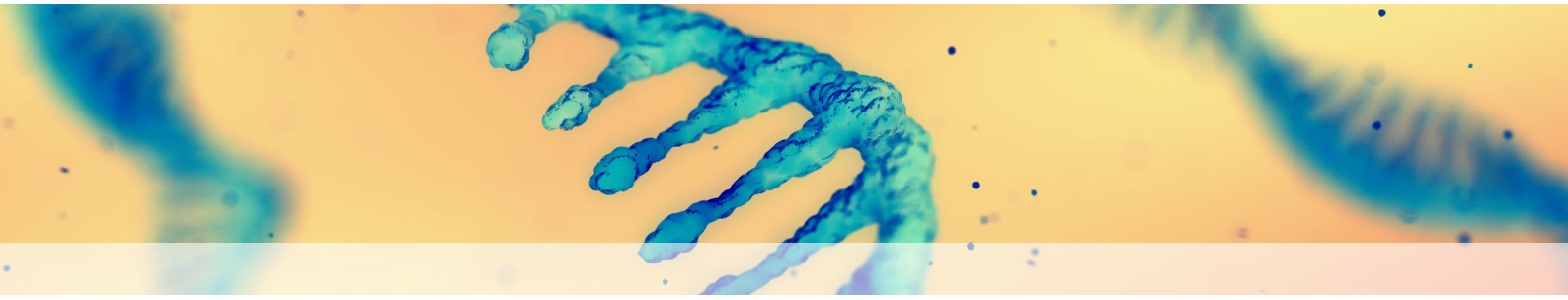
MACHEREY-NAGEL

NucleoMag® RNA

Reliable, high-throughput extraction of RNA from cells and tissue using the Hamilton NIMBUS® Presto workstation



Introduction

A wide variety of research laboratories routinely perform RNA purification from cells or tissue specimens. The purified RNA is the basis for genome-wide transcriptome studies, which can provide, for example, an in-depth understanding of gene expression networks and patterns, cross-cancer gene signatures or genetic biomarkers. Thereby, RNA downstream analysis place very high demands on the purified nucleic acids in terms of purity and integrity.

To meet these requirements, MACHEREY-NAGEL has developed the NucleoMag® RNA kit. This magnetic bead-based kit is scalable and was developed for high-throughput processing in a 96-well format. The RNA purified with this kit is of high purity and integrity and meets all the requirements imposed by sophisticated methods such as real-time PCR (RT-qPCR), cDNA synthesis, RNA-Seq or microarray analysis.

As purification of RNA from large numbers of samples represents a serious bottleneck in sample processing, MACHEREY-NAGEL and Hamilton have joined forces to provide a flexible automated solution for the purification of RNA from cells and tissue on the Hamilton NIMBUS Presto workstation.

Your advantages at a glance

- Proven NucleoMag® lysis and purification procedure for highest demands
- Automated plate prefilling and plate handling by the Hamilton NIMBUS liquid handling system
- High-speed RNA purification by the integrated KingFisher™ Presto instrument
- Purification of ready-to-use RNA, suitable for all common downstream applications (e.g., RT-qPCR, RNA-Seq, microarrays)

NucleoMag® RNA	
Technology	Magnetic beads
Sample material	Animal tissue, cells, human tissue, plant
Elution volume	50–200 µL
Typical yield	< 30 µg
Fragment size	> 200 nt
Preparation time	Approx. 94 min (excl. lysis) / 96 samples
Tip consumption	1.31 tips per sample / 96 samples

The NIMBUS Presto workstation combines liquid handling and magnetic rod processing for fully automated, high-throughput nucleic acid extractions.

NIMBUS Presto workstation	
Technology	Automated liquid handling platform (Hamilton NIMBUS) with integrated magnetic rod processing unit (KingFisher™ Presto)
Capacity	1–96 samples
Processable volume	50–5000 µL
Footprint	L 1359 mm | W 709 mm | H 889 mm

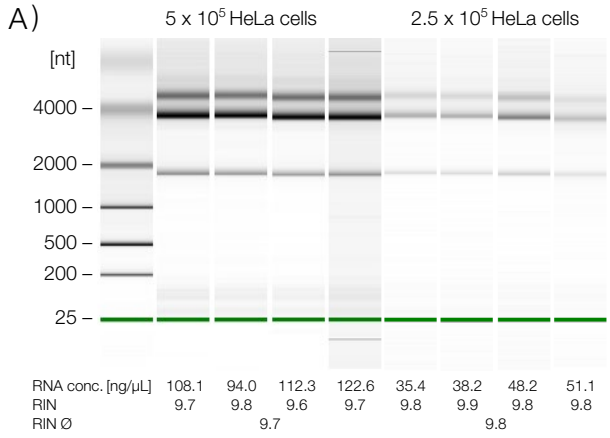
Material and Methods

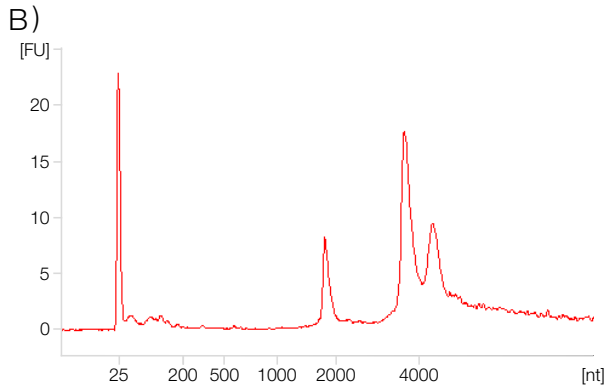
The isolation procedure is based on reversible adsorption of nucleic acids to paramagnetic NucleoMag® B-Beads under appropriate buffer conditions. The RNA purification is performed by a KingFisher™ Presto unit, which is integrated into the NIMBUS liquid handling system.

Samples are lysed in the presence of lysis buffer MR1 and TCEP. Following centrifugation and transfer of supernatant, binding of RNA to the NucleoMag® B-Beads is achieved by the addition of Binding Buffer MR2.

We demonstrate this automated purification workflow for cell and tissue samples. The tailored protocol allows for the flexible processing of up to 96 samples per run.

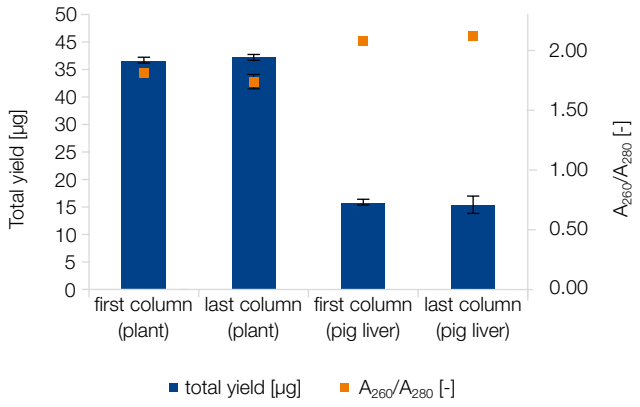
Application data





Quality of isolated RNA from HeLa cells

(A) After total RNA isolated from four individual 5 × 10^5 or four individual 2.5 × 10^5 HeLa cell samples, the total RNA integrity was determined. RNA was isolated using the NucleoMag® RNA kit on a Hamilton NIMBUS Presto platform. The quality of the non-denatured RNA was determined by using the Bioanalyzer® 2100 and the total RNA 6000 Nano kit. The results demonstrate the reliable detection of clear bands for each sample and RIN values constantly above 9.7 with a mean of 9.76 (Standard deviation of 0.09). (B) The graph shows an exemplified Bioanalyszer result of non-denatured RNA extracted from 5 × 10^5 Hela cells (lane 1 above).



High reproducibility in automated RNA purification

Total RNA was isolated from young wheat leaves (plant) using the lysis buffer RL1 and animal (pig liver) tissue samples using the NucleoMag® RNA kit on the Hamilton NIMBUS Presto platform. The total average RNA yield purified from first and last columns was determined by UV Spectrometry (dark blue bars). Average purity of isolated RNA of first and last columns was assessed by UV Spectrometry resulting in an average $A_{260}/_{280}$ of 1.78 (plant samples) and 2.1 (pig liver). The data demonstrate high reproducibility of RNA yield and purity across the entire 96-well plate in automated RNA purification, independent of sample material.

A rapid, fully automated solution for RNA purification from various sample materials

MACHEREY-NAGEL and Hamilton deliver a tailored solution for your automated isolation of RNA from cell and tissue samples. We have adapted the NucleoMag® RNA procedure on the NIMBUS Presto workstation to meet the requirements of high-throughput laboratories.

The powerful combination of the NucleoMag® technology and the NIMBUS Presto workstation has several advantages over standard nucleic acid purification procedures:

- Save hands-on time by using automated plate-prefilling and plate-handling performed by the NIMBUS workstation
- Benefit from the high-speed extraction procedure of the integrated KingFisher™ Presto unit
- Fast and reliable recovery of high-quality RNA
- Highest performance in downstream assays

Ordering information

Product	Specifications	Pack of	REF
NucleoMag® RNA	Magnetic bead-based kit for the isolation of RNA from cells and tissue; including NucleoMag® B-Beads, buffers, rDNase	1 x 96 preps 4 x 96 preps	744350.1 744350.4
NIMBUS Presto	Automated liquid handling platform with 4 pipetting channels, a CO-RE Gripper, barcode scanner, and many additional features		Hamilton*

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