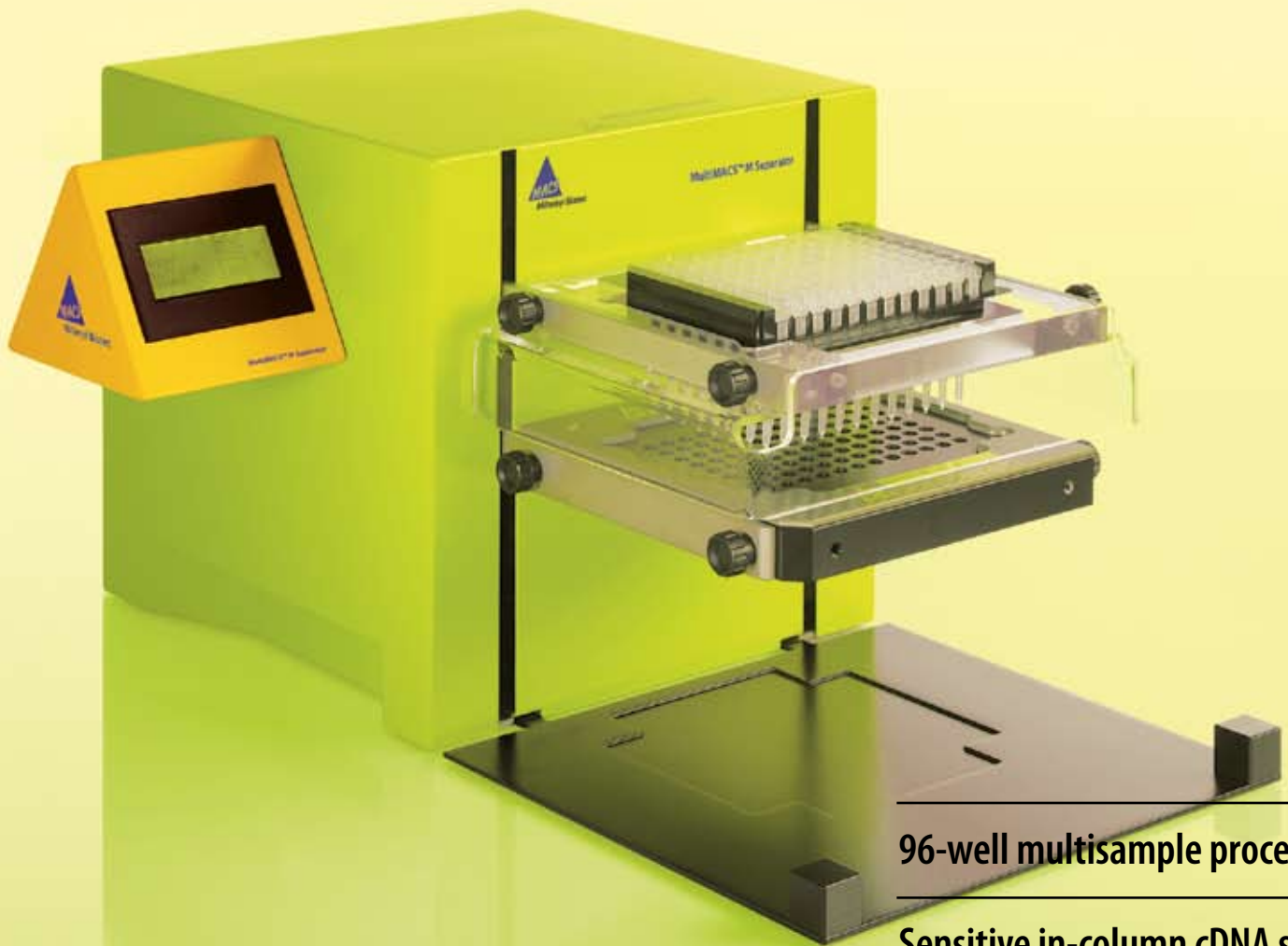




Miltenyi Biotec

Rapid, multisample biomolecule isolation & processing

MultiMACS™ M Separator



96-well multisample processing

Sensitive in-column cDNA synthesis

Rapid protein isolation

Easy isolation of viable viruses

Robotic integration

Flexibility in magnetic biomolecule isolation

One instrument for manual or fully-automated processes



Figure 1: Easy manual operation of the MultiMACS M96 Separator via the touchscreen

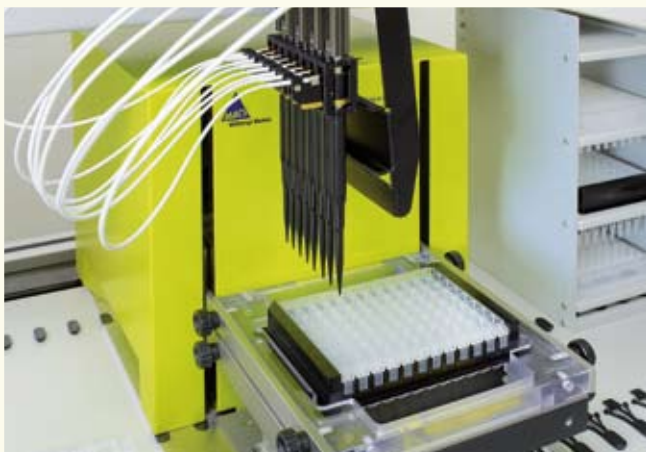


Figure 2: Automated use of the MultiMACS M96 Separator in a pipet robot

The MultiMACS™ M Separator family

The MultiMACS M Separator family is composed of the **MultiMACS M96 Separator** and **MultiMACS M96thermo Separator** — instruments that easily upscale Miltenyi Biotec's MACS® Technology for molecular applications to a higher throughput format. Both instruments perform efficient biomolecule isolation, with the MultiMACS M96thermo Separator also providing precise enzymatic reactions of isolated molecules directly in the column via a heatable magnet.

The family at a glance

- Small benchtop instruments
- Parallel processing of up to 96 samples
- Manual or robotic operation (fig. 1 and fig. 2)
- Reliable and convenient data
- Heatable magnet on the MultiMACS M96thermo Separator allows enzymatic reactions of isolated molecules

One instrument for a scope of applications:

Nucleic acid research

- mRNA isolation and in-column cDNA synthesis

Protein research

- Purification of epitope-tagged proteins
- (Co-)Immunoprecipitation of proteins
- Protein isolation via biotinylated capture probes
- In-column enzymatic reactions at 37 °C or 42 °C

Virus research

- Isolation of infectious viruses particles such as HIV-1



Figure 3: μ MACS Anti-GFP MicroBeads



Figure 4: Multi-96 Columns enable efficient small-scale isolation of biomolecules with MACS[®] MicroBeads

MACS[®] Technology for biomolecule isolation

The recognized standard in cell separation is applied to biomolecule isolation for fast and sensitive isolation of mRNA, cDNA, proteins or viruses.

How MACS Technology works

Superparamagnetic μ MACS[™] MicroBeads (fig. 3) are added to the cell lysate and instantly bind to their target. The magnetically labeled target molecules are isolated and purified in Multi-96 Columns (fig. 4) positioned within the magnetic field of the MultiMACS M Separator. Pure target molecules are eluted after thorough washing.

How you benefit from MACS[®] Technology for biomolecule isolation

Fast

45 minutes for 96 mRNA samples and less than two hours for 96 protein isolations.

Highly sensitive

Due to fast reaction kinetics of 50-nm small MicroBeads.

High specificity

Due to low rate of background binding of MicroBeads and usage of proven binding moieties.

One-step mRNA isolation & cDNA synthesis

Manual or fully-automated 96-well PCR sample preparation at its best

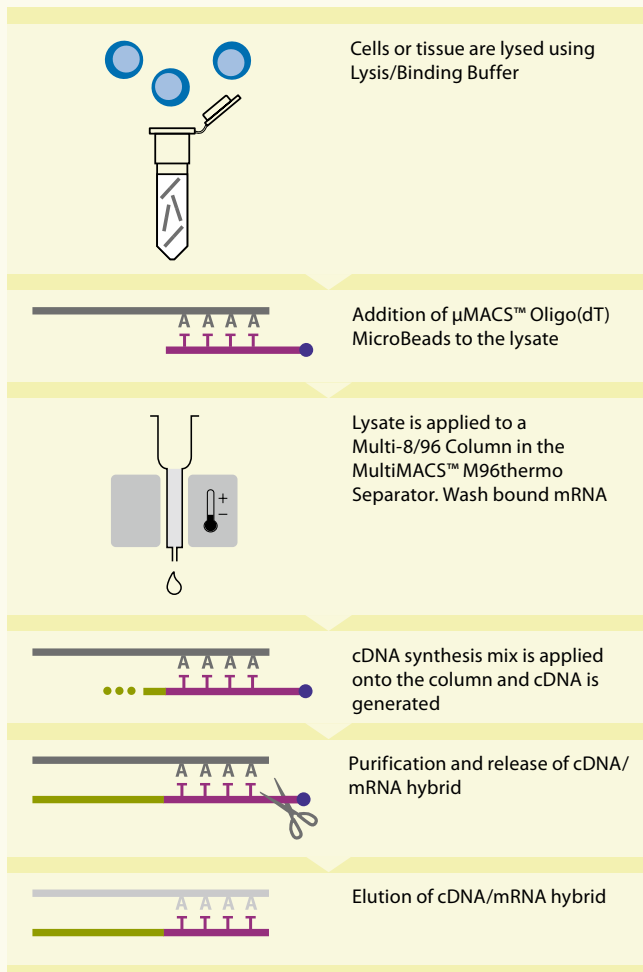


Figure 5: Principle of MACS Technology for mRNA isolation and cDNA synthesis

High-purity mRNA from small sample amounts

The **MultiMACS™ mRNA Isolation Kits** are precisely developed for the MultiMACS M96 Separator to provide scientists with a robust and reproducible 96-well mRNA isolation procedure based on MACS® Technology. Genomic DNA contamination is below the limit of detection¹ and 96 mRNA samples can be processed within just 45 minutes.

1) Mack *et al.* (2007) *Cytometry* 71: 404–409.

Save time and material — perform cDNA synthesis instantly

Instead of eluting purified mRNA from the Multi-96 Columns, first-strand cDNA can be synthesized directly in the same column. By employing the **MultiMACS cDNA Synthesis Kits** and the MultiMACS M96thermo Separator with a heatable magnet, PCR templates can be prepared in the same column. It takes less than 2 hours to obtain pure cDNA from 96 samples.

“We usually process several dozen samples. Now, with the MultiMACS M96thermo Separator we can do parallel cDNA synthesis from up to 96 samples and save a lot of time and costs.”

Prof. C. Wolfrum, ETH Zurich, Switzerland

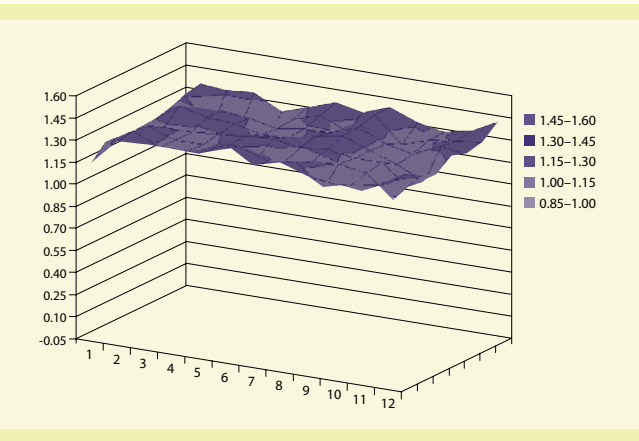


Figure 6: Quantification of 96 mRNA samples purified from 100 µg total RNA extracted from mouse liver using the MultiMACS mRNA Isolation Kit. Average yield: 1.3 µg mRNA; coefficient of variation of 96 samples: 5.2%

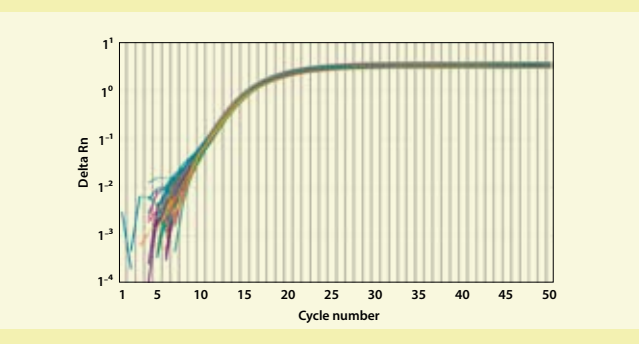


Figure 7: Quantitative RT-PCR of 96 samples purified from 100 µg total RNA extracted from mouse liver using the MultiMACS cDNA Synthesis Kit. After reverse transcription, quantitative amplification of the housekeeping gene GAPDH was performed. Mean cycle threshold: 12.0; coefficient of variation: 2.0%

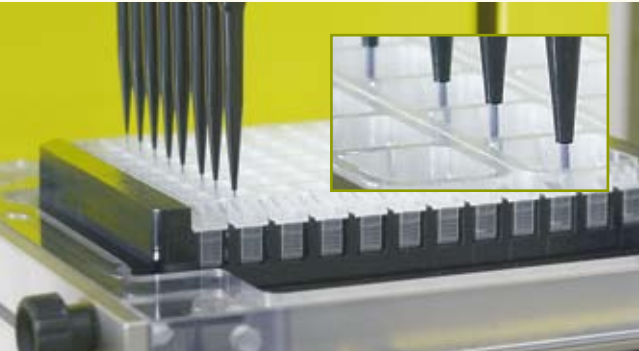


Figure 8: Contact-free pipetting for reduced risk of cross-contamination

High reliability and reproducibility

The MultiMACS M96thermo Separator and kits enable exceptionally low variation in the yield and quality of isolated mRNA and synthesized cDNA as shown in figures 6 and 7.

Contact-free pipetting eliminates cross-contamination

A hallmark of MACS Technology is the gravity-driven column flow. This not only circumvents centrifugation steps but also enables contact-free pipetting as there is no need to remove buffers after washing steps. The risk of cross-contamination of adjacent columns is thus minimized (fig. 8).

Accelerate your protein research

Protein isolation from 96 samples in less than 2 hours

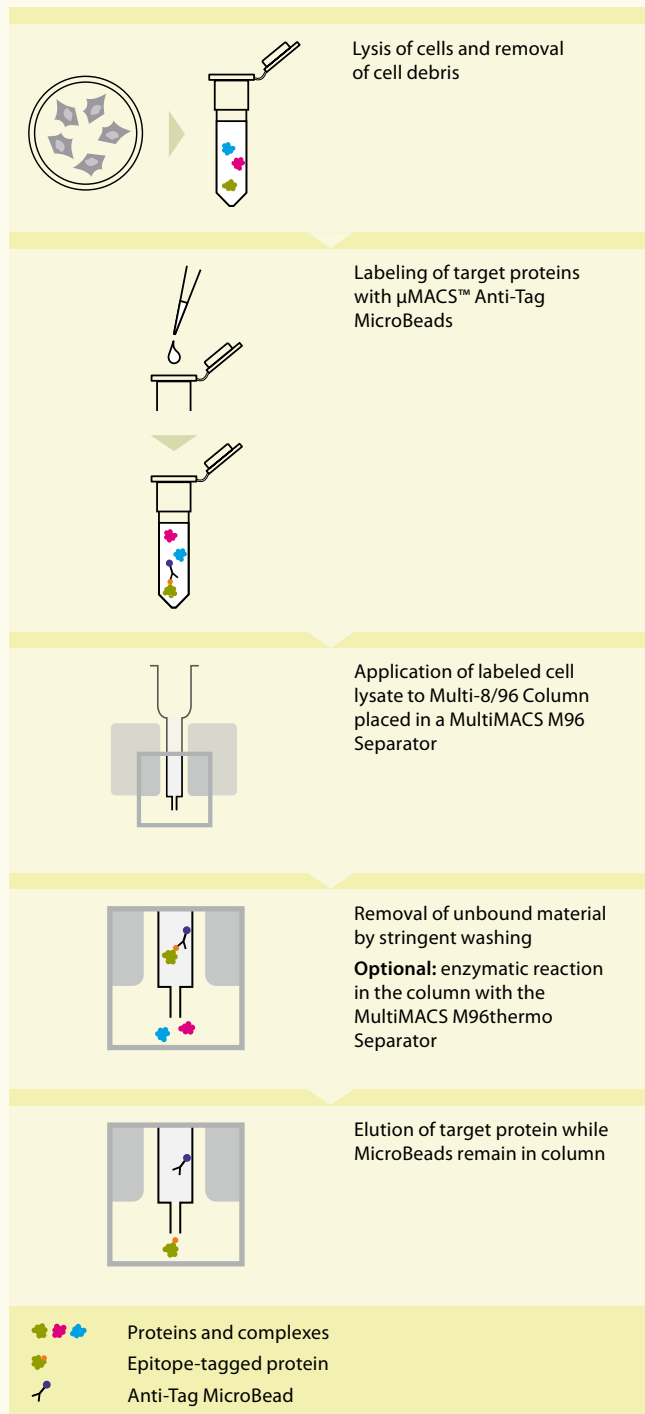


Figure 9: Principle of MACS Technology for isolation of epitope-tagged proteins

Manual or automated 96-well isolation of proteins

In combination with one of the **MultiMACS™ Protein Isolation Kits** the MultiMACS M96 Separator can also be used for manual or automated 96-well isolation of proteins².

The main principle of MACS® Technology for protein isolation is illustrated in figure 9.

²Hubner, Mann *et al.* (2010) JCB 189: 739–754.

How you benefit from MACS® Technology for protein isolation

Time-saving

In less than 2 hours you can isolate proteins with high purity from up to 96 samples in a single run.

Manual or fully-automated approaches

Effortless robotic integration enables precise liquid handling and fully automated sample processing².

Reliable data

Precise and accurate sample handling ensures reproducible results that you can rely on.

No cross-contamination

Contact-free pipetting ensures that cross-contamination is completely eliminated (refer to page 5).

Flexible

Numerous reagent kits are available for a wide selection of protein applications.

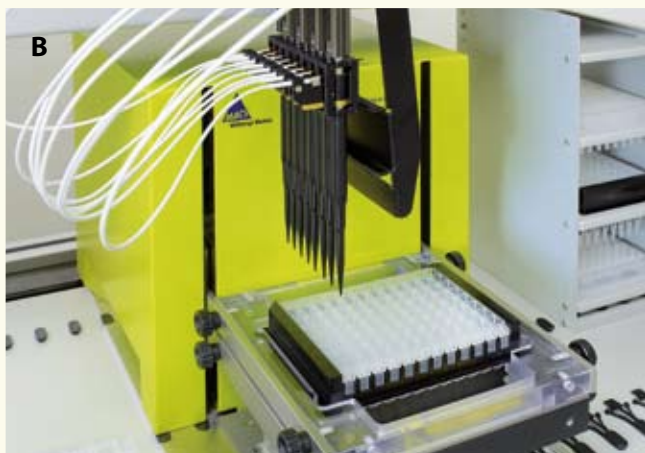


Figure 10: Automated use of MultiMACS M96 Separator in a pipet robot
A: The robotic arm places the waste plate in the right position.
B: The pipetting arm applies samples and buffers to the columns.

Isolate any protein with ease

MultiMACS™ Protein Isolation Kits are available for:

Isolation of epitope-tagged proteins

Anti-Tag MicroBeads are coupled to high-quality monoclonal antibodies ensuring specific isolation of proteins tagged with:

- **GFP** (green fluorescent protein)
- **GST** (glutathione S-transferase)
- **HA** (hemagglutinin)
- **His** (histidine)
- **c-myc**

(Co-)Immunoprecipitation of proteins

The extremely small MicroBeads of the MultiMACS™ Protein A/G Kits ensure very fast reaction kinetics: formation of the labeled immune complex is generally completed in 30 minutes — no need for overnight incubation.

Chromatin immunoprecipitation (ChIP)

ChIP protocols also benefit from the higher specificity and lower rate of background binding of Protein A/G MicroBeads.

Isolation of proteins via biotinylated capture probes

The MultiMACS Streptavidin Kits efficiently isolate any molecule interacting with a biotinylated capture probe.

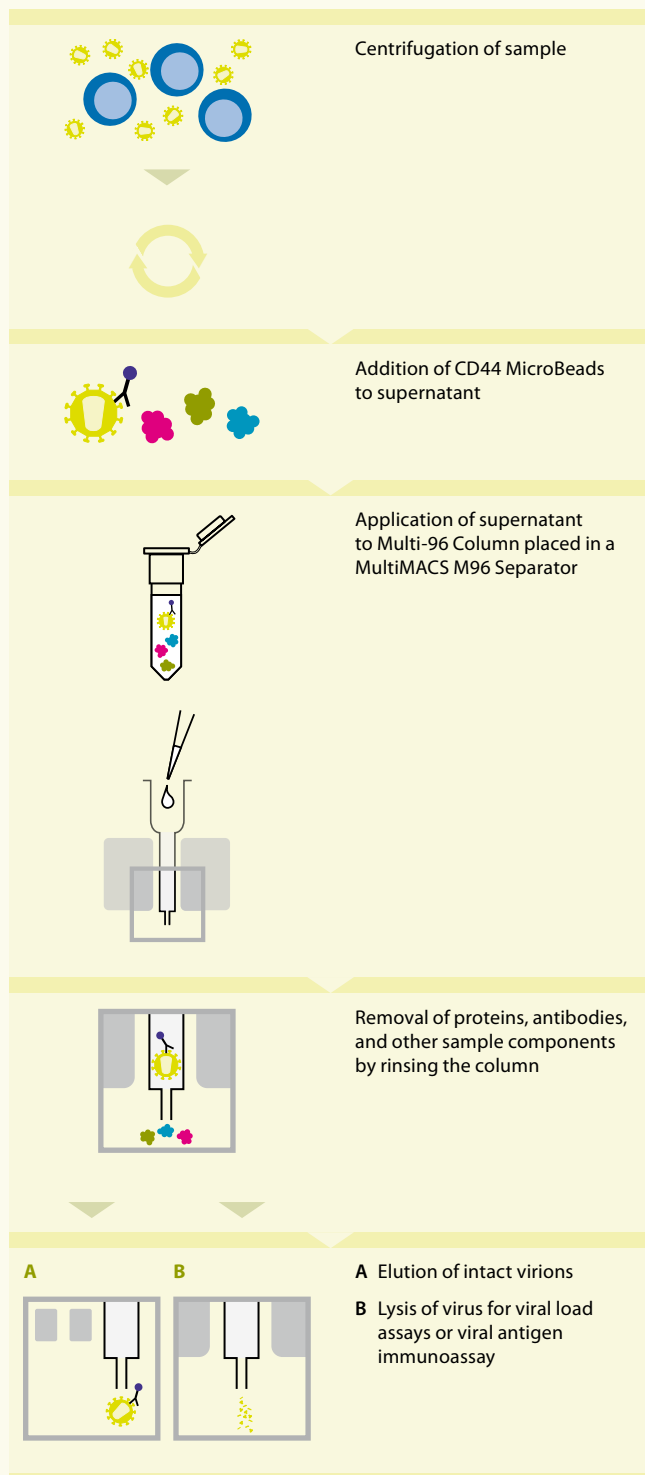
“Small magnetic beads in combination with a flow-through column system gave the best results for bait sequence coverage by MS, detection of interaction partners, and robustness while keeping background proteins at acceptable levels.”

“The small beads provide a large surface to volume ratio and consequently favorable binding kinetics as well as short incubation times ...”

Hubner and Mann *et. al.* (2010) JCB 189: 739–754.

Standardize 96-well isolation of infectious HIV

Isolate infectious HIV virions in less than 1 hour



Rapid magnetic virus isolation

In combination with the **MultiMACS™ VitalVirus Isolation Kits**, the MultiMACS M96 Separator accelerates your HIV research.

You can isolate infectious HIV-1 virions from up to 96 samples in less than 1 hour.

The MicroBeads are coupled to a monoclonal antibody recognizing CD44 on human hematopoietic cells. CD44 is incorporated into HIV particles when the virus buds from the host cell membrane.

Infectious virions can be isolated without extensive sample processing from plasma, serum, or other bodily fluids, such as, cerebral spinal fluid, breast milk, seminal fluid, or cervical lavage.

Figure 11: Principle of HIV-1 isolation with MACS® Technology

Complete customer care

Trusted worldwide customer support from Miltenyi Biotec



Support when and where it's needed

Miltenyi Biotec is committed to providing outstanding customer care worldwide.

Sales support

All Miltenyi Biotec technical sales consultants have a background in life sciences and can offer advice on:

- Experimental design
- Troubleshooting experimental protocols
- Choosing the appropriate Miltenyi Biotec product

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Worldwide technical support can be accessed by:

- e-mail or telephone: simply ask technical support a question
- an online discussion forum
- a list of frequently asked questions
- a comprehensive library of datasheets and protocols

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Training resources are adapted to the individual:

- hands-on training offered onsite or at dedicated Miltenyi Biotec facilities
- online multimedia presentations
- webinars provide real-time access to a Miltenyi Biotec expert

Visit www.miltenyibiotec.com/support for more details.





Technical specifications

Instrument specifications of the MultiMACS M Separator

Instrument specifications

MultiMACS M Separator

Size	230 × 435 × 230 mm
Weight	11 kg
Conditions of operation	15 – 30 °C with 0 – 85% humidity at a maximum altitude of 2000 m
Input voltage	100 – 240 VAC, ~ 50/60 Hz
Current	3.5 A max.
Power consumption	200 W
Fuses	T3.15AH 250V, 5 × 20 mm
RS232-Interface (labeled "com")	Pin 1, 4, 6, 7, 8, 9 NC; Pin 2 RXD; Pin 3 TXD; Pin 5 GND
DC-Output	Module 1 24 VDC / 8 A; Module 2 24 VDC / 0.315 A

Order information

Place your order by fax, phone, or online !

Products	Capacity	Order no.
Isolation of epitope-tagged proteins		
MultiMACS c-myc Isolation Kit (12×8) ¹	96 isolations	130-094-250
MultiMACS c-myc Isolation Kit (4×96) ²	384 isolations	130-094-251
MultiMACS GFP Isolation Kit (12×8) ¹	96 isolations	130-094-252
MultiMACS GFP Isolation Kit (4×96) ²	384 isolations	130-094-253
MultiMACS GST Isolation Kit (12×8) ¹	96 isolations	130-094-254
MultiMACS GST Isolation Kit (4×96) ²	384 isolations	130-094-256
MultiMACS HA Isolation Kit (12×8) ¹	96 isolations	130-094-255
MultiMACS HA Isolation Kit (4×96) ²	384 isolations	130-094-257
MultiMACS His Isolation Kit (12×8) ¹	96 isolations	130-094-258
MultiMACS His Isolation Kit (4×96) ²	384 isolations	130-094-259
(Co-)Immunoprecipitation of proteins		
MultiMACS Protein A Kit (24×8) ³	192 isolations	130-092-944
MultiMACS Protein G Kit (24×8) ³	192 isolations	130-092-946
MultiMACS Protein A Kit (4×96) ⁴	384 isolations	130-092-945
MultiMACS Protein G Kit (4×96) ⁴	384 isolations	130-092-947

Products	Capacity	Order no.
Protein isolation via biotinylated capture probe		
MultiMACS Streptavidin Kit (12×8) ⁵	96 isolations	130-092-948
MultiMACS Streptavidin Kit (4×96) ⁶	384 isolations	130-092-949
mRNA isolation and cDNA synthesis		
MultiMACS mRNA Isolation Kit (12×8) ⁷	96 reactions	130-092-520
MultiMACS mRNA Isolation Kit (4×96) ⁸	384 reactions	130-092-519
MultiMACS cDNA Synthesis Kit (12×8) ⁹	96 reactions	130-094-410
MultiMACS cDNA Synthesis Kit (4×96) ¹⁰	384 reactions	130-094-408
HIV-1 isolation		
MultiMACS VitalVirus HIV Isolation (12×8) ¹¹	96 isolations	130-092-806
MultiMACS VitalVirus HIV Isolation (4×96) ¹²	384 isolations	130-092-807

Product	Components	Order no.
MultiMACS M Separators		
MultiMACS M96 Separator		130-091-937
MultiMACS M96thermo Separator		130-094-534
MultiMACS Accessories		
Multi-8 Columns, molecular (12×8)	12 Multi-8 Columns, 1 MultiColumn Frame, 1 Deep Well Block, 1 Microtiter Plate	130-092-444
Multi-96 Columns, molecular (4×96)	4 Multi-96 Columns with MultiColumn Frame, 4 Deep Well Blocks, 4 Microtiter Plate	130-092-445
Multi-8 Filters	12 Multi-8 Filters	130-092-546
Multi-8 Filters and Frames	1 Multi-8 Filter Frame, 12 Multi-8 Filters	130-092-548
Multi-96 Filters	4 Multi-96 Filters	130-092-547
Deep Well Block, 2.5 mL	6 Deep Well Blocks, 2.5 mL	130-092-549

¹ Kit contains 3×2 mL μMACS Anti-Tag MicroBeads, Equilibration Buffer, 12× Multi-8 Columns, 1 MultiColumn Frame, 1 Deep Well Block, 1 Microtiter Plate.

² Kit contains 5×4.6 mL μMACS Anti-Tag MicroBeads, Equilibration Buffer, 4× Multi-96 Columns, 4 Deep Well Blocks, 4 Microtiter Plates.

³ Kit contains 5×2 mL μMACS Protein A or G MicroBeads, 24× Multi-8 Columns, 2 MultiColumn Frame, 2 Deep Well Block, 2 Microtiter Plate.

⁴ Kit contains 10×2 mL μMACS Protein A or G MicroBeads, 4 Multi-96 Columns, 4 Deep Well Blocks, 4 Microtiter Plates.

⁵ Kit contains 5×2 mL μMACS Streptavidin MicroBeads, Equilibration Buffers, 12 Multi-8 Columns, 1 MultiColumn Frame, 1 Deep Well Block, 1 Microtiter Plate.

⁶ Kit contains 20×2 mL μMACS Streptavidin MicroBeads, Equilibration Buffers, 4 Multi-96 Columns, 4 Deep Well Blocks, 4 Microtiter Plate.

⁷ Kit contains 3×1 mL Oligo(dT) MicroBeads, all needed buffers, 12 Multi-8 Columns, 1 MultiColumn Frame, 1 Deep Well Block, 1 Microtiter Plate.

⁸ Kit contains 4×3×1 mL Oligo(dT) MicroBeads, all needed buffers, 4 Multi-96 Columns, 4 Deep Well Blocks, 4 Microtiter Plates.

⁹ Kit contains 3×1 mL Oligo(dT) MicroBeads, 96 cDNA synthesis enzyme mixes, all needed buffers, 12 Multi-8 Columns, 1 MultiColumn Frame, 1 Deep Well Block, 1 Microtiter Plate.

¹⁰ Kit contains 4×3×1 mL Oligo(dT) MicroBeads, 4×96 cDNA synthesis enzyme mixes, all needed buffers, 4 Multi-96 Columns, 4 Deep Well Blocks, 4 Microtiter Plates.

¹¹ Kit contains 5× μMACS VitalVirus HIV Isolation Reagents, 12 Multi-8 Columns, 1 Deep Well Block, 1 Microtiter Plate.

¹² Kit contains 20× μMACS VitalVirus HIV Isolation Reagents, 4 Multi-96 Columns, 4 Deep Well Blocks, 4 Microtiter Plates.



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