



NucleoMag[®] Tissue with Opentrons Flex[™]

Automated genomic DNA purification from cells or tissue samples using the Opentrons Flex[™] Nucleic Acid Extraction Workstation

Application benefits

Experience enhanced nucleic acid purification workflows with the NucleoMag[®] Tissue kit and Opentrons Flex, featuring:

- Verified methods ensuring a fully automated purification process.
- Consistent recovery of genomic DNA with reliable reproducibility in both yield and purity.
- High throughput capability, processing up to 96 samples in parallel.
- Accessible protocols in the Opentrons Protocol Library or through MACHEREY NAGEL's technical automation support at automation-bio@mn-net.com.

Keywords

Genomic DNA nucleic acid extraction, automated DNA purification, genotyping, cells, tissue, magnetic beads, Opentrons Flex, Opentrons automation system, laboratory protocol optimization

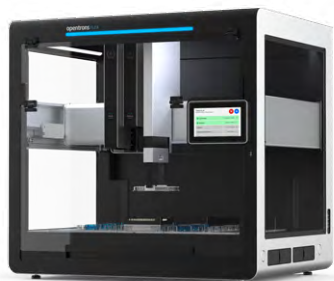


Figure 1:

The Opentrons Flex Nucleic Acid Extraction Workstation is equipped with the Opentrons Flex Magnetic Block for separation of magnetic beads, and the Opentrons Heater-Shaker for sample lysis and resuspension of magnetic beads.

Introduction

Efficiently isolating genomic DNA from cells and tissues is a cornerstone in life science and applied testing labs. For downstream applications like genotyping, sequencing, and clinical research, labs demand DNA that's dependable, pure, and high-quality.

MACHEREY NAGEL's NucleoMag[®] Tissue kit steps up to the plate, offering a magnetic bead-based solution for quick and automated genomic DNA purification. Designed for ease in a 96-well format, this kit ensures your DNA is not only pure but also of top-notch quality, ready to be a template for PCR, NGS, or other enzymatic reactions.

This Application Note illustrates the automated purification of genomic DNA from HeLa cells using the Opentrons Flex Nucleic Acid Extraction Workstation, featuring the Flex Magnetic Block, Opentrons Heater-Shaker, and Flex 1- and 8-Channel Pipettes (5 – 1000 µL). Note that there is also a configuration of the Flex Nucleic Acid Extraction Workstation that comes with a 96-channel pipette. The described application is adaptable for various sample materials, including DNA extraction from alternative eukaryotic cells or diverse tissue biopsy samples.

A directly downloadable optimized protocol for utilizing the Opentrons Flex Nucleic Acid Extraction Workstation with the NucleoMag[®] Tissue kit is available in the Opentrons Protocol Library: [Click here](#) to get to the protocol in 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
Sample numbers on Opentrons Flex [™]	48 samples with 1- and 8-channel pipette configuration 96 samples with 96-channel pipette configuration

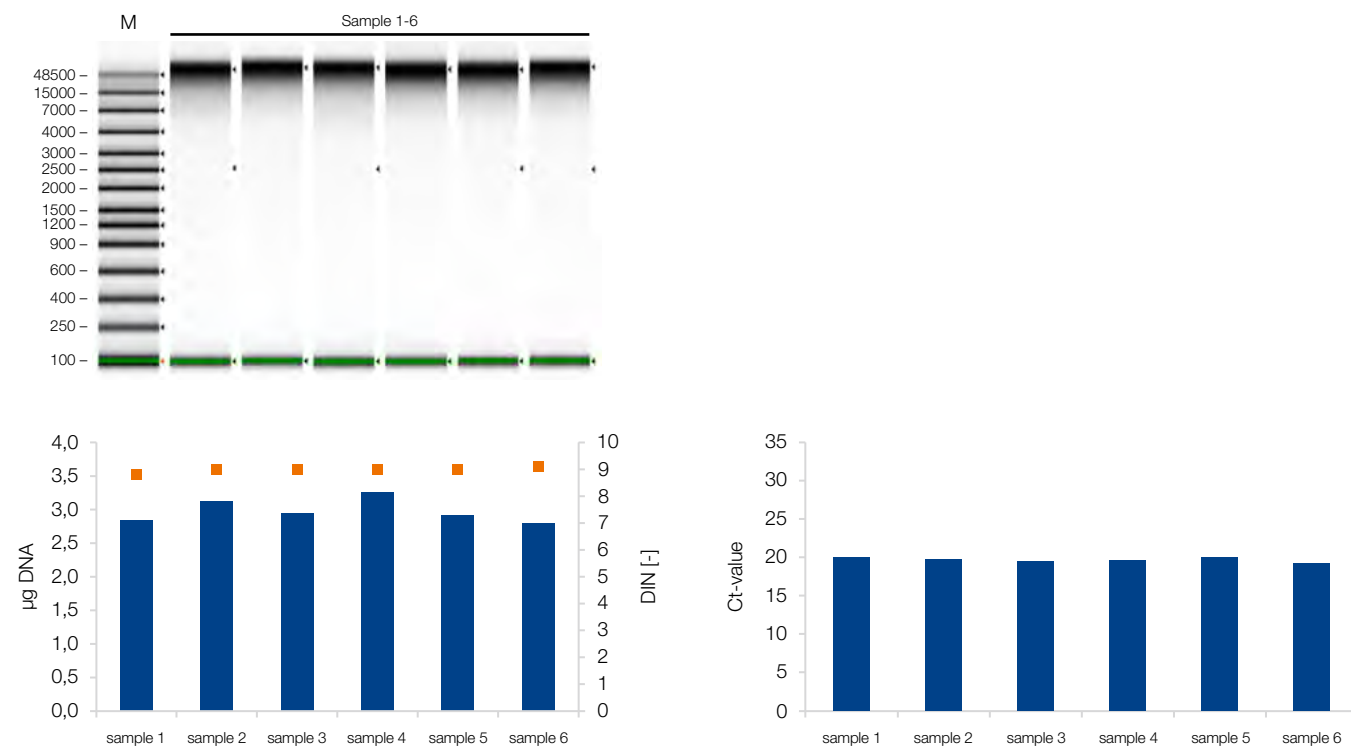
Opentrons Flex [™]	
Technology	Automated liquid handling platform equipped with electronic pipettes, Heater-Shaker and Magnetic Block (further modules are available for different applications).
Sample numbers	1 – 96 samples
Deck position	Configurable platform with 11 deck slots + trash + 4 slots for staging tips and labware
Pipetting volume	Flex 1-Channel Pipettes (5 – 1000 µL) Flex 8-Channel Pipettes (5 – 1000 µL) or Flex 96-Channel Pipette (5 – 1000 µL)

Material and Methods

The NucleoMag® Tissue kit employs a method for isolating nucleic acids based on the reversible adsorption of nucleic acids to paramagnetic NucleoMag® B-beads under specific binding conditions. Tissue samples of up to 20 mg or cell quantities of up to 1×10^6 are combined with Proteinase K and Lysis Buffer T1. The reversible binding of nucleic acids to paramagnetic beads is facilitated by adjusting with Binding Buffer MB2. Following

magnetic separation, NucleoMag® B-Beads undergo washing with Wash Buffer MB3 and MB4 to eliminate contaminants and salts. Subsequent air drying or a brief MB5 washing step results in the elution of highly pure nucleic acids in elution buffer MB6. All pipetting steps and magnetic bead separations were carried out by the Opentrons Flex™.

Application Data



DNA extraction from HeLa cells

Highly pure DNA was extracted from 2.4×10^5 HeLa cells using the NucleoMag® Tissue kit on the Opentrons Flex system. Purified DNA quality was evaluated using TapeStation® for DIN (DNA Integrity Number; orange squares) and size distribution (virtual gel image), revealing consistently high-quality DNA with average DIN values of 9.0 ± 0.09 . These findings illustrate the effectiveness of utilizing the NucleoMag® Tissue kit in conjunction with the Opentrons Flex™ system to consistently isolate high-molecular-weight DNA from HeLa cells.

Reliable qPCR performance of isolated DNA

DNA extraction was conducted from 2.4×10^5 HeLa cells utilizing the NucleoMag® Tissue kit on the Opentrons Flex system. Subsequent qPCR analysis (depicted by blue bars) used the PowerTrack™ SYBR Green Master Mix, with IDT-designed primers targeting a 190 bp region of the genome, beta-2-microglobulin. The qPCR results indicate robust detection of the target amplicon across all tested samples, affirming the suitability of the purified nucleic acids for various common enzyme-based downstream applications.

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
Opentrons Flex	Automated platform for scaling up and fully automating magnetic bead-based	1 – 48 samples	991 – 00120
Nucleic Acid Extraction Workstation	nucleic acid extraction	1 – 96 samples	991 – 00121

NucleoMag® is a registered trademark of MACHERY NAGEL (contact: automation-bio@mn-net.com); Opentrons Flex™ is a registered trademark of Opentrons Labworks, Inc.; TapeStation automated electrophoresis system is a registered trademark of Agilent

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