Applied Cells

# Improving cell isolation for advanced **STEM CELL** therapy development

# Transforming CD34+ Cell Isolation

Multipotent hematopoietic stem cell (HSC) therapy has become increasingly popular due to its wide range of health benefits and research potential.[1] The CD34 protein is considered the primary marker of HSCs and hematopoietic progenitor cells, as it is expressed on the majority of these cells.[2]

The current process used to isolate CD34+ HSCs is time-consuming and typically results in considerable loss of cells. The MARS® platform uses a more efficient method, eliminating multiple centrifugation steps, while yielding high purity HSCs.


***Dive into a world where innovation meets simplicity.***

### AUTOMATED PRECISION

MARS® brings the next level of automation. **Automatic 2x or 3x separation** promises unrivaled consistency and a seamless user experience, setting us apart from the laborious manual methods.

### UNRIVALED RECOVERY AND PURITY

Break away from traditional limitations. Our technology guarantees **high cell purity** that far outstrip conventional methods. When it comes to **recovery**, we persistently outperform - even after intensive serial runs.

### EFFICIENT, ECONOMICAL AND REUSABLE

With **reusable and cleanable fluidics**, MARS® dramatically reduces the per sample running cost. Preset cleaning protocols offer unprecedented efficiency, enabling multiple sample runs without the need for fluidics replacement.

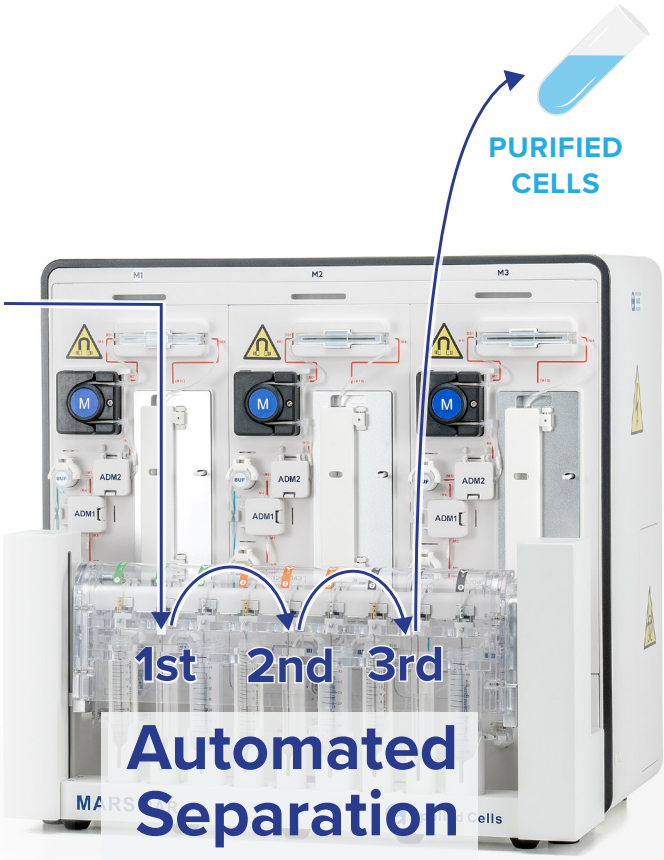
1. Lee JY, Hong SH. Hematopoietic Stem Cells and Their Roles in Tissue Regeneration. Int J Stem Cells. 2020 Mar 30;13(1):1-12.
2. Ivanovic Z. Hematopoietic stem cells in research and clinical applications: The “CD34 issue”. World J Stem Cells. 2010 Apr 26;2(2):18-23.

# Automated, Simplified Isolation Process

1. Prepare an MNC suspension
2. Resuspend MNC to a desired concentration
3. Add cocktail, incubate
4. Add beads, incubate
5. Dilute and run

Delve into the MARS® platform's seamless cell isolation experience. Our intuitive workflow guarantees high purity and superior cell recovery rates with minimal hands-on time.

Automated one- to three-pass cell enrichment ensures efficiency at every step, together with our matrix-free isolation, cost-effective consumables, and reusable fluidics. Plus, swiftly re-run samples through the magnetic channel, amplifying your operational efficiency.



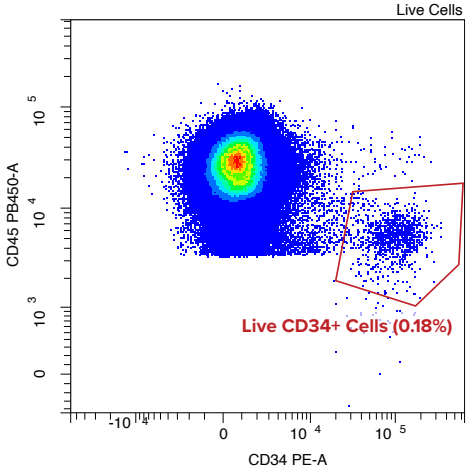

2022 WINNER TheScientist TOP 10 INNOVATIONS

Simple CD34+ hematopoietic stem cell enrichment from Human Cord Blood Mononuclear Cells process using MARS® Bar.

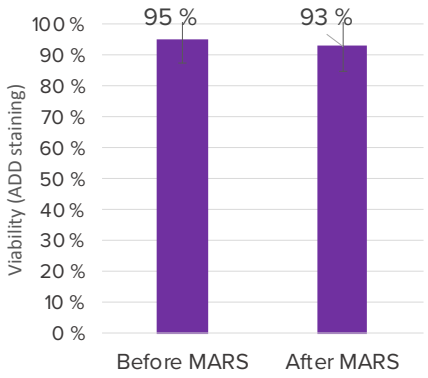
# CD34+ Cell Isolation from Cord Blood MNC

**The MARS® platform provides a convenient and cost-effective solution for isolating CD34+ cells from CBMCs.** By utilizing an **automated** CD34+ enrichment process, the workflow enhances purity while ensuring **reproducibility**, **high recovery, high viability** of the isolated cells.

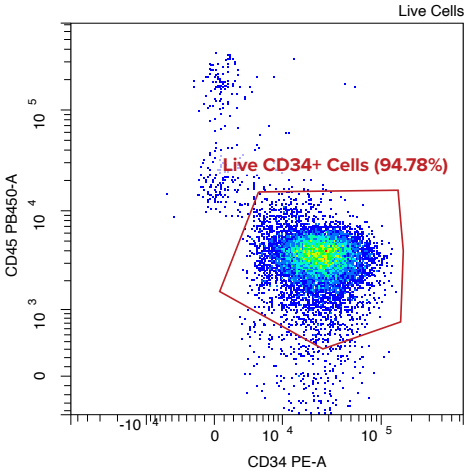
## BASELINE



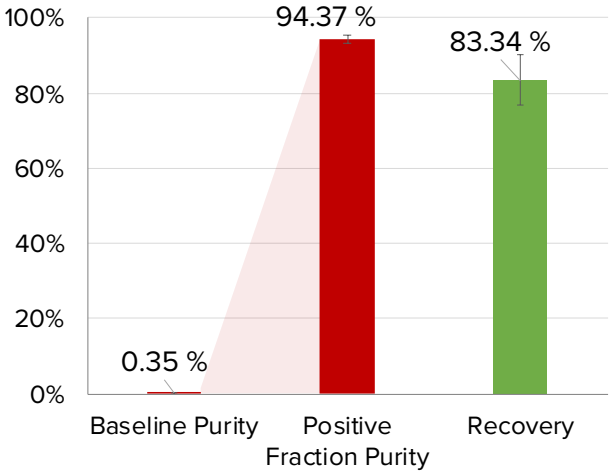

## VIABILITY




## POSITIVE after serial separation




## SUMMARY




Example data (Baseline and Positive): Gating: the 'Live CD34+ Cells' gate includes 7AAD negative, CD34+ and CD45+ dim cells (platelets, red blood cell debris and aggregates excluded); Summary: n=3 experiments

**MARS® isolation enhances the yield of CD34+ cells, achieving 5 to 8 times more than the column method, especially when starting with samples that have cell counts below 1%. This efficiency not only cuts down the relative cost of cell isolation but also provides an increased volume of cells suitable for biobanking and ensures a richer stem cell base for successful cell therapy outcomes.**

*The information provided by our user is intended for general guidance only. We do not guarantee its accuracy, completeness, or suitability for any particular purpose. We disclaim any responsibility or liability for any decisions made or actions taken based on this information.

# Cost-Effective, Time-Efficient

Discover a transformative approach to cell separation with the MARS® platform. Not only can you reduce assay costs by 60%, but you can also cut experiment time by nearly 50% for a 50 mL input sample. Elevate your workflow and efficiency instantly!

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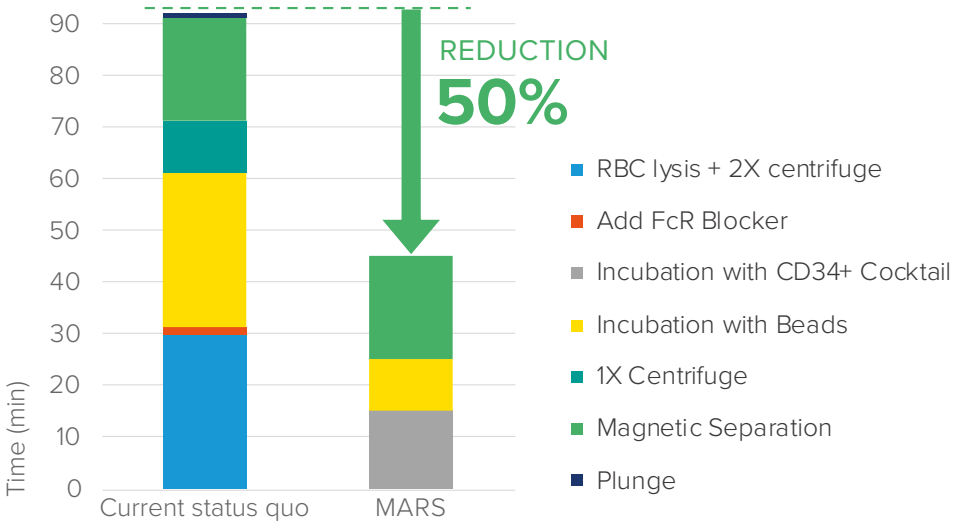
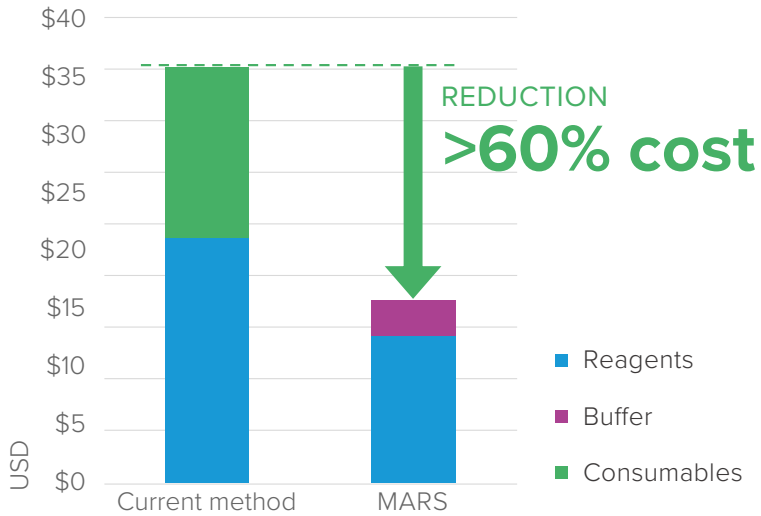
## After Ficoll, the time reduced from 90 min to 45 min




## Cost to process 70 million cells (~50ml cord blood)




## A VARIETY OF INPUT SAMPLES

PERIPHERAL BLOOD
CORD BLOOD

BONE MARROW

APHERESIS AND LEUKOPAKS

MNCS AND PBMCS

# Faster, Simpler, Better

Experience an unparalleled ease in cell separation with the MARS® platform. Cut down both overall and hands-on time by nearly an hour, and follow a seamless workflow: from labeling protocol straight to two (or optionally three) MARS® Immunomagnetic isolation runs. Dive into efficiency today!

## MARS® workflow reduced the number of steps from 8 to 4

| **Current workflow**<br>example for 100M cells isolation | | **MARS® workflow**<br>example for 100M cells isolation | |
|---|---|---|---|
| CORD BLOOD | | CORD BLOOD | |
| MNC ISOLATION BY FICOLL DENSITY GRADIENT CENTRIFUGATION | 50 min | MNC ISOLATION BY FICOLL DENSITY GRADIENT CENTRIFUGATION | 50 min |
| RBC LYSIS | 10 min | INCUBATE WITH ANTI CD34 COCKTAIL | 15 min |
| 2x CENTRIFUGATION | 20 min | INCUBATE WITH MAGNETIC BEADS | 10 min |
| ADD FCR BLOCKER | 1 min | RUN A SERIAL PROGRAM | 20 min |
| INCUBATE WITH ANTI CD34 MICROBEADS | 30 min | ISOLATED CD34+ CELLS | TOTAL: **95 min** |
| CENTRIFUGATION | 10 min | | |
| MANUAL COLUMN 3x WASH | 20 min | | |
| PLUNGE | 1 min | | |
| ISOLATED CD34+ CELLS | TOTAL: **142 min** | | |

# MARS® Bar Specifications

| | MARS® BAR Flex | MARS® BAR BIBO |
|---|---|---|
| **SAMPLE** | | |
| **Magnetic Cell labeling** | ✓ | ✓ |
| **Containment** | 5 mL, 15 mL, 50 mL tubes | Bags |
| **Sample processing** | 1 sample each module Max 3 samples in parallel | 1 sample by 3 parallel channels |
| **Sample types** | | |
| • Whole blood | ✓ | ✓ |
| • Apheresis | ✓ | ✓ |
| • Leukopaks | ✓ | ✓ |
| • Frozen PBMC's | ✓ | ✓ |
| • Bone marrow | ✓ | ✓ |
| • Dissociated Tissue | ✓ | |
| **REAGENTS & CONSUMABLES** | | |
| **Isolation buffer** | MARS® MAG buffer | |
| **Isolation reagents** | | |
| • MARS® MAG lines (RUO) | ✓ | |
| • MARS® Ingenuity Line (RUO, GMP) | ✓ | ✓ |
| **Fluidics** | Open-end tubing sets<br>Cleaning and sterilization protocols | Closed tubing set (Gamma radiated) |
| **CELL ISOLATION** | | |
| **Positive isolation** | ✓ | ✓ |
| • Direct from Whole Blood & Leukopak | ✓ | ✓ |
| **Depletion** | ✓ | ✓ |
| **Positive & negative tubing sets** | Same (program enabled change) | |
| **OPERATIONS** | | |
| **Speed** | Protocol dependent; 0.5-6 mL/min | |
| Column-free **MARS® MAG in-flow technology** | ✓ | ✓ |
| **Separation channels** | Flex-BIBO scalable | |
| **Redundancy** | 3x Modules | |
| **Time to assemble tubing set** | <5 min* | <15 min* |
| **Time to initiate isolation** | <2 min | < 8 min |
| **Typical time to process 1e9 cells** | <20 min (3 modules, single batch) | <30 min (25e6/mL) |
| **Capacity** | 0.5 - 45 mL per module | 20 mL - 1L \| Expandable >1L |
| **Max total cells processable** | No practical limit | |
| **Batched isolation** | ✓ | ✓ |
| **Operation in bio-safety hood** | ✓ | N/A |
| **Additional configuration** | Serial program** | N/A |
| **SOFTWARE** | | |
| **Pre-programmed protocols** | ✓ | ✓ |
| **Adjustable & lockable parameters** | ✓ | ✓ |
| **Tiered user rights** | ✓ | ✓ |
| **Logged UI events** | ✓ | ✓ |
| **Encrypted logs** | ✓ | ✓ |
| **INSTRUMENT** | | |
| **Dimensions** | 20.5" W x 16.5" D x 19.75" H<br>52cm W x 41 cm D x 50 cm H | 20.5" W x 16.5" D x 28" H<br>52cm W x 42cm D x 74cm H |
| **Weight** | 62 lb / 28 kg | 59 lb / 27 kg |

For research use only. Not for use in therapeutic or diagnostic procedures. The MARS® Bar instrument and tubing set are designed, manufactured and tested under quality system certified to ISO 13485. Not a medical device.

* With standard training ** Customizable on demand

# Contact us


North America & International
Applied Cells HQ

3350 Scott Blvd Bldg 6
Santa Clara, CA 95054, USA
Tel. 1-800-960-3004 EXT 1

**www.appliedcells.com | info@appliecells.com**

THE NETHERLANDS
**BIOKÉ**
Tel. +31 71 720 0220
info@bioke.com
www.bioke.com

SINGAPORE
**SciMed Pte Ltd**
Tel: (65) 6779 3388
sales@scimed.com.sg
www.scimed.com.sg

INDIA
**Biotron**
Tel: +91-22-6140 6400
info@biotronhealthcare.com
www.biotronhealthcare.com

CHINA
**Nanjing Applied Cells Technology Co., Ltd.**
Tel. +85 15032370112
Sales @appliedcells.com
www.appliedcells.com

ITALY
**Euroclone S.p.A.**
Tel. +39 02 38.19.51
info@euroclone.it
www.euroclone.it

SOUTH KOREA
**DAON Biosciences, Inc**
Tel +82 2 575 6227
www.daonbs.com/

POLAND
**Medianus Pharma S.A.**
Tel: +48 12 665 31 31
medianus@medianus.net
medianus.net

CANADA
**DMarkbio**
Tel 416-297-8220
orders@dmarkbio.com

JAPAN
**Biomedica Solutions Inc**
Tel 072-641-8140
info@bio-ms.com
www.bio-ms.com

CZECH REPUBLIC, POLAND, SLOVAKIA, HUNGARY, ROMANIA
**Accela s.r.o.**
Tel: +420 210 323 421
accela@accela.eu
www.accela.eu

ISRAEL
**Danyel Biotech**
Tel 1-800-711-911
danyel@danyel.co.il
www.danyel.co.il

SPAIN AND PORTUGAL
**Izasa Scientific**
Tel: +34 900 810 061
izasa@izasascientific.com
www.izasascientific.com/es

SWITZERLAND AND LIECHTENSTEIN
**Bucher Biotec AG**
Tel. +41 (0)61 269 1111
info@bucher.ch
www.bucher.ch


**Learn more**

https://appliedcells.com/target-cell-isolation/stem/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