



NucleoMag[®] Tissue

Flexible magnetic bead based DNA purification from a broad range of samples on the MultiEX 032

Application benefits

Experience fast and flexible nucleic acid purification with the NucleoMag[®] Tissue kit and the MultiEX 032 system, featuring:

- Verified methods ensuring a reliable automated purification process
- Consistent recovery of total DNA with high reproducibility in both yield and purity
- Increasing throughput capability, processing up to 32 samples in parallel
- No programming or complex setup required: Verified and pre-installed methods available.

Keywords

Total DNA, nucleic acid extraction, automated DNA purification, tissue, cell culture, genotyping, mouse, phylogenetics, magnetic beads, magnetic rod system, laboratory protocol optimization



MultiEX 032

Scripts are pre installed and biologically verified on the MultiEX 032 workstation.

Introduction

Effective isolation of genomic DNA from cells or tissue samples is crucial for subsequent molecular biological applications in life science and applied testing laboratories. Molecular biology labs require a reliable method to obtain pure and high quality DNA for their downstream analyses, such as genotyping, sequencing, parental and husbandry testing or clinical research.

MACHEREY-NAGEL has developed the NucleoMag[®] Tissue kit, which utilizes magnetic beads for the rapid and automated purification of genomic DNA from animal and human cells and tissue samples. This kit is not only flexible in the sample type but also scalable in sample number and designed to be compatible from small to large scale automation platforms. The resulting DNA is of high purity, integrity and overall quality, suitable for use directly in qPCR, NGS, blotting or various enzymatic reactions.

This application note demonstrates the automated purification of genomic DNA from mammalian tissue samples as well as eukaryotic cells using the MultiEX 032 automatic magnetic separation device. An optimized protocol for using the MultiEX 032 with the NucleoMag[®] Tissue kit was pre-verified and is directly available for easy automation. Simply lyse your sample, pipette the buffers into the plate and start the automated nucleic acid extraction by using the MultiEX touch screen to select the protocol. Automation does not need to be complicated. It is meant to make lab work easy and achieve the highest data integrity.

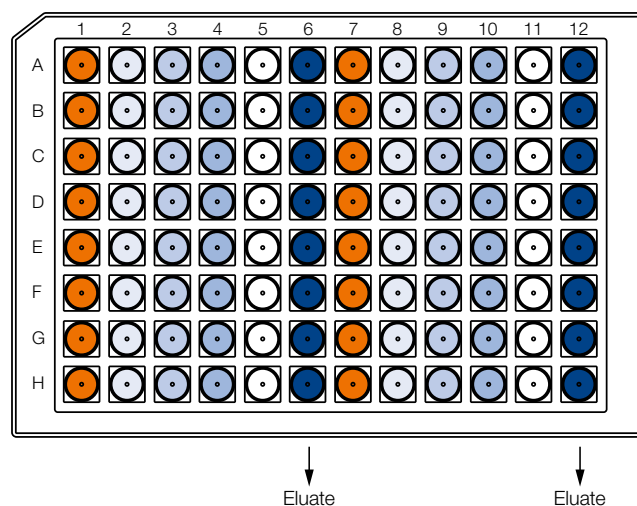
NucleoMag [®] Tissue	
Technology	Magnetic beads
Sample material	Animal or human tissue and cells
Target molecules	total DNA
Elution volume	50 – 100 µL
Fragment size	~300 bp – approx. 50 kbp
Sample numbers on MultiEX 032	32 samples with 2 plates and 4 tip combs
Processing time	Approx. 30 min (excluding lysis)

MultiEX 032	
Technology	Automated magnetic rod system
Sample number	1 – 32 samples
Deck positions	Two plate positions and 4 rows of magnetic rods
Capacity	Volume per well: 50 µL to 1000 µL
Size / footprint	349 x 325 x 390 mm (width x depth x height)
Usage	Ready to use verified scripts
Ease of Use	10-inch color touch screen
Contamination Control	Built-in UV lamp for disinfection
Advantages	Fast automated processing for higher efficiency and reliability

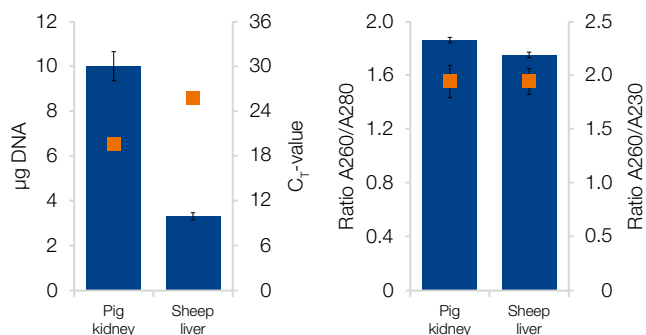
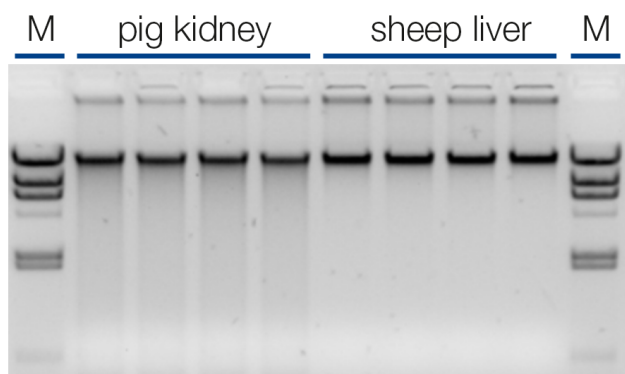
Material and Methods

The NucleoMag[®] Tissue kit DNA isolation starts by lysing the samples. This is achieved by either performing a mechanical lysis, which was performed via a syringe needle in case of the four dilutions of HeLa-cells or an enzymatic lysis in case of the 20 mg tissue samples via incubation with Proteinase K and Lysis Buffer T1. After clarifying the lysate via centrifugation, the plate is filled according to the layout to the right and placed on the MultiEX 032 which fully automatically performs the DNA purification through a predefined order of mixing and magnetic separation. Nucleic acids bind reversibly to the paramagnetic beads when combining 225µL lysate, 360µL Binding Buffer MB2 and 24µL NucleoMag[®] B-Beads in column 1 ●. Column 2 & 3 contain 600µL Wash Buffers MB3 ● and MB4 ● to remove contaminants and salts while the 900µL of Buffer MB5 ● in column 4 do serve the removal of ethanol. Highly pure nucleic acids are eluted in 50 – 200µL Elution Buffer MB6 ● in column 6.

Plate Layout

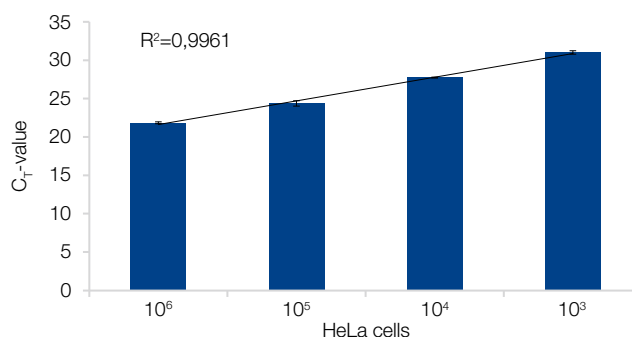
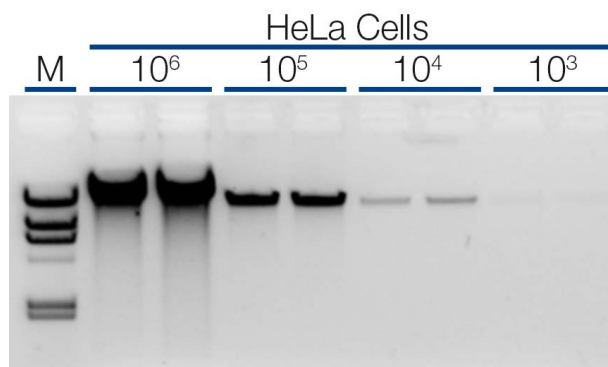


Application Data



DNA extraction from 20mg tissue samples

DNA extraction was conducted from 20mg pig kidney and sheep liver using the NucleoMag[®] Tissue kit on MultiEX 032 system. High DNA quality and integrity was visualized via gel electrophoresis (1% TAE-gel) shown on the upper picture, revealing consistently high-molecular DNA. Below the photometrically evaluated yield (blue bars) is shown alongside the C_T-values (orange squares) that were obtained via qPCR, targeting a conserved region of the mammalian beta-actin locus. This PCR-analysis was conducted using the SensiFast[™] probe Lo-ROX kit from BioLine on an Applied Biosystems[®] 7500 Real-Time PCR System. Next to this the purity ratios A260/A280 (blue bars) and A260/A230 (orange squares) demonstrate the reliability and consistency of the NucleoMag[®] Tissue kit and the MultiEX 032 system when performing automated DNA isolations from a variety of tissue samples.



DNA from a series of cell culture concentrations

DNA extraction from a 1:10 dilution series from a HeLa cell culture, starting with 10⁶ cells and ending with only 10³ cells was carried out on the MultiEX 032 system using the NucleoMag[®] Tissue kit. High DNA quality and integrity is shown via gel electrophoresis (1% TAE-gel, top). The qPCR analysis in the bar graph reveals that even in the lowest concentration the DNA could be detected clearly, showing the consistent high DNA recovery of the NucleoMag[®] Tissue kit across all four dilutions from high input numbers of one million cells all the way to just 1000 cells. The reliability is further underlined by a very good R² of 0.996. qPCR analysis, targeting a highly conserved part of the beta-actin gene was conducted with the BioLine SensiFast[™] probe Lo-ROX kit on an Applied Biosystems[®] 7500 Real-Time PCR System.

Ordering information

Product	Specifications	Pack of	REF
NucleoMag [®] Tissue	Flexible magnetic bead based isolation of DNA from a multitude of tissue samples, including buffers and magnetic beads. (Plastics are robot specific and need to be purchased separately)	96, 384 or 2304 preps	744300.1 / .4 / .24
96-Deep-Well plates	96-Deep-Well plates for processing of NucleoMag [®] kits with magnetic rod systems	25 pieces	744955
MultiEX 032	Magnetic rod system for bead based automated nucleic acid purification	1 – 32 samples	*

NucleoMag[®] is a registered trademark of MACHEREY-NAGEL (contact: automation-bio@mn-net.com); Applied Biosystems[®] is a registered trademark of Applied Biosystems.
*For more detailed information, please reach out to your local distributor
