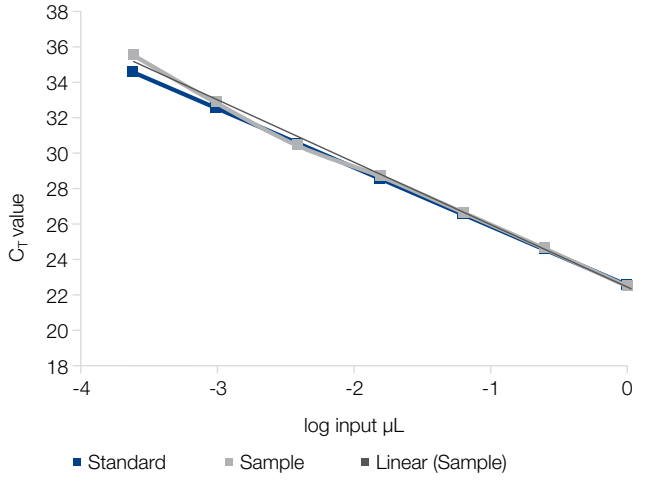
	Mag NucleoMag® DNA Food
Technology	Magnetic bead technology
Sample material	< 200 mg food / feed
Fragment size	300 bp–50 kbp
Typical yield	0.1–10 µg (depending on sample type)
Elution volume	50–200 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps (excl. lysis)

Application data



Reliable automated extraction of DNA from highly diverse food and feed matrices

DNA was isolated from different food and feed samples (n=4; 200 mg each sample) including raw meat, seeds, or shredded soybeans (dark blue bars) using the NucleoMag® DNA Food kit the ep*Motion*® 5075T platform. A subsequent qPCR analysis was performed for a 103 bp actin amplicon using the SensiFast™ Probe Lo-ROX kit from BioLine on an Applied Biosystems® 7500 Real-Time PCR System. All of the samples resulted in good PCR amplification, indicating the suitability of the kit for high throughput analysis of diverse food matrices.



qPCR performance analysis of purified nucleic acids from sausage samples

DNA was isolated from 50 mg of sausage samples using the NucleoMag® DNA Food kit on a Freedom EVO® 150 platform and subjected to a subsequent qPCR analysis using dilution series of the eluate (1:4 serial dilution). The qPCR was performed for a 103 bp actin amplicon using the SensiFast™ Probe Lo-ROX kit from BioLine on an Applied Biosystems® 7500 Real-Time PCR System. The measured values closely follow the theoretical values of an ideal sample preparation, indicating excellent qPCR-performance without PCR inhibition.

Ordering information

Product	Preps	REF
NucleoMag® DNA Food	1 x 96 / 4 x 96	744945.1 / .4

Magnetic bead technology – Viral RNA / DNA

NucleoMag® Virus

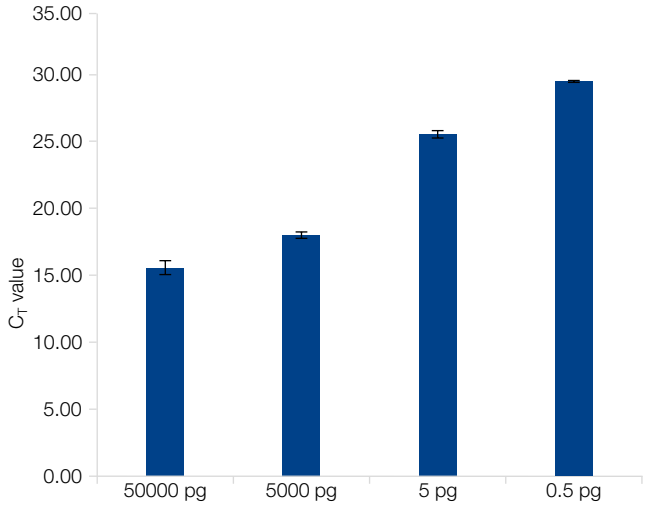
Isolation of viral RNA / DNA from biological fluids

- Elution in minimal volume to achieve highest sensitivities for virus detection

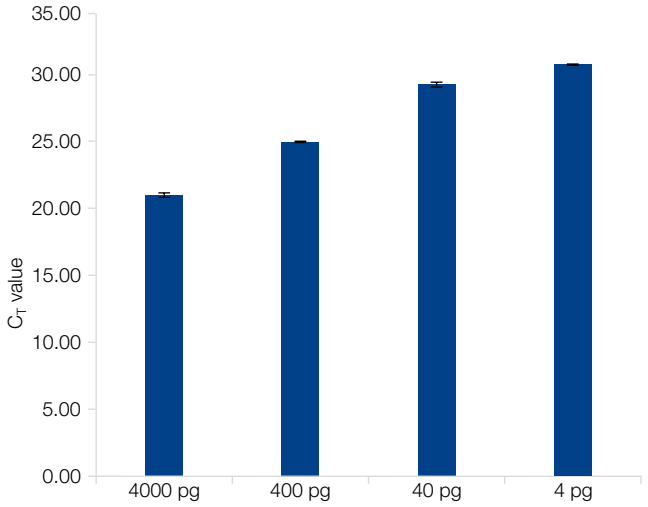
Product at a glance

	Mag NucleoMag® Virus
Technology	Magnetic bead technology
Sample material	< 200 µL serum, plasma, cell-free biological fluid
Fragment size	100 bp–50 kbp
Typical yield	Depending on sample amount and quality
Elution volume	50–100 µL
Theoretical binding capacity	0.2 µg/µL beads
Preparation time	40–120 min/96 preps

Application data



T7 phage DNA



MS2 phage RNA

Highly efficient, automated purification of viral DNA from human plasma

T7 phage DNA was spiked into human plasma samples. Viral DNA was purified in an automated manner by using the NucleoMag®Virus kit on the ep*Motion* 5073m workstation. The recovery efficiency was determined by a subsequent Taqman® Probe qPCR assay using the Applied Biosystems® 7500 Real-Time PCR System.

Highly efficient, automated purification of viral RNA from human plasma

MS2 phage RNA was spiked into human plasma samples. Viral RNA was purified in an automated manner by using the NucleoMag®Virus kit on the ep*Motion* 5073m workstation. The recovery efficiency was determined by a subsequent Taqman® Probe qRT-PCR assay using the Applied Biosystems® 7500 Real-Time PCR System.

Ordering information

Product	Preps	REF
NucleoMag® Virus	1 x 96 / 4 x 96	744800.1 / .4

Magnetic bead technology – Viral RNA / DNA and bacterial DNA

NucleoMag® Pathogen

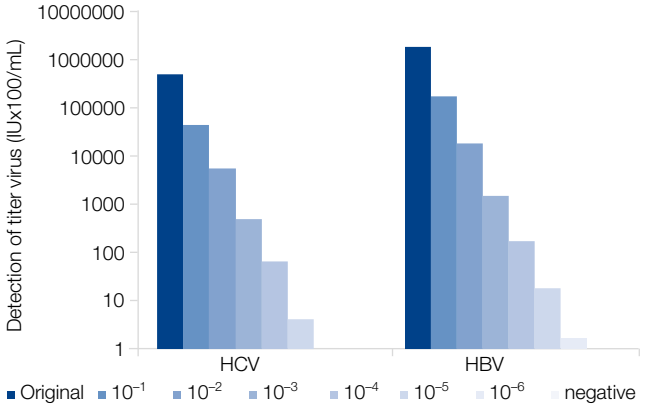
Isolation of viral RNA/DNA and bacterial DNA from clinical samples

- One kit for all common clinical sample types
- Reliable nucleic acid isolation – suitable even for low viral titers

Product at a glance

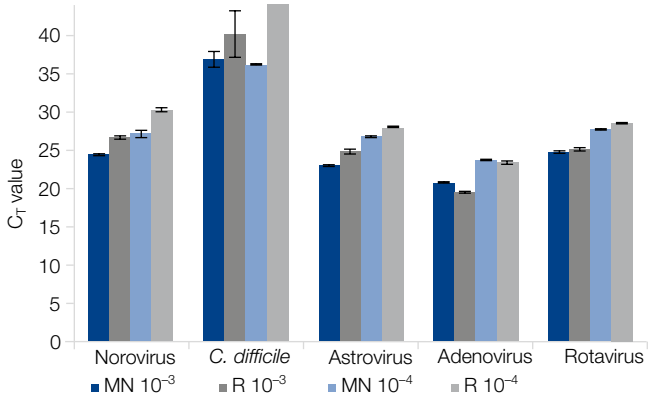
	Mag NucleoMag® Pathogen
Technology	Magnetic bead technology
Sample material	< 200 µL whole blood, serum, plasma, swab wash solution, feces, < 25 mg tissue
Fragment size	300 bp–50 kbp
Typical yield	Depending on sample amount and quality
Elution volume	50–100 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps

Application data



Highly sensitive detection of Hepatitis B (HBV) and Hepatitis C (HCV) virus from human plasma

Triplicates of human plasma dilutions (200 µL, with original virus titer as shown) were subjected to the NucleoMag® Pathogen extraction procedure. Eluates were used as input for the RealStar® HBV PCR 1.0 and the RealStar® HCV RT-PCR 1.0 assays (altona diagnostics). The purified nucleic acids enabled highly sensitive detection of Hepatitis B (HBV) and Hepatitis C (HCV) viruses in human plasma samples. PCR inhibition was not observed.



Competitive, highly sensitive detection of pathogens from human fecal samples

Triplicates of human fecal sample dilutions (10^{-3} – 10^{-4}) were subjected to the NucleoMag® Pathogen extraction procedure and to a competitor extraction procedure (R). Eluates were used as input for PCR analysis performed using the RIDA® GENE Viral Stool Panel I (R-Biopharm) and RealStar® Clostridium difficile PCR Kit 1.0 (altona diagnostics). The NucleoMag® Pathogen kit shows a comparable or even superior performance in comparison to the competitor kit.

Reference

"The NucleoMag® Pathogen kit meets all expectations and requirements of a nucleic acid extraction system for the molecular diagnostic market."

Dr. Carsten Tiemann, LABCON-OWL GmbH (certified laboratory)

Ordering information

Product	Preps	REF
NucleoMag® Pathogen	1 x 96 / 4 x 96	744210.1 / .4

Magnetic bead technology – Viral RNA / DNA and bacterial DNA

NucleoMag® VET

Isolation of viral RNA/DNA and bacterial DNA from veterinary samples

- One kit for all common samples in veterinary diagnostics
- High sensitivity even with low viral titers

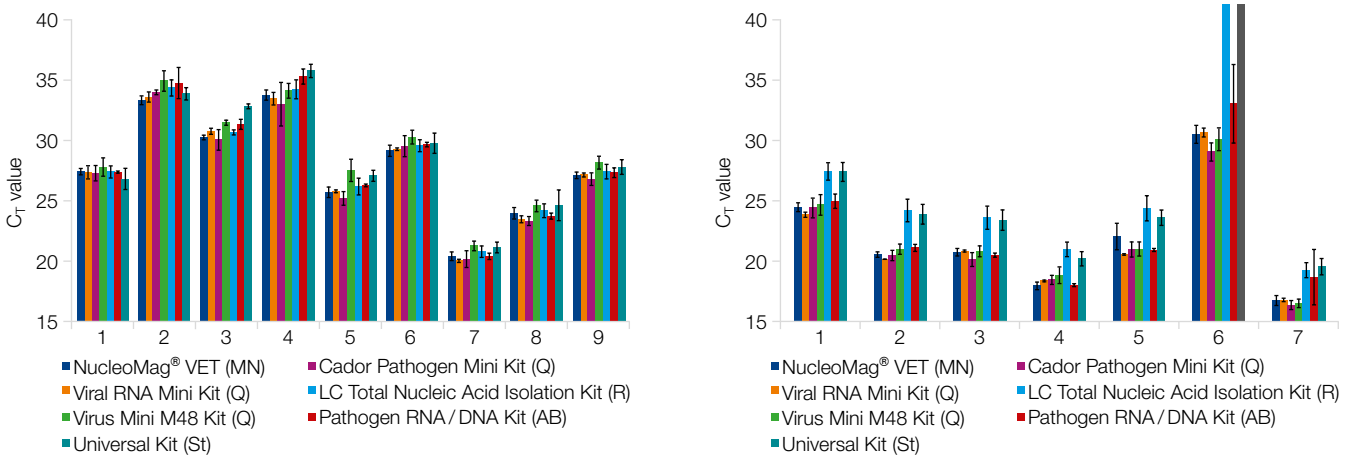
Product at a glance

	Mag NucleoMag® VET
Technology	Magnetic bead technology
Sample material	< 200 µL whole blood, serum, plasma, swab wash solution, feces, < 25 mg tissue
Fragment size	300 bp–50 kbp
Typical yield	Depending on sample amount and quality
Elution volume	50–100 µL
Theoretical binding capacity	0.4 µg/µL beads
Preparation time	40–120 min/96 preps

Viruses:
Infectious Bronchitis Virus (IBV), Porcine Circovirus type 2 (PCV-2), Porcine Epidemic Diarrhea Virus (PEDV), Porcine Deltacoronavirus (PDCoV), Porcine Reproductive and Respiratory Virus (PRRSV), Infectious Bursal Disease Virus (IBDV), Bluetongue virus (BTV), Classical Swine Fever virus (CSFV), African swine fever virus (ASFV), Schmallenberg virus (SBV), Avian Influenza Viruses (AIV), Sindbis virus (SINV), Usutu virus (USUV), Batai virus (BATV), Cowpox Virus (CPXV), Giant squirrel respirovirus (GSqRV), Influence D and C Virus (IDV/ICV), Deformed wing virus (DWV), Varroa destructor virus 1 (VDV 1), Acute bee paralysis virus (ABPV), Sacbrood virus (SBV), Israeli acute paralysis virus (IAPV), Black queen cell virus (BQCV), Chronic bee paralysis virus (CBPV), Kashmir bee virus (KBV)

Bacteria:
Paenibacillus larvae, Melissococcus plutonius, Ascophaera apis, Aspergillus spp., Nosema ceranae, N. apis, Mycoplasma gallisepticum / synoviae

Application data



Leading performance in detection of BTV (RNA virus) and PCV 2 (ssDNA virus) after nucleic acid isolation

Viral RNA and DNA was isolated from veterinary samples by using the NucleoMag® VET kit and different competitor kits. Specific qPCR was performed to determine the viral titer load in the different sample materials. Detection of BTV (Bluetongue virus) in cattle blood (left). Detection of PCV 2 (Porcine Circovirus Type 2) in pig tissue (right). The NucleoMag® VET kit shows a leading performance among all extraction kits tested.

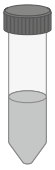
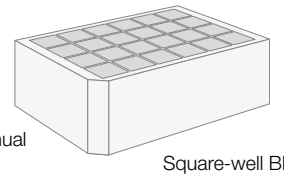
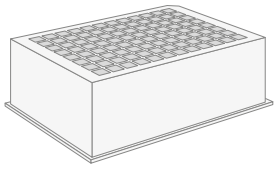
Data was kindly provided by Dr. Hoffmann, Friedrich-Loeffler-Institut, Germany

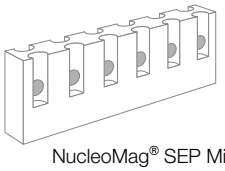
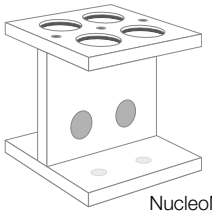
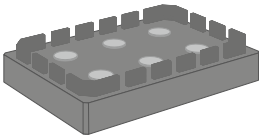
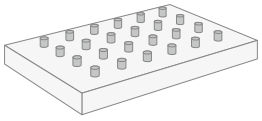
Ordering information

Product	Preps	REF
NucleoMag® VET	1 x 96 / 4 x 96	744200.1 / .4

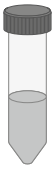
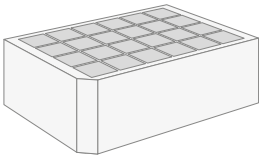
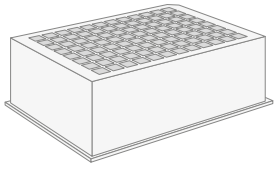
Equipment for Magnetic bead technology

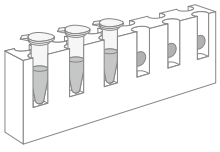
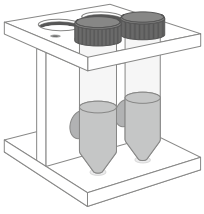
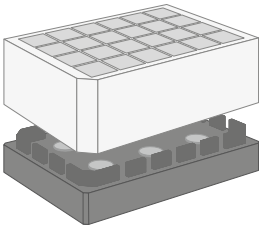
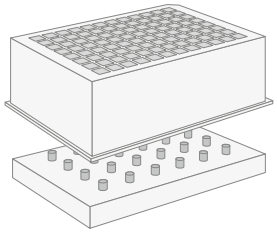
NucleoMag® procedure

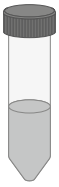
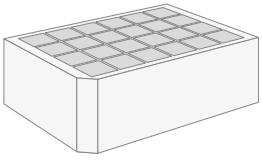
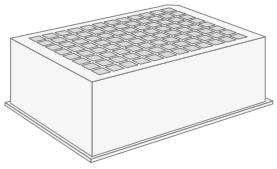
Format	Mini	Maxi	24-well	96-well
Tube/plate	 Tube for manual small volume processing	 Tube for manual large volume processing	 Square-well Block U-bottom	Suitable plate  Square-well Block

Format	Mini	Maxi	24-well	96-well
Magnetic separator	 NucleoMag® SEP Mini	 NucleoMag® SEP Maxi	 NucleoMag® SEP 24	 NucleoMag® SEP

NucleoMag® processing

Format	Mini	Maxi	24-well	96-well
Sample lysis/ pretreatment/ adjust binding conditions			Suitable plate 	

Format	Mini	Maxi	24-well	96-well
Binding/washing/ drying				

Format	Mini	Maxi	24-well	96-well
Elution				

Equipment for Magnetic bead technology

Product	Pack of	Specification	REF
NucleoMag® SEP	1	Magnetic separator, for use with 96-well plates (e.g., REF 740481)	744900
Square-well Block	4 24	96-well blocks with 2.1 mL u-bottom square wells for use with NucleoMag® SEP	740481 740481.24
Elution Plate U-bottom	24	96-well microplates with 300 µL u-bottom wells, including Self-adhering Foil	740486.24
NucleoMag® 24 SEP	1	Magnetic separator, for use with 24-well plates (e.g., REF 740448/.4 / .24)	744903
24-Square-well Block U-bottom	4 24	24-well blocks with 10 mL U-bottom square wells	740448.4 740448.24
NucleoMag® SEP Mini	1	Magnetic separator; for use with 1.5 mL or 2 mL reaction tubes (12 positions)	744901
NucleoMag® SEP Maxi	1	Magnetic separator; for use with 50 mL tubes (4 positions)	744902
KingFisher® Accessory Kit A	1 set	KingFisher® Deep-well Blocks, KingFisher® Deep-well Tip Combs, KingFisher® Elution Plates, for 4 x 96 NucleoMag® PCR / Tissue / Trace / Forensic / DNA Food / DNA Forensic / DNA Swab / DNA/RNA Water / Pathogen / Virus / VET preps using KingFisher® Flex / 96 platform	744950
KingFisher® Accessory Kit B	1 set	KingFisher® 24 Deep-well Blocks, KingFisher® Flex 24 Tip Combs, for 5 x 24 preps with NucleoMag® Blood 3 mL / DNA Plasma using a KingFisher® Flex platform	744951
KingFisher® 24 Accessory Kit	1 set	KingFisher® 24 Deep-well Blocks, KingFisher® Duo 6 Tip Combs, for 8 x 6 preps with NucleoMag® Blood 3 mL / DNA Plasma using a KingFisher® Duo / Duo Prime platform	744953
KingFisher® Duo Prime Accessory Kit	1 set	KingFisher® 24 Deep-well Blocks, KingFisher® Duo 6 Tip Combs, for 8 x 6 preps with NucleoMag® Blood 3 mL / DNA Plasma using a KingFisher® Duo / Duo Prime platform	744952

Anion exchange chromatography – Plasmid DNA

NucleoBond® 96 Xtra EF

Plasmid purification for transfection of sensitive cells

- Patented endotoxin removal technology – no incubation on ice required
- NucleoBond® Filter Plate for filtration of bacterial lysates in HTP-format
- NucleoBond® Finalizer Plate to avoid inconvenient DNA precipitation

Product at a glance

	 NucleoBond® 96 Xtra EF
Technology	Anion exchange chromatography
Sample material	1–5 mL bacterial culture
Vector size	< 25 kbp, < 300 kbp (without NucleoBond® Finalizer Plate)
Typical yield	2–4 (1.5 mL in 96-well plates), 10–50 µg 5 mL in glass tubes)
Endotoxin level	< 0.1 EU/µg*
Elution volume	100–200 µL
Theoretical capacity	50 µg
Preparation time	120 min/plate

*EU = Endotoxin Units, please refer to the information box on page 8

Ordering information

Product	Preps	REF
NucleoBond® 96 Xtra EF	1 x 96 / 4 x 96	740430.1 / .4

Ultrafiltration technology – Clean up

NucleoFast® 96 PCR

Time saving clean up for insensitive enzymatic reactions

- Detergent-free membrane optimized for ultrafiltration
- Fast and convenient procedure

Product at a glance

	 NucleoFast® 96 PCR
Technology	Ultrafiltration technology
Sample material	20–300 µL PCR reaction mixture
Fragment size	> 150 bp
Recovery	40–95 %
Elution volume	25–100 µL
Preparation time	20 min/plate

Reference

Herold et al., 2014 “Isolated trisomy 13 defines a homogeneous AML subgroup with high frequency of mutations in spliceosome genes and poor prognosis”

Blood

Ordering information

Product	Preps / Pack of	REF
NucleoFast® 96 PCR Clean up Kit	4 x 96	743500.4
NucleoFast® 96 PCR Plates	10 x 96 / 50 x 96	743100.10/.50

Immobilized metal ion chromatography – Protein

Protino® 96 Ni-NTA

High throughput purification of His-tagged proteins

- High purity protein purification using chelating group NTA (nitrilotriacetic acid)
- Unique Protino® Purification Plate for leak-free incubation during the entire procedure
- Purification under native or denaturing conditions

Product at a glance



	Protino® 96 Ni-NTA
Technology	IMAC (immobilized metal ion affinity chromatography)
Chelating ligand	NTA (nitrilotriacetic acid)
Matrix	6 % beaded agarose (crosslinked), precharged with Ni^{2+}
Bead size	45–165 µm
Sample volume	< 750 µL/well (50 µL of settled agarose beads/well)
Theoretical binding capacity	2 mg/well (with 50 µL agarose beads/well)

Reference

Holstein et al., 2015 “Engineering Giardia lamblia trimethylguanosine synthase (GlaTgs2) to transfer non-natural modifications to the RNA 5’-cap”

Protein Engineering, Design & Selection

Ordering information

Product	Preps	REF
Protino® 96 Ni-NTA	1 x 96 / 4 x 96	745425.1 / .4
Related product		
Protino® Purification Plate	1 x 96 / 4 x 96	745426.1 / .4

Immobilized metal ion chromatography – Protein

Protino® 96 Ni-IDA

High throughput purification of His-tagged proteins

- Chelating group IDA allows for highest protein purity
- Dry resin – storage at room temperature
- Purification under native or denaturing conditions

Product at a glance



	Protino® 96 Ni-IDA
Technology	IMAC (immobilized metal ion affinity chromatography)
Chelating ligand	IDA (iminodiacetic acid)
Matrix	Macroporous silica
Theoretical binding capacity	1 mg/well (with 50 mg resin/well)

Reference

Koerfer et al., 2016 “In vitro flow cytometry-based screening platform for cellulase engineering”

Scientific Reports

Ordering information

Product	Preps	REF
Protino® 96 Ni-IDA	1 x 96 / 4 x 96	745300.1 / .4
Related product		
Protino® Purification Plate	1 x 96 / 4 x 96	745426.1 / .4

HTP equipment

Product	Pack of	Specification	REF
NucleoVac 96 Vacuum Manifold	1	Vacuum manifold; consists of manifold base and lid, a spacer set and a waste container set For use of NucleoSpin® Midi / L Columns (see required Starter Set Midi below), for use of NucleoSpin® 8-well Strips (see required Starter Set A below)	740681
Starter Set Midi	1 set	For processing NucleoSpin® Midi / L Columns under vacuum on NucleoVac 96 Vacuum Manifold or similar manifolds; contains 1 Column Holder Midi, 1 Wash Plate Midi, 1 Elution Tube Holder Midi, 24 Dummy Columns Midi	740744
NucleoVac Vacuum Regulator	1	For controlling of vacuum	740641
NucleoSpin® Dummy Strips	6 strips	For sealing unused rows of Column Holders A, B, and C using NucleoSpin® 8-well kits	740685
MN Frame	1	For optimized handling of 96-well plates with a vacuum manifold on BioRobot® 9600, 9604, and 3000 (Qiagen), MultiPROBE® II / Janus (PerkinElmer), Biomek® 2000 / 3000 and FX / NX (Beckman Coulter)	740680
MN Shaker Frame	1	Adapter frame for shaking Protino and NucleoSpin® 96-well Plates	740489
NucleoMag® SEP	1	Magnetic separator, for use with 96-well plates (e.g., REF 740481)	744900
NucleoMag® SEP 24	1	Magnetic separator, for use with 24-well plates (e.g., REF 740448.4)	744903
Starter Set A	1	For processing NucleoSpin® 8-well strips under vacuum on a NucleoVac 96 Vacuum Manifold or similar manifolds; contains 2 Column Holders A, NucleoSpin® Dummy Strips	740682
Starter Set B	1	For processing NucleoSpin® 8-well strips on the Qiagen Bio Robot® 9600 / 9604 / 3000 ; contains 1 Column Holder B, 1 Column Holder D, NucleoSpin® Dummy Strips	740683
Starter Set C	1	For processing NucleoSpin® 8-well strips under centrifugation; contains 2 Column Holders C, MN Square-well Blocks, Racks of Tube Strips	740684

HTP consumables

Product	Pack of	Specification	REF
MN Wash Plate	4 24	96-well plates with funnel shaped wells to minimize the risk of cross-contamination using NucleoSpin® 8-well strips / 96-well plates under vacuum or gravity flow	740479 740479.24
Square-well Block	4 24	96-well blocks with 2.1 mL u-bottom square wells for use with NucleoMag® SEP	740481 740481.24
MN Square-well Block	4 24	96-well blocks with 2.1 mL square wells for mixing steps and waste collection using NucleoSpin® 8-well strips / 96-well plates under vacuum or centrifugation	740476 740476.24
Culture Plate	4 sets 24 sets	Square-well Blocks with 2.1 mL square wells, including Gas-permeable Foil for cultivation of bacteria in 96-well format	740488 740488.24
Round-well Block	20	96-well blocks with 1.2 mL round wells for sample lysis, mixing steps, and collection of elution fractions using NucleoSpin® 8-well strips / 96-well plates under vacuum; wells can be closed with Cap Strips	740671
Round-well Block with Cap Strips	4 sets 24 sets	1 set consists of 1 Round-well Block with 12 Cap Strips	740475 740475.24
Round-well Block Low	4	96-well blocks with 0.8 mL v-bottom round wells	740485
Elution Plate U-bottom	24	96-well microplates with 300 µL u-bottom wells, including Self-adhering Foil	740486.24
24-Square-well Block	4 24	24-well blocks with 10 mL u-bottom square wells	740448.4 740448.24
Rack of Tube Strips	5 sets	1 set consists of 1 rack, 12 strips with 8 tubes each for sample lysis, mixing steps, and collection of elution fractions using NucleoSpin® 8-well strips / 96-well plates under vacuum or centrifugation; strips can be closed with cap strips	740637
Rack of Tube Strips with Cap Strips	4 sets 24 sets	1 set consists of 1 rack, 12 strips with 8 tubes each, and 12 cap strips	740477 740477.24
Cap Strips	48 288	Strips with of 8 caps each for sealing of Tube Strips and Round-well Blocks	740478 740478.24
96-well Silicone Lid	24	Silicone Lid for sealing 96-well Round-well Blocks Low	740447.24
Gas-permeable Foil	50	Gas-permeable, self adhering foil for sealing of 96-well plates	740675
Self-adhering PE Foil	50	Adhesive tape foils for air-tight sealing and storage of 96-well elution plates	740676
NucleoSpin® Plasmid Filter Strips	48	8-well strips for clarification of lysates, for use under vacuum or centrifugation	740730.48F
NucleoSpin® RNA Filter Strips	12 60	8-well strips for filtration of cell and tissue homogenates; for use under vacuum or centrifugation	740699.12F 740699.60F
NucleoSpin® RNA Filter Plate	4	96-well plates for filtration of cell and tissue homogenates; for use under vacuum or centrifugation	740711
NucleoSpin® Trace Filter Plate	20	96-well plates for lysis of samples and subsequent removal of particulate matter; for use under vacuum or centrifugation	740677
Receiver Plates 35 µm	4	96-well plates with inserted filter frits of 35 µm pore size for general filtration purposes as well as for retaining chromatographic resins; suitable for centrifugation and use under vacuum	740686.4
Receiver Plates 35 µm hydrophilized	4	96-well plates with inserted hydrophilized filter frits of 35 µm pore size for general filtration purposes as well as for retaining chromatographic resins; suitable for gravity flow, centrifugation, and use under vacuum	740687.4
Receiver Plates 50 µm	4	96-well plates with inserted filter frits of 50 µm pore size for general filtration purposes as well as for retaining chromatographic resins; suitable for centrifugation and unse under vacuum	740688.4
Receiver Plates 50 µm hydrophilized	4	96-well plates with inserted hydrophilized filter frits of 50 µm pore size for general filtration purposes as well as for retaining chromatographic resins; suitable for gravity flow, centrifugation, and use under vacuum	740689.4
KingFisher® 96 Accessory Kit A	1 set	KingFisher® Deep-well Blocks, KingFisher® Deep-well Tip Combs, KingFisher® Elution Plates, for 4 x 96 NucleoMag® PCR / Tissue / Trace / Forensic / DNA Food / DNA Forensic / DNA Swab / DNA/RNA Water / Pathogen / Virus / VET preps using KingFisher® Flex / 96 platform	744950
KingFisher® 96 Accessory Kit B	1 set	KingFisher® Deep-well Blocks, KingFisher® Deep-well Tip Combs, KingFisher® Elution Plates, for 4 x 96 NucleoMag® Blood 200 µL and NucleoMag® Plant / RNA preps using KingFisher® Flex / 96 platform	744951
KingFisher® 24 Accessory Kit	1 set	KingFisher® 24 Deep-well Blocks, KingFisher® Flex 24 Tip Combs, for 5 x 24 preps with NucleoMag® Blood 3 mL / DNA Plasma using a KingFisher® Flex platform	744953
KingFisher® Duo Prime Accessory Kit	1 set	KingFisher® 24 Deep-well Blocks, KingFisher® Duo 6 Tip Combs, for 8 x 6 preps with NucleoMag® Blood 3 mL / DNA Plasma using a KingFisher® Duo / Duo Prime platform	744952

HTP kits

Product*	Pack of	REF
Plasmid DNA		
NucleoSpin® 8 Plasmid	12 x 8 / 60 x 8	740621 / .5
NucleoSpin® 8 Plasmid Core** Kit	48 x 8	740461.4
NucleoSpin® 96 Plasmid	1 x 96 / 4 x 96 / 24 x 96	740625.1 / .4 / .24
NucleoSpin® 96 Plasmid Core** Kit	4 x 96	740616.4
NucleoSpin® 96 Plasmid Transfection-grade	1 x 96 / 4 x 96 / 24 x 96	740491.1 / .4 / .24
NucleoSpin® 96 Plasmid Transfection-grade Core** Kit	4 x 96 / 24 x 96	740492.4 / .24
NucleoBond® 96 Xtra EF	1 x 96 / 4 x 96	740430.1 / .4
NucleoSpin® 96 Flash	2 x 96 / 4 x 96 / 24 x 96	740618.2 / .4 / .24
Clean up		
NucleoSpin® 8 PCR Clean up	12 x 8 / 60 x 8	740668 / .5
NucleoSpin® 8 PCR Clean up Core** Kit	48 x 8	740463.4
NucleoSpin® 96 PCR Clean up	1 x 96 / 2 x 96 / 4 x 96 / 24 x 96	740658.1 / .2 / .4 / .24
NucleoSpin® 96 PCR Clean up Core** Kit	4 x 96	740464.4
NucleoFast® 96 PCR Clean up Kit	4 x 96	743500.4
NucleoFast® 96 PCR Plates	10 x 96 / 50 x 96	743100.10 / .50
NucleoMag® NGS Clean up and Size Select	5 mL / 50 mL / 500 mL	744970.5 / .50 / .500
RNA		
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
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
DNA from blood		
NucleoSpin® 8 Blood	12 x 8 / 60 x 8	740664 / .5
NucleoSpin® 8 Blood Core** Kit	48 x 8	740456.4
NucleoSpin® 96 Blood	1 x 96 / 4 x 96 / 24 x 96	740665.1 / .4 / .24
NucleoSpin® 96 Blood Core** Kit	4 x 96	740455.4
NucleoSpin® 8 Blood QuickPure	12 x 8 / 60 x 8	740666 / .5
NucleoSpin® 96 Blood QuickPure	2 x 96 / 4 x 96 / 24 x 96	740667.2 / .4 / .24
NucleoSpin® Blood L Vacuum	24	740954.24
NucleoMag® Blood 200 µL	1 x 96 / 4 x 96	744501.1 / .4
NucleoMag® Blood 3 mL	1 x 96	744502.1
Cell-free DNA from plasma		
NucleoSpin® cfDNA Midi	48	740303.48
NucleoSpin® cfDNA Midi Core** Kit	48	740302.48
NucleoSpin® 96 cfDNA	1 x 96 / 4 x 96	740873.1 / .4
NucleoSpin® 96 cfDNA Core** Kit	1 x 96 / 4 x 96	740874.1 / .4
DNA from tissue and cells		
NucleoSpin® 96 RapidLyse	1 x 96 / 4 x 96 / 24 x 96	740110.1 / .4
NucleoSpin® 8 Tissue	12 x 8 / 60 x 8	740740 / .5
NucleoSpin® 8 Tissue Core** Kit	48 x 8	740453.4
NucleoSpin® 96 Tissue	2 x 96 / 4 x 96 / 24 x 96	740741.2 / .4 / .24
NucleoSpin® 96 Tissue Core** Kit	4 x 96	740454.4
NucleoMag® Tissue	1 x 96 / 4 x 96 / 24 x 96	744300.1 / .4 / .24

* Kits to be used for research purposes only.
** Kits with basic content focused on automation platforms. Additional accessories can be combined as needed.

HTP kits

Product*	Pack of	REF
DNA from FFPE		
NucleoSpin® 8 DNA FFPE	12 x 8 / 60 x 8	740242 / .5
NucleoMag® 96 DNA FFPE	1 x 96 / 4 x 96	744320.1 / .4
DNA from forensic samples		
NucleoSpin® 8 Trace	12 x 8 / 60 x 8	740722.1 / .5
NucleoSpin® 96 Trace	2 x 96 / 4 x 96	740726.2 / .4
NucleoMag® DNA Forensic	1 x 96 / 4 x 96	744660.1 / .4
DNA from plant		
NucleoSpin® 8 Plant II	12 x 8 / 60 x 8	740669 / .5
NucleoSpin® 8 Plant II Core** Kit	48 x 8	740467.4
NucleoSpin® 96 Plant II	2 x 96 / 4 x 96 / 24 x 96	740663.2 / .4 / .24
NucleoSpin® 96 Plant II Core** Kit	4 x 96	740468.4
NucleoMag® Plant	1 x 96 / 4 x 96 / 24 x 96	744400.1 / .4 / .24
NucleoMag® 384 Plant	1 x 96 / 4 x 96	744402.1 / .4
DNA from bacteria and yeast		
NucleoMag® DNA Bacteria	1 x 96 / 4 x 96	744310.1 / .4
DNA from soil		
NucleoSpin® 8 Soil	12 x 8	740779
NucleoSpin® 96 Soil	2 x 96 / 4 x 96	740787.2 / .4
DNA from water		
NucleoMag® DNA/RNA Water	1 x 96 / 4 x 96	744220.1/.4
DNA from food and feed		
NucleoSpin® 8 Food	12 x 8 / 60 x 8	740975 / .5
NucleoSpin® 96 Food	2 x 96 / 4 x 96 / 24 x 96	740976.2 / .4 / .24
NucleoMag® DNA Food	1 x 96 / 4 x 96	744945.1 / .4
Viral RNA and DNA		
NucleoSpin® 8 Virus	12 x 8 / 60 x 8	740643 / .5
NucleoSpin® 8 Virus Core** Kit	48 x 8	740451.4
NucleoSpin® 96 Virus	2 x 96 / 4 x 96	740691.2 / .4
NucleoSpin® 96 Virus Core** Kit	4 x 96	740452.4
NucleoMag® Virus	1 x 96 / 4 x 96	744800.1 / .4
Viral RNA / DNA and bacterial DNA		
NucleoMag® Pathogen	1 x 96 / 4 x 96	744210.1 / .4
NucleoMag® VET	1 x 96 / 4 x 96	744200.1 / .4
Protein Purification		
Protino® 96 Ni-NTA	1 x 96 / 4 x 96	745425.1 / .4
Protino® 96 Ni-IDA	1 x 96 / 4 x 96	745300.1 / .4

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