



NucleoMag® Tissue

Automated genomic DNA purification from cells or tissue samples using the Opentrons OT-2

Application benefits

The combination of the NucleoMag® Tissue kit with the OT-2 has several advantages that streamline your nucleic acid purification workflows:

- Verified methods for fully automated nucleic acid purification workflow
- Recovery of genomic DNA with reliable reproducibility in yield and purity
- Processing of up to 48 samples in parallel
- Protocols available in the Opentrons Protocol Library or via MACHEREY-NAGEL technical automation support: automation-bio@mn-net.com

Keywords

Genomic DNA, genotyping, cells, tissue, magnetic beads, OT-2

Introduction

The efficient isolation of genomic DNA from cells or tissue samples is essential for subsequent molecular biological applications in life science and applied testing laboratories. For their demanding downstream analyses in genotyping, sequencing, parental and husbandry testing, or clinical research, molecular biology laboratories require reliable, pure, and high quality DNA.

MACHEREY-NAGEL designed the magnetic bead-based NucleoMag® Tissue kit for the rapid and automated purification of genomic DNA from animal/human cells and tissue specimens in an automation-friendly 96-well format. The obtained DNA is of pure and high quality can be used directly as template for PCR, NGS, blotting, or any kind of enzymatic reactions.

In this Application Note we demonstrate the automated purification of genomic DNA from eukaryotic cells and different tissue biopsy samples on the Opentrons OT-2 equipped with the Opentrons Magnetic Module, with the Single-Channel P1000 and with the 8-Channel P300 Pipettes.

An optimized protocol using the Opentrons OT-2 with the NucleoMag® Tissue kit can be downloaded directly from the Opentrons Protocol Library.

NucleoMag® Tissue	
Technology	Magnetic beads
Sample material	Animal cells/tissue Human cells/tissue
Target molecules	Genomic DNA
Fragment size	~300 bp – approx. 50 kbp
Max. sample number on OT-2	48 samples



Figure 1:

The Opentrons OT-2 is equipped with the Opentrons Magnetic Module and Opentrons GEN2 Pipettes for DNA purification. The Magnetic Module uses high-strength magnetic bars that can be engaged to magnetize magnetic beads, and disengaged to allow magnetic beads to remain in solution.

Opentrons OT-	
Technology	Automated liquid handling platform equipped with electronic pipettes and Magnetic Module (further modules are available for different applications).
Sample numbers	1 – 96 samples
Deck positions	Configurable platform with 11 deck slots
Pipetting volume	20 – 300 µL (P300 8-Channel Pipette) 100 – 1000 µL (P1000 Single-Channel Pipette) (Further Single-Channel and 8-Channel pipettes with different ranges are available for other applications)

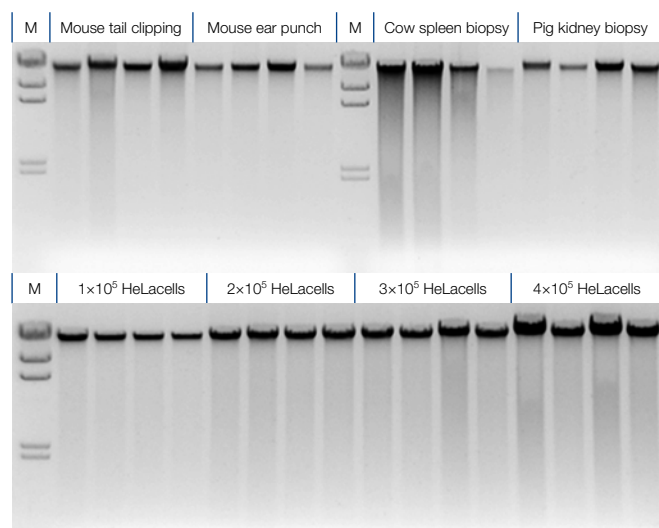
Material and Methods

The isolation procedure of the NucleoMag® Tissue kit is based on reversible adsorption of nucleic acids to paramagnetic NucleoMag® B-beads under appropriate binding conditions. Up to 20 mg tissue or up to 1×10^6 cells are mixed and incubated with Proteinase K and Lysis Buffer T1. After lysate clarification via centrifugation, reversible binding of nucleic acids to paramagnetic beads was enabled by adjustment with

Binding Buffer MB2. Subsequent to the magnetic separation, the NucleoMag® B-Beads are washed to remove contaminants and salts using Wash Buffer MB3 and MB4. After air drying or a short MB5 washing step, highly pure nucleic acids are eluted in elution buffer MB6.

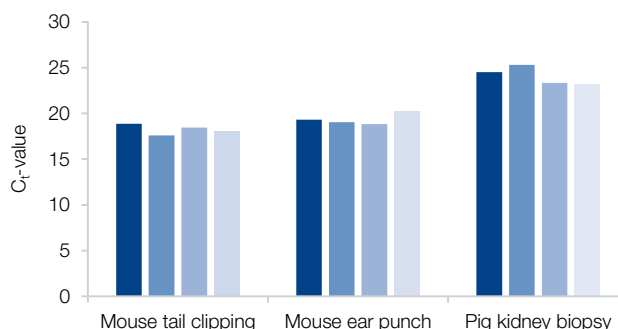
All liquid handling pipetting steps and magnetic bead separations

Application data



High integrity DNA with reliable reproducibility and yields

DNA was purified from 1×10^5 to 3×10^5 HeLa cells and from mouse tail clippings, mouse ear or pig kidney biopsies using the NucleoMag® Tissue kit on the Opentrons OT-2 equipped with the Opentrons Magnetic Module, with the Single-Channel P1000 and with the 8-Channel P300 Pipettes. Purified DNA was analyzed on a 1 % agarose gel. The genomic DNA was purified with high integrity and purity with comparable yield from the different HeLa cell or tissue samples inputs.



Reliable qPCR performance of isolated DNA

Purified DNA eluates of approx. 1–2 mg mouse tail clippings, mouse ear punches or pig kidney biopsies were used in quantitative PCR with primers targeting the gene for GAPDH using the SensiFast™ Probe Lo-Rox Kit on an Applied Biosystems® 7500 instrument. This data show that purified DNA is suitable for common downstream applications such as qPCR, with amplified targets detected with reliable sensitivity.

Ordering information

Product	Specifications	Pack of	REF
NucleoMag® Tissue	Magnetic bead-based kit for the isolation of genomic DNA from cell and tissue samples; including NucleoMag® B-Beads, buffers, Proteinase K	1 × 96 preps	744300.1
		4 × 96 preps	744300.4
		24 × 96 preps	744300.24
OT-2 pipetting robot	Automated liquid handling platform with Magnetic Module and electronic pipettes	OT-2 Pipetting Robot	999-00111*
		Single-Channel P1000 Pipette	999-00004*
		8-Channel P300 Pipette	999-00006*
		Magnetic Module	999-00098*

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*For more detailed information, please visit www.opentrons.com. To contact Opentrons Sales or to schedule a demo, please email info@opentrons.com.