



Sartorius MSC Optimization and Characterization Solution

Data Sheet Collection

SARTORIUS

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Ambr[®] 250 Modular



Technical Specification

Scope

System combines 2, 4, 6 or 8 "Easy-Connect" single-use bioreactors, automated platform, bioreactor controller and flexible system control software.

Recommended Working Space

System dimensions including monitor, excluding chiller and external system options.

Ambr[®] 250 Modular 2 vessel system

Width	Depth	Height
88.5 cm	45.5 cm	60 cm
35"	18"	24"

Ambr[®] 250 Modular 4 vessel system

Width	Depth	Height
127 cm	45.5 cm	60 cm
50"	18"	24"

Ambr® 250 Modular 6 vessel system

Width	Depth	Height
165.5 cm	45.5 cm	60 cm
65"	18"	24"

Ambr® 250 Modular 8 vessel system

Width	Depth	Height
204 cm	45.5 cm	60 cm
80"	18"	24"

System operating parameters

Agitation speed (standard)	150 - 4500 rpm
Agitation speed (wide range)	100 - 4500 rpm
Culture temperature	18 - 55°C ± 0.5°C
Post culture period chilling	6 - 8°C
Temperature shift rate	> 5°C per 30 mins
pH range	2.0 - 8.5
pH monitoring accuracy	± 0.02 pH units
DO (% air saturation) monitoring range	0 - 200%
DO monitoring accuracy	± 2% @ 100%
Maximum air or total gas flow	550 mL/min
Gas-flow monitoring accuracy	± 5% @ > 50 mL/min
Exhaust gas CO ₂ monitoring	0 - 20%
Exhaust gas CO ₂ monitoring accuracy	± 5% @ 5% CO ₂
Exhaust gas O ₂ monitoring range	0 - 50%
Exhaust gas O ₂ monitoring accuracy	± 2% @ 21% O ₂
Integrated pump design	Syringe pumps
Flow rates	0 - 20 mL/hr (viscosity dependent)
Pump dispense accuracy	± 5% @ >10 µL/hr
Integrated pumps per vessel	5
Peristaltic pumps per bioreactor	1
Number of 125 mL reservoirs per bioreactor	2
Number of 50 mL reservoirs per bioreactor	3

Note: All information is correct at time of publication, but Sartorius reserves the right to make alterations due to technical enhancements or other changes.

Maximum flow rate mL/min

Gases	Cell culture		Microbial	
	Sparge	Headspace	Gases	Sparge
Air N ₂	550	100	Air	550
O ₂	80	50	O ₂	120
CO ₂	75	50	N ₂	120

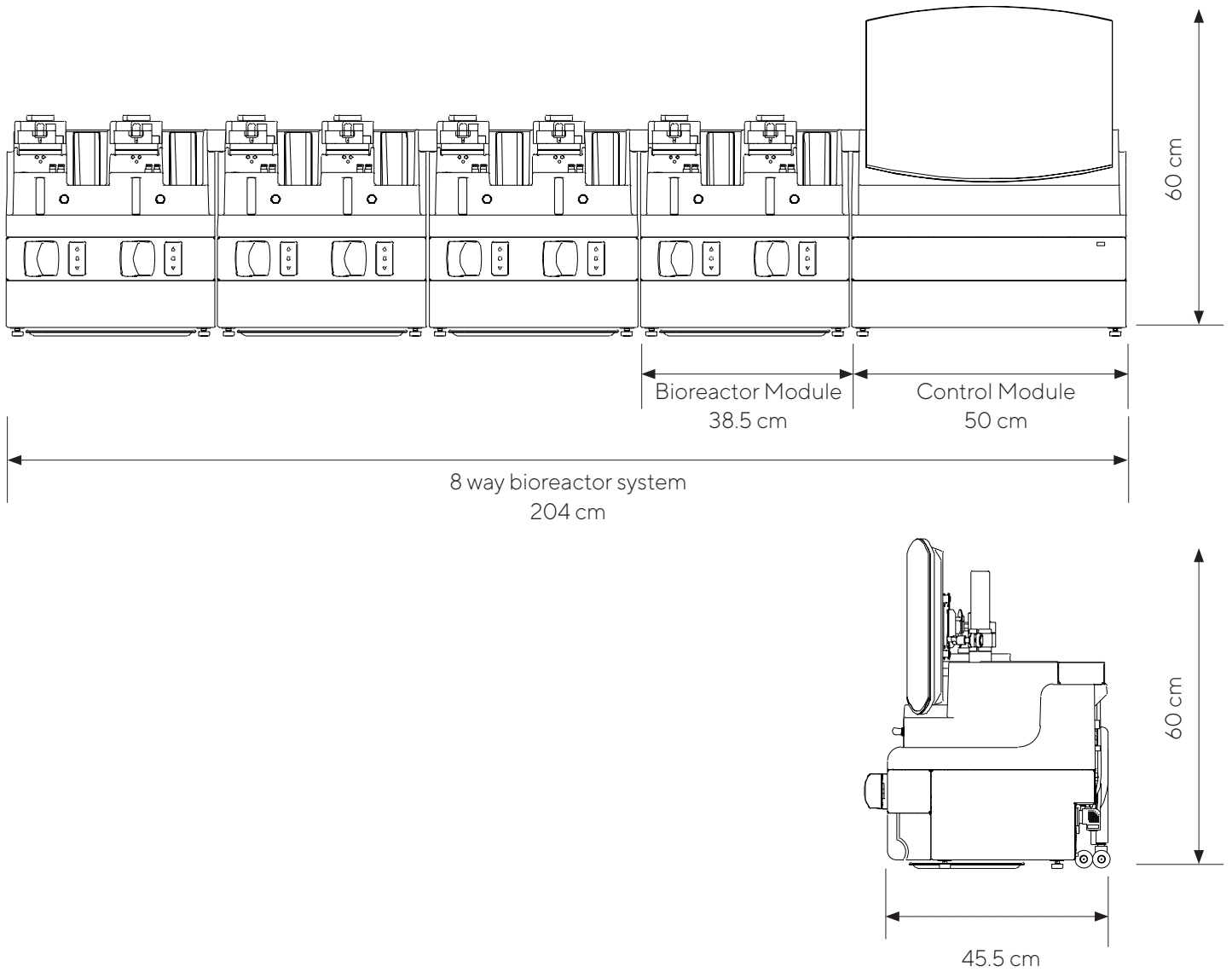
Bioreactor vessel general information

Construction material	Polycarbonate, polypropylene, polyethylene
Dimensions	Internal diameter 60 mm. Internal height 120 mm
Total volume	350 mL
Working volume	100 - 250 mL
pH monitoring technology	Single-use electrode
DO monitoring technology	Fluorescence based spot

Bioreactor vessel information

Bioreactor type	Cell culture	Cell culture	Microbial
Baffles	4	0	4
Number of impellers	2	1	2
Impeller type	Pitch blade	Elephant ear	Rushton turbine
Diameter	Ø26 mm	Ø30 mm	Ø20 mm
Power number	1.34	2.07	7.3
kLa	3.4/h @ 450 rpm, 200 mL water, 6 mL/min air	2.3/h @ 200 rpm, 200 mL water, 6 mL/min air	1780/h @ 4200 rpm, 250 mL water, 375 mL/min air
Maximum power input dependent on nature of culture	-	-	35.1 kW/m ³
Reynolds number	-	-	3.37 x 10 ⁴
Tip speed	-	-	4.71 m/s
Mixing time	-	-	0.642/s

Dimensions of Ambr[®] 250 Modular 8 vessel system



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MODDE[®]

Design of Experiments solution

Simplifying Progress

SARTORIUS

Create the knowledge you need more efficiently

The more efficient your Design of Experiments (DOE) solution, the faster you can get products to market. MODDE® is an innovative DOE solution from Sartorius Stedim Data Analytics. Its straightforward graphical interface and support for data analytics lets you interpret your results with confidence. With over 30 years of experience in data analytics, MODDE gives you the insight to set up your experiment and get it right from the start.

What does MODDE offer?

MODDE is a lot more than just DOE software. It also provides a quality analysis on your decisions and looks at the risks - warning you about critical settings and guiding you towards more robust conclusions. It will:

- Reduce the number of required experiments
- Guide you through the set-up of your experiment
- Provide confidence in your data handling
- Help you make better decisions
- Integrate with your systems
- Meet your quality goals

Who is using MODDE?

MODDE is helping companies in many different industries to design more effective experiments and create more effective strategies for tackling process problems. For instance:

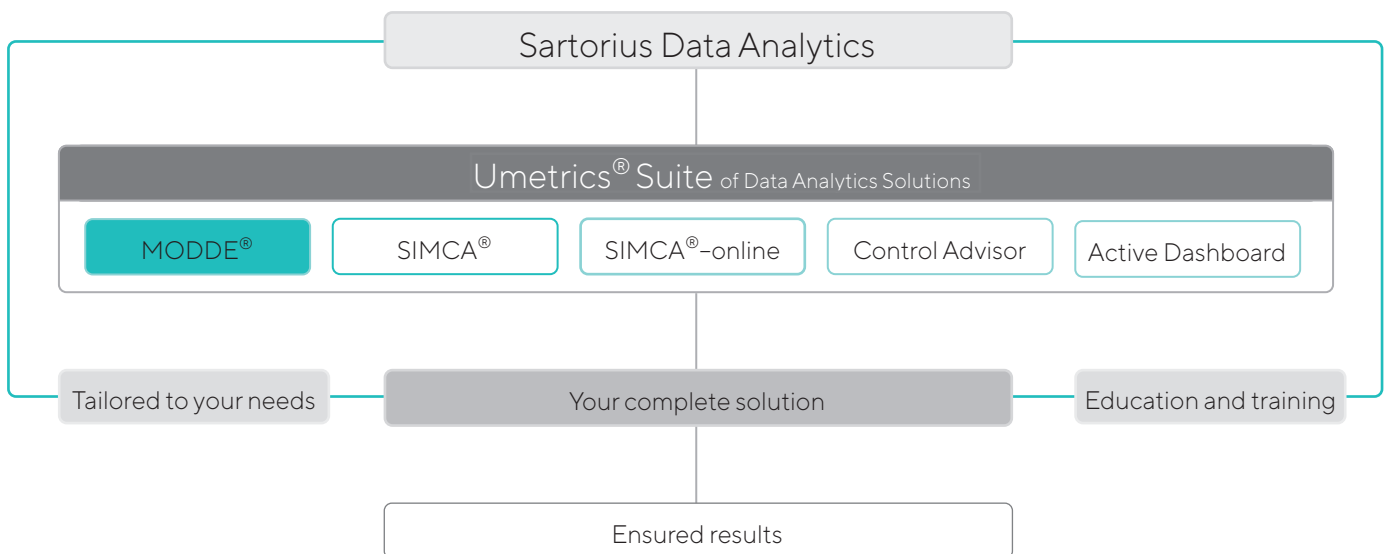
- In pharma and biopharma, there are a wide variety of aspects to consider when determining the correct tablet formulation. These include how the drug dissolves, its hardness and how it is administered, which can now be addressed with MODDE's advanced formulation DOE toolbox.
- In manufacturing there needs to be a careful balance between productivity and quality. MODDE helps producers use DOE to maximize production quality through applications like robust optimization - where MODDE has the best available tools.



MODDE at a glance:

- Automated analysis wizard
- Robust optimum identification
- Interactive setpoint analysis with risk estimate
- Design Space visualization
- Generalized subset designs
- Stability testing design setup

More than Software



Our complete solution includes everything you need through the whole process and provides results quickly.

As our customer, you'll have access to supporting documents, templates, training and consultation to address your specific business challenges. Our courses and webinars help over a thousand people every year develop expertise and confidence in data analytics.

“ The Umetrics® Suite simplifies the entire process of handling, analyzing and managing our data.

A complete suite for business growth

The Umetrics Suite is a family of proven data analytics solutions that work seamlessly together. Other software solutions in the Umetrics Suite are:

- SIMCA®
Multivariate Data Analysis Solution to help you see what others don't
- SIMCA®-online
Online – Real-time process monitoring to maintain product quality
- Control Advisor
Predictive capabilities to be able to forecast the output
- Active Dashboard
Interactive performance insight

These solutions give you control and confidence in your processes at every stage – from development to manufacturing.



Sartorius Data Analytics – Change a little. Grow a lot.

We help organizations grow. The Umetrics® Suite of Data Analytics Solutions helps you harness the wealth of data within your organization. Our expertise in data analytics can help you identify vital elements to improve the results of your research, development and manufacturing processes. With improved process understanding and more consistent product quality, you'll be able to reduce risk, get to market faster, and grow your business. Our complete solution encompasses software, training, support and project management. And as part of Sartorius, a global company with more than 7,000 employees, we give you the backing of an international presence.

Experience the benefits for your business today

Find out how our solutions can help your business to grow, whatever industry you are in.

Visit www.sartorius.com/umetrics for details or to download a free 30-day trial.

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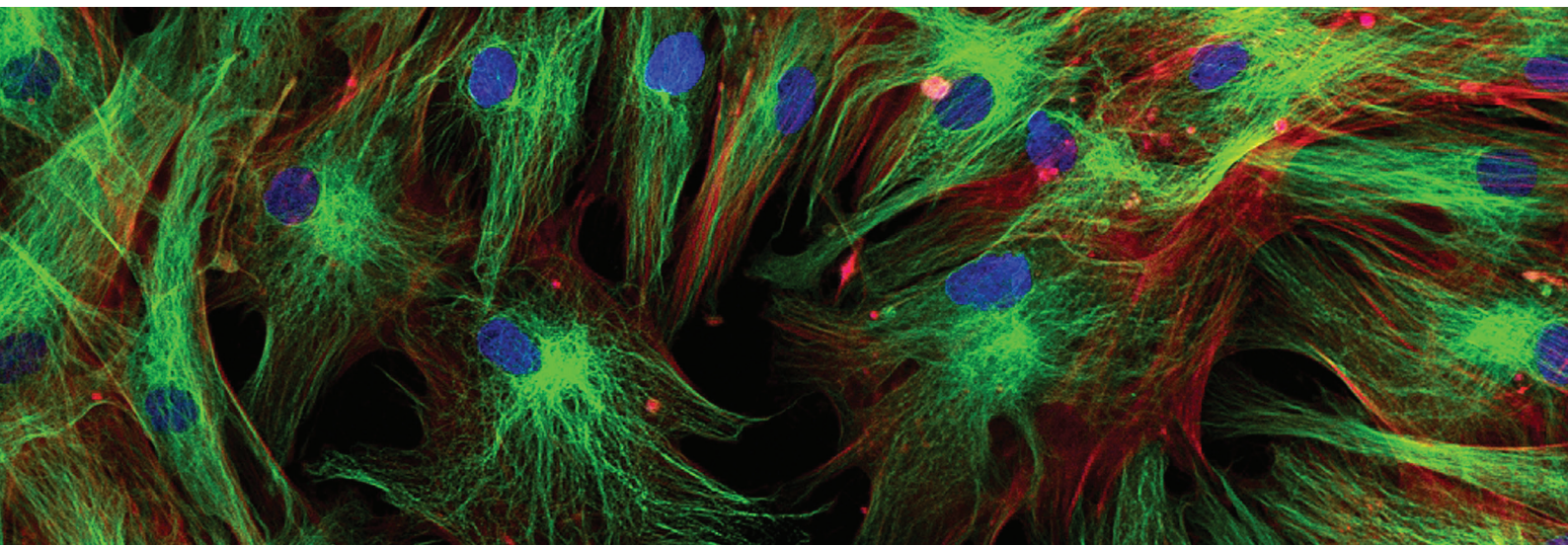


◀ www.sartorius.com/umetrics



NutriStem® MSC Culture System

A complete xeno-free, serum-free system for the growth and expansion of hMSCs



- **Defined, xeno-free, serum-free medium**
- **Superior proliferation of hMSCs**
- **Supports long-term growth and differentiation potential**
- **FDA Drug Master File**

Redefining stem cell excellence and advancing clinical applications

Defined, serum-free, xeno-free reagents are essential tools for all human mesenchymal stem cell (hMSC) research having potential clinical applications. The NutriStem® MSC Culture System includes defined reagents ideal for translational research use. hMSCs cultured in serum-free, xeno-free NutriStem® MSC XF Medium show superior proliferation and self-renewal potential in comparison to serum-containing media and other serum-free media. In addition, hMSCs maintain their proper fibroblast-like cell morphology, tri-lineage differentiation potential, and demonstrate normal hMSC marker profiles and karyotypic stability over long-term culture.

NutriStem® MSC XF Medium is designed for optimal growth and expansion of hMSCs derived from a variety of sources, including bone marrow (BM-hMSC), adipose tissue (AT-hMSC), Wharton's jelly (WJ-hMSC), placental tissue (PT-MSC), and umbilical cord matrix (UC-hMSC).

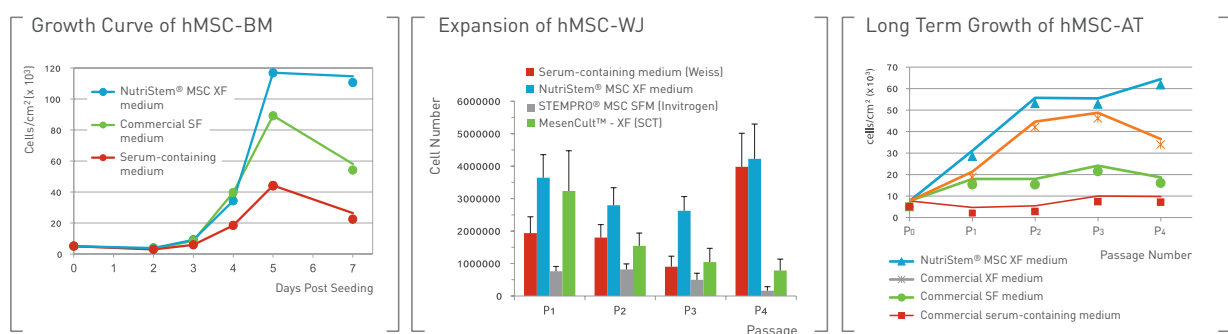
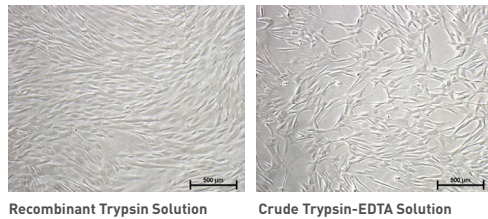


Figure 1: NutriStem® MSC XF Medium promotes superior proliferation and expansion of hMSCs over time as compared to other serum-free and serum-containing media.

MSC Attachment Solutions

- Xeno-free, purified human fibronectin/human fibrinogen
- Optimized for serum-free cultures
- For hMSC proliferation and differentiation



MSC Dissociation Solutions

- Ready-to-use, defined
- Recombinant trypsin solutions

NutriFreez™ D10 Cryopreservation Solution

- Chemically defined, animal component-free, protein-free
- Excellent cell attachment and viability

Figure 2: MSC Dissociation Solutions.

Recovery of BM-hMSC after dissociation with either Recombinant Trypsin Solution or Recombinant Trypsin-EDTA Solution and re-seeding on plates pre-coated with the MSC Attachment Solution and cultured in NutriStem® MSC XF Medium. Images were taken on Day 5 post-dissociation (100X).

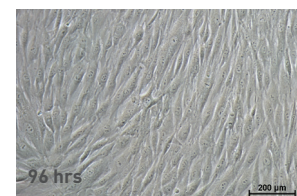
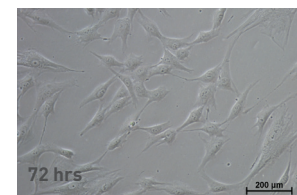
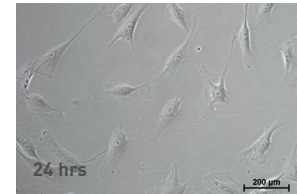
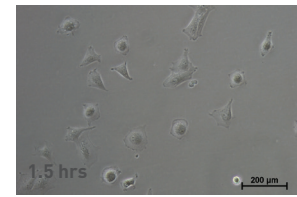


Figure 3: NutriFreez™ D10 Cryopreservation Medium. Images show the recovery of BM-hMSC after thawing. Cells were frozen using NutriFreez™ D10 Cryopreservation Medium, thawed, and re-seeded in NutriStem® MSC Medium. Images were taken at the indicated time points post-thawing (200X).

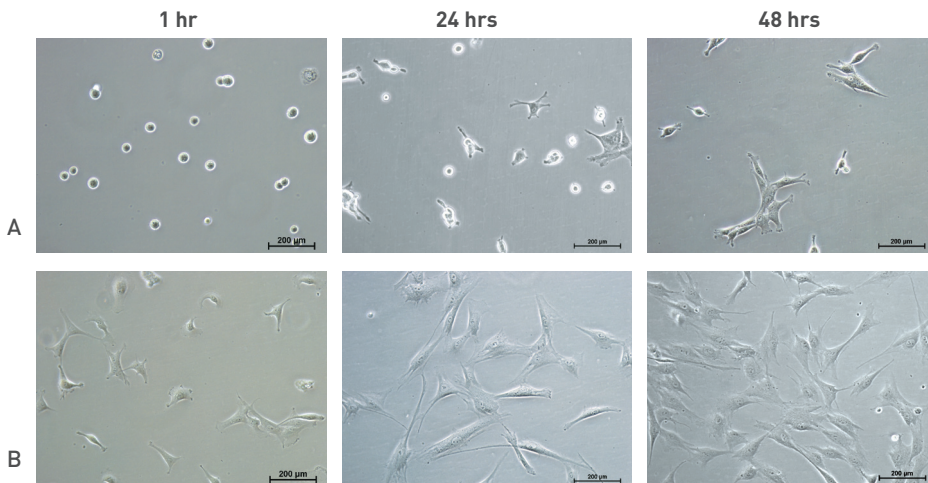


Figure 4: MSC Attachment Solutions. The use of MSC Attachment Solution greatly enhances BM-hMSC attachment and growth in culture. Cells in panel A images were cultured without MSC Attachment Solution. Cells in panel B were cultured with MSC Attachment Solution. Images were taken at the indicated time points post-seeding (200X).

Ordering Information

Cat. #	Product
05-200-1	MSC NutriStem® XF Basal Medium
05-201-1	MSC NutriStem® XF Supplement Mix
05-760-1	NutriCoat™ Attachment Solution
05-752-1	MSC Attachment Solution
05-713-1	NutriFreez™ D10 Cryopreservation Medium
03-078-1	Recombinant Trypsin Solution
03-079-1	Recombinant Trypsin-EDTA Solution
PLTGOLD100R	PLTGold® Human Platelet Lysate (Research-grade)
PLTGOLD100GMP	PLTGold® Human Platelet Lysate (Clinical-grade)
PLTGOLD100GMP-PI	PLTGold® Human Platelet Lysate (Pathogen Inactivated)
PLTMAX100R	PLTMax® Human Platelet Lysate (Research-grade)
PLTMAX100GMP	PLTMax® Human Platelet Lysate (Clinical-grade)

ALSO AVAILABLE

MSCgo™ Differentiation Media

A unique line of complete, serum-free, and xeno-free media for efficient and reproducible differentiation of hMSCs.

- MSCgo™ Osteogenic XF Medium
- MSCgo™ Rapid Osteogenic XF Medium
- MSCgo™ Chondrogenic XF Kit
- MSCgo™ Adipogenic XF Kit

How to Order

Biological Industries USA | T. 860.316.2702 F. 860.269.0596 | orders-usa@bioind.com

Biological Industries | T. 972.4.9960595 F. 972.4.9960631 | info@bioind.com

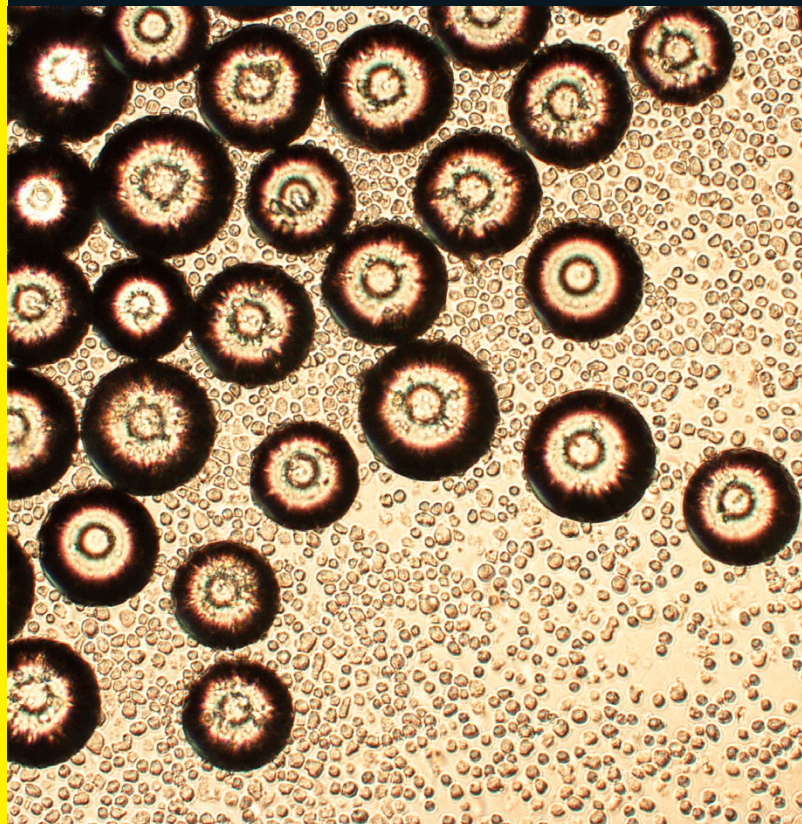
Culture of Excellence



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Microcarrier Products

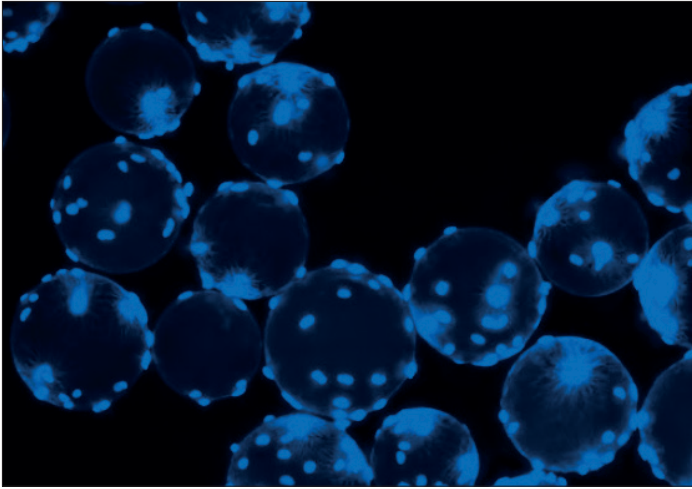
Simplifying adherent,
cell-based research and
manufacturing



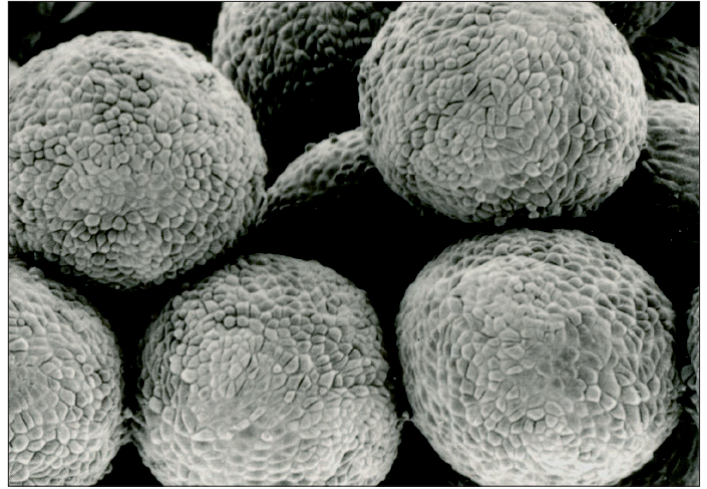
Product Information

Since its inception in 1984, SoloHill® has developed an extensive range of commercially available microcarrier products. By successfully combining cutting-edge research with high-quality manufacturing, SoloHill® not only offers excellent products but also provides valuable technical expertise to ensure optimal results. Our talented scientists are available to assist with product selection, process optimization, and technology transfer to end-user laboratories.

Microcarriers are tiny spheres that normally range from 90 to 300 microns in diameter. The relative density of microcarriers is close to water, which facilitates easy suspension in a cell culture medium. Their core material, surface chemistry, and coating promote attachment and growth of anchorage-dependent cells and influences the production of biologics in cell culture processes. A fundamental benefit of microcarriers is that they provide a large effective surface area with a relatively small footprint, allowing large-scale manufacturing of biologics for lower capital investment.



Human mesenchymal stromal/stem cells (hMSCs) growing on SoloHill® Microcarriers

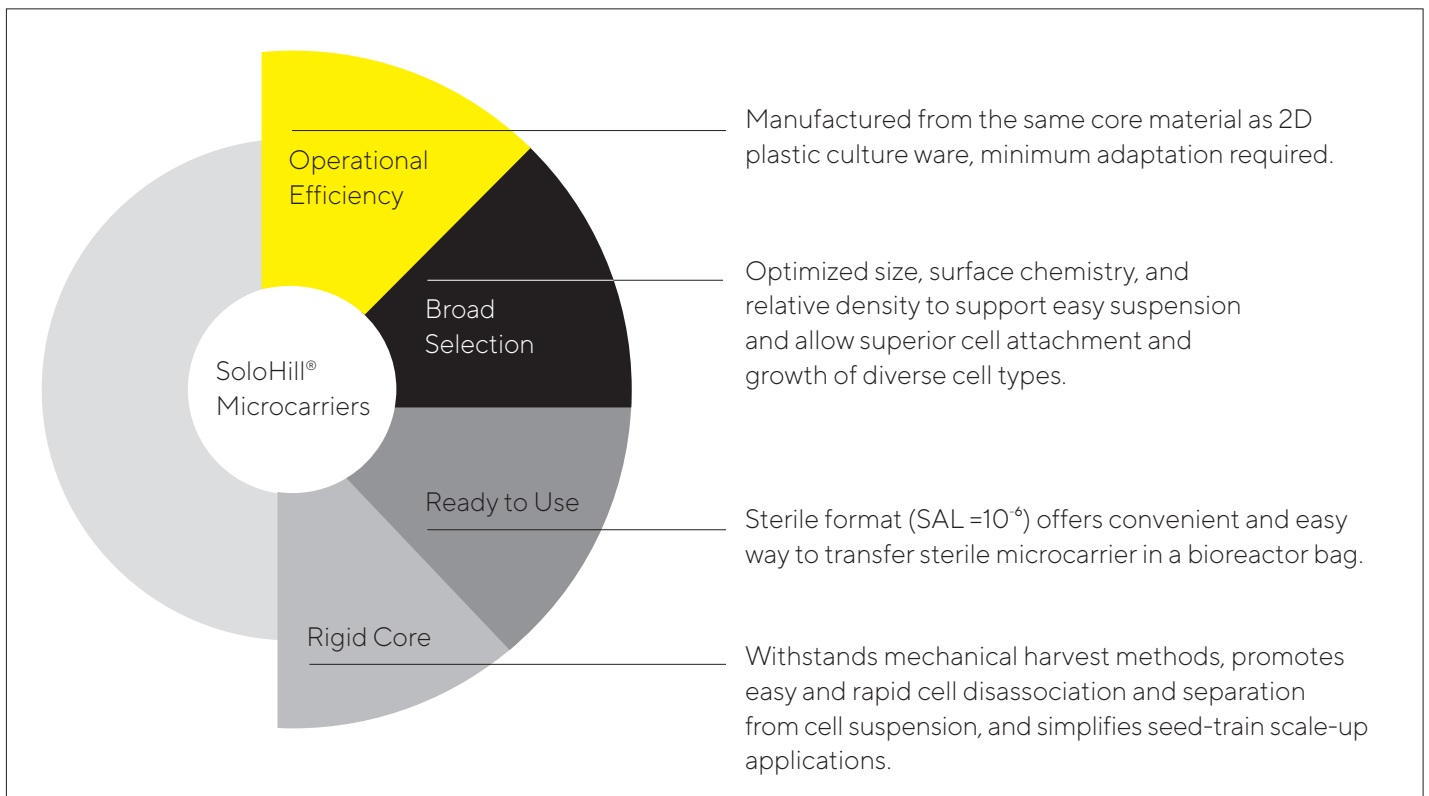


Scanning electron micrograph of Vero cells on SoloHill® Microcarriers

Benefits

Sartorius SoloHill® Microcarrier technology has many advantages for the large-scale production of high-quality, anchorage-dependent cells.

- **Proven Track Record:** Used by the animal and human health industry for over 30 years.
- **Streamlined Solution:** Simply sterilize and use: hydration and pre-swelling steps are not required.
- **Ready-to-Use:** Sterile format with sterility assurance level (SAL) 10^{-6} eliminates sterilization validation and shortens manufacturing process.



Applications

Microcarrier technology provides an efficient, cost-effective tool to scale up various adherent, cell-based biopharmaceutical applications such as advanced cell and gene therapy, vaccines, and biologics production. Historically, microcarrier and stirred-tank bioreactor technologies have been used successfully by the biopharmaceutical industry, and this platform is accepted by regulatory agencies for both animal and human health product manufacturing.

A wide range of commercially available, traditional stainless steel, and single-use stirred-tank bioreactors are used to scale processes up to 3000 m² surface area or greater using microcarrier technology. Additionally, microcarrier-based scale-up performed in controlled bioreactor systems facilitates automated closed system operations, thereby diminishing contamination risks and providing a regulated manufacturing environment for consistent product manufacturing.

Product Specification

SoloHill's diverse microcarrier products are manufactured and handled under ISO 9001 standards. All microcarrier types are offered in standard non-sterile and sterile (gamma-irradiated), ready-to-use formats that facilitate ease of use. Specific cell types have different requirements for attachment, growth, and biologic production, hence the optimal microcarrier should be selected experimentally.

Microcarriers are offered in a convenient starter kit format to accelerate this initial screening and evaluation. Selecting the optimal microcarrier type is key to a successful culture. Sartorius offers a variety of microcarrier types in multiple size formats ranging from 10 grams to 1000 grams, allowing user flexibility during the selection and optimization of manufacturing processes.

Microcarrier Types and Their Properties

Microcarrier type, core material, and surface chemistry	Relative density range	Size (microns)	Surface area (cm ² /g)	Surface charge	Protein-coated	Number of MC per gram
Plastic Cross-linked polystyrene	1.022-1.030	125-212	360	No	No	4.6 × 10 ⁵
	1.022-1.030	90-150	480	No	No	1.0 × 10 ⁶
Plastic Plus Cross-linked polystyrene, cationic-charged	1.022-1.030	125-212	360	Yes	No	4.6 × 10 ⁵
Star-Plus Cross-linked modified polystyrene, cationic-charged	1.022-1.030	125-212	360	Yes	No	4.6 × 10 ⁵
Hillex II® Modified polystyrene, cationic-charged	1.090-1.150	160-200	515	Yes	No	5.5 × 10 ⁵
Collagen Cross-linked polystyrene coated with Type 1 porcine collagen (gelatin)	1.022-1.030	125-212	360	No	Yes	4.6 × 10 ⁵
	1.034-1.046	125-212	360	No	Yes	4.6 × 10 ⁵
	1.022-1.030	90-150	480	No	Yes	1.0 × 10 ⁶
Fact III Cross-linked polystyrene coated with Type 1 porcine collagen (gelatin), cationic-charged	1.022-1.030	125-212	360	Yes	Yes	4.6 × 10 ⁵

Ordering Information

Microcarrier type	Part number	Weight (gram)	Ready to use (Sterile)
Plastic Cross-linked polystyrene	P-221-020	10	No
	P-221-050	100	No
	P-221-070	500	No
	P-221-080	1000	No
	PIR-221-020	10	Yes
	AMDS05PS100	100	Yes
Plastic Plus Cross-linked polystyrene, cationic-charged	PP-221-020	10	No
	PP-221-050	100	No
	PP-221-070	500	No
	PP-221-080	1000	No
	PPIR-221-020	10	Yes
	AMDS05PPS100	100	Yes
Star-Plus Cross-linked modified polystyrene, cationic-charged	SP-221-020	10	No
	SP-221-050	100	No
	SP-221-070	500	No
	SP-221-080	1000	No
	SPIR-221-020	10	Yes
	AMDS05SPS100	100	Yes
Hillex II® Modified polystyrene, cationic-charged	H-170-020	10	No
	H-170-050	100	No
	H-170-070	500	No
	H-170-080	1000	No
	HIR-170-020	10	Yes
	AMDS05HS100	100	Yes
Collagen-coated Cross-linked polystyrene coated with Type 1 porcine collagen (gelatin)	C-221-020	10	No
	C-221-050	100	No
	C-221-070	500	No
	C-221-080	1000	No
	CIR-221-020	10	Yes
	AMDS05CS100	100	Yes
FACT III Cross-linked polystyrene coated with Type 1 porcine collagen (gelatin), cationic-charged	F-221-020	10	No
	F-221-050	100	No
	F-221-070	500	No
	F-221-080	1000	No
	FIR-221-020	10	Yes
	AMDS05FS100	100	Yes
Microcarrier Starter Kit (Plastic, Plastic Plus, Star-Plus, Hillex® II, Collagen-coated, Fact III)	SK102-1521B	10g of each	No


Custom size options are available upon request, contact at microcarriers@sartorius.com.

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PLTGold® Product Insert

About PLTGold®

PLTGold® is a non-xenogeneic, animal serum-free product derived from human platelets. PLTGold® is used as a manufacturing component in the generation of adult stems cells. A Drug Master File for PLTGold® is registered with the FDA and is cross-referenceable. Contact us for more information on the DMF.

Product	Catalog Number	Size
PLTGold® Research Grade	PLTGold27R	27mL
	PLTGold100R	100mL
	PLTGold500R	500mL
PLTGold® Clinical Grade (GMP)	PLTGold27GMP	27mL
	PLTGold100GMP	100mL
	PLTGold500GMP	500mL

Safety Information

All PLTGold® donors have been tested for infectious diseases; however, universal precautions for handling and disposal of biological products should be used when working with PLTGold®.

Using PLTGold®

- Thaw at 37°C or 4°C.
- It is not recommended to expose PLTGold® to repeated temperature changes that could affect the integrity of its components. For that reason, we recommend thawing the product and preparing aliquots as soon as it is received.
- Aliquots can be stored at -20°C or colder. Storage at 4°C is recommended for periods no longer than 2 weeks.
- Complete media can be prepared, aliquoted and stored at -80°C for up to 9 months. Do not store complete media at 4°C for longer than 2 weeks.
- Filtration of PLTGold® or complete media containing PLTGold® is NOT recommended.

Culture Conditions Using PLTGold®

- Cell seeding should be performed following the general guidelines for the specific cell type. For Mesenchymal Stem Cells (MSCs), cells are typically plated at approximately 2×10^3 – 5×10^3 cells per cm^2 .
- For MSCs, PLTGold® can be used at 5% vol/vol in a typical cell culture medium such as DMEM or α -MEM. If the basic media doesn't contain Glutamine, a source of L-Glutamine will need to be added to the media at a final concentration of 2mM. For other types of cells, the concentration of PLTGold® will need to be titrated according to the application (a titration from 2% vol/vol to 10% vol/vol is recommended to establish the percentage of PLTGold® needed for the cell type to use).
- Do not allow primary MSC confluence to exceed 70-80%.

Origin

- PLTGold® was developed to eliminate the need for heparin in hPL. It is an unfractionated product derived from our original hPL, PLTMax® that does not contain or require the addition of heparin. PLTGold® remains clot free and with similar performance to PLTMax®.

References

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- Burnouf T, Strunk D, Koh MB, et al. **Human platelet lysate: Replacing fetal bovine serum as a gold standard for human cell propagation?** *Biomaterials.* 2016 Jan;76:371-87.
- Alonso-Camino V, Clarke B, Nielsen J, et al. **In vitro expansion of mesenchymal stem cells using media supplemented with unfractionated heparin-free platelet lysate.** Poster presented at: ISCT Annual Meeting. London, UK. 2017 May.
- Bulur P, Wiltshire T, Dudakovic A, et al. **Impact of media supplementation on the secretion of IFN- γ induced indoleamine 2-3 deoxygenase and resultant immune suppression by mesenchymal stromal cells.** Poster presented at: ISCT Annual Meeting. Montreal, Canada. 2018 May.
- Alonso-Camino V, Mirsch W. **In vitro expansion of human primary endothelial cells for clinical use using EndoGo™ XF Medium supplemented with PLTGold® human platelet lysate.** Poster presented at: ISCT Annual Meeting. Montreal, Canada. 2018 May.

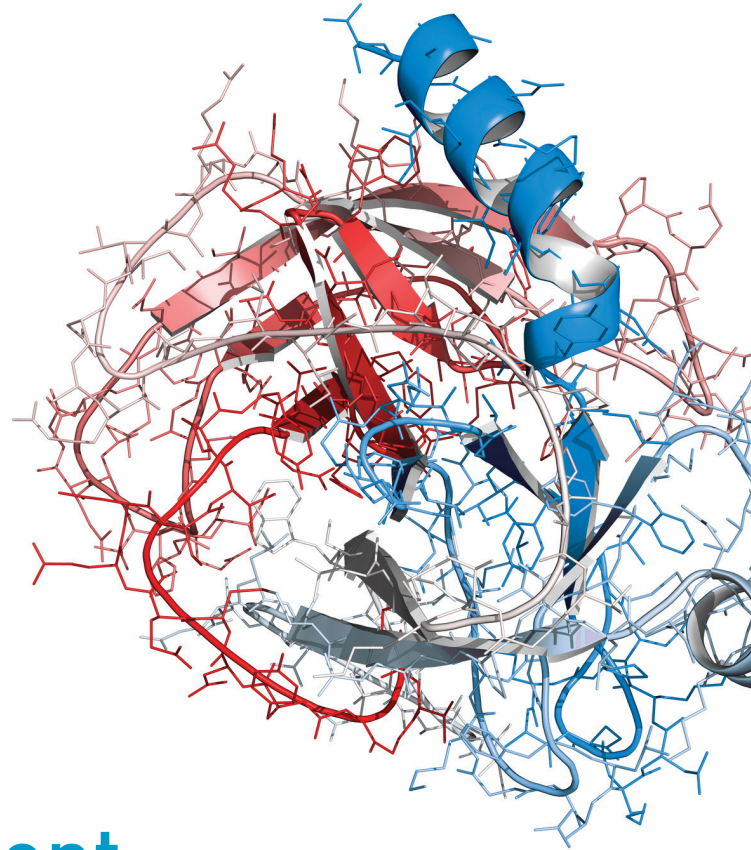
For Technical and Ordering Information, Please Contact Us At:

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Phone: +1 (507) 287-6257 Email: info@millcreeks.com Website: www.millcreeks.com



BI
Biological Industries
Culture of Excellence



Chemical structure of
trypsin enzyme

All the way with animal
component-free solutions

Animal Component- Free (ACF) Recombinant Trypsin Solutions

Alternative to porcine/bovine trypsin

- **Animal Component-Free (ACF)**

Eliminates the risk of viruses or other potential adventitious agents found in animal derived components.

- **High Purity**

- Pure enzyme solutions increase specificity and eliminate contaminating activities found in lower purity enzymes.
- Free of chymotrypsin, carboxypeptidase-A and other protease contaminants.
- Prevents the toxic effects induced by non-desirable proteases.

- **High Activity**

- Maximizes the yield of functionally viable cells.
- Recombinant Trypsin-EDTA Solution (Cat. No. 03-079-1) accelerates the dissociation phase.
- Results in efficient dissociation of adherent cell types (including primary and sensitive cells) from surfaces and tissues.
- Optimized for hMSCs, from a variety of sources, cultured in both serum-free and serum-containing systems.

- **Enzyme Inhibition**

Inactivation with Soybean Trypsin Inhibitor (SBTI, Cat. No. 03-048-1).

- **Ready-to-use**



Comparison of hMSC Dissociation with Various Trypsin Solutions

Recovery of hMSC- Adipose Tissue (AT) cultured in MSC NutriStem XF medium after dissociation with three different dissociation solutions

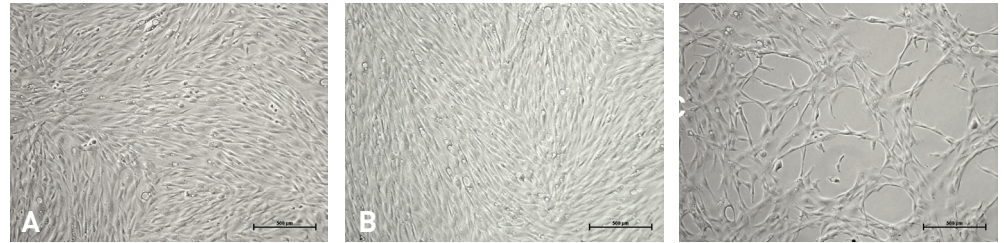


Figure 1.

hMSC-AT, 3 days post split I – Cells were equally seeded (5000cells/cm²) in MSC NutriStem® XF medium. The dissociation procedure was carried out at 37° using:
 A. Recombinant Trypsin Solution, without EDTA (BI's Cat. No. 03-078-1)
 B. Crystalline Trypsin (BI's Cat. No. 03-047-1) (high purity)
 C. Trypsin sol. C (BI's Cat. No. 03-053-1) (crude trypsin)

Rapid and Efficient Dislodging of hMSC with Recombinant Trypsin

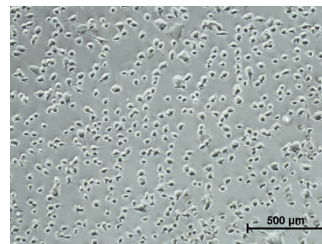
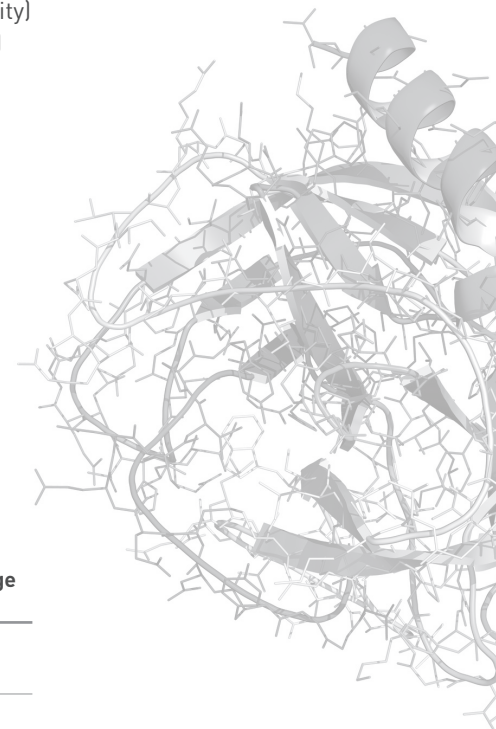


Figure 2.

hMSC-BM cultured in MSC NutriStem® XF medium, were incubated for 2-5 min at 37°. with Recombinant Trypsin Solution (Cat. No. 03-078-1)



Ordering Information

Product Name	Cat. No.	Unit Size	Storage Temp.
Recombinant Trypsin Solution	03-078-1B	100ml	RT
Recombinant Trypsin-EDTA Solution	03-079-1B	100ml	RT
Soybean Trypsin Inhibitor (SBTI) x50	03-048-1C	20ml	-20°C

Source of raw material:

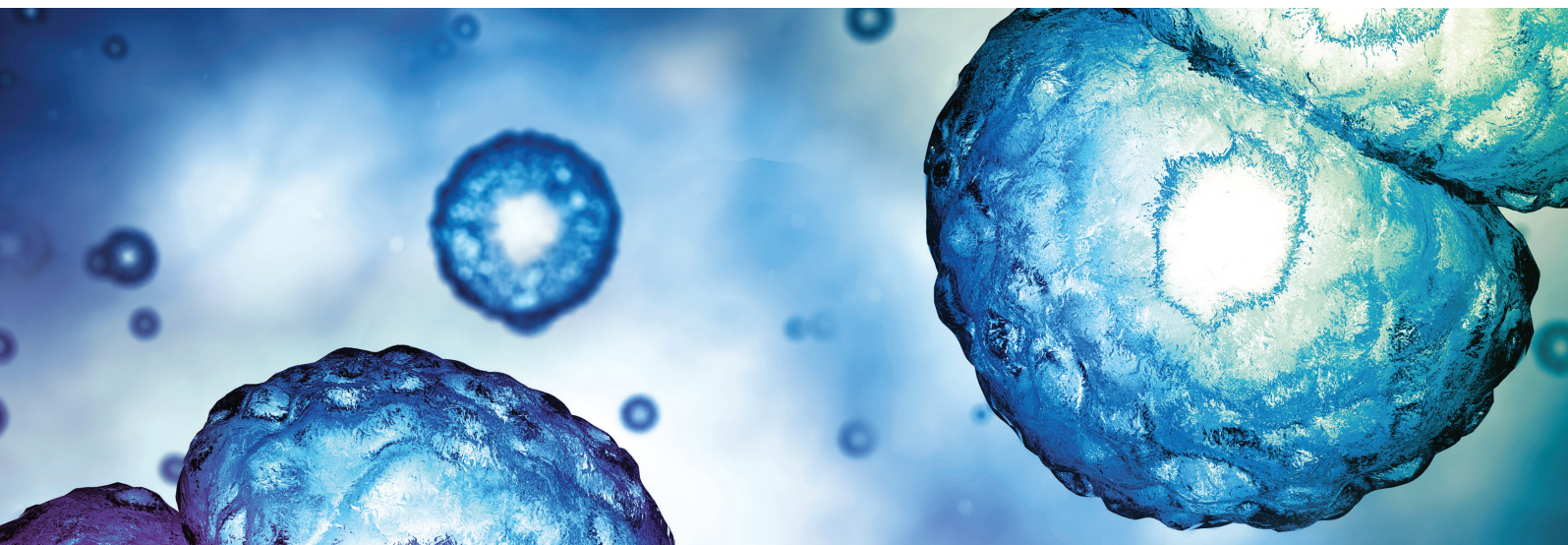
The Recombinant Trypsin is produced by submerged fermentation of *Fusarium Oxysporum*.

It is derived from a production process which does not utilize any raw materials and/or processing aids of animal origin.



MSCgo™ Differentiation Media

Advanced adipogenesis, osteogenesis, and chondrogenesis from hMSCs



- **Complete, serum-free, xeno-free media**
- **Validated to efficiently differentiate hMSCs from various sources**
- **Simple, efficient protocols**

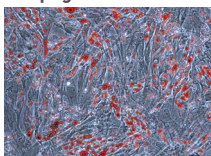
Redefining stem cell excellence

Whether for basic research, drug discovery, or for therapeutic applications, stem cell differentiation requires standardized culture methods to ensure reproducible and reliable results. The unique line of **MSCgo™ Differentiation Media** offers a complete system for multipotency evaluation of human mesenchymal stem cells (hMSCs), designed to efficiently differentiate hMSCs from a variety of sources into mature adipocytes, chondrocytes, and osteocytes/osteoblasts.

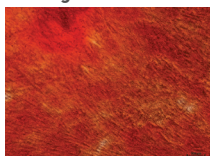
The MSCgo™ Differentiation Media are complete, serum-free, and xeno-free solutions, eliminating the drawbacks of unwanted background differentiation or interruption in cell metabolism, while providing consistent and repeatable results.

Each MSCgo™ Differentiation Medium contains all growth factors and supplements necessary for differentiation to the specified lineage. No adaptation phase is required prior to initiating differentiation when the hMSC's are cultured using NutriStem® MSC XF Medium. The differentiation media are validated with hMSC from a variety of sources, including bone marrow (BM-hMSC), adipose tissue (AT-hMSC), Wharton's jelly (WJ-hMSC), and umbilical cord tissue (CT-hMSC).

Adipogenesis



Osteogenesis



Chondrogenesis



Figure 1: MSCgo™ Differentiation Media is a complete system for multipotency evaluation of hMSCs into mature adipocytes, osteocytes/osteoblasts, and chondrocytes. Images taken of mature differentiated cells from adipose tissue-derived hMSCs.

Adipogenic Differentiation

MSCgo™ Adipogenic Differentiation Medium is a serum-free and xeno-free formulation developed for optimal differentiation of hMSCs to mature adipocytes. Efficient adipogenic differentiation of hMSCs is achieved through cycles in culture with MSCgo™ Adipogenic Differentiation Medium and maintenance medium (NutriStem MSC XF Medium). Oil Red-O solution is then used to stain accumulated intercellular lipid droplets, which are an indication of mature adipocytes.

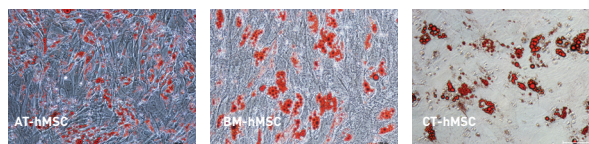


Figure 2: Adipogenesis. After expansion in culture using NutriStem® MSC XF Medium, hMSCs from adipose tissue [AT-hMSC], bone marrow [BM-hMSC], and cord tissue [CT-hMSC] were transferred to a differentiation assay in MSCgo Adipogenic Differentiation Medium. Images were taken after 16 days of adipogenesis and Oil Red-O staining [20X].

Osteogenic Differentiation

The MSCgo™ Osteogenic Differentiation Media were developed for differentiation serum-free, xeno-free differentiation of hMSCs to mature osteocytes/osteoblasts with ready-to-use media and simple protocols. Osteogenic differentiation of hMSC results in the formation of a mineralized culture that can be detected and semi-quantified by Alizarin Red S (ARS) staining.

Mature osteocytes are generated between 14 and 21 days with the MSCgo™ Osteogenic Differentiation Medium. Faster osteogenesis is observed with the MSCgo™ Rapid Osteogenic Differentiation Medium, in which mature osteocytes are observed in less than 10 days.

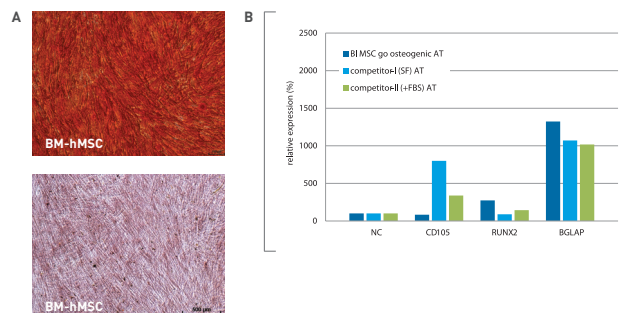


Figure 3: Osteogenic Differentiation. A. BM-hMSCs differentiate into osteoblasts when using serum-free MSCgo Osteogenic Differentiation Medium, detected by ARS staining (top). No osteogenesis is observed when serum-containing medium is used (bottom). B. The MSCgo Osteogenic Differentiation Medium results in the lowest expression of CD105 (hMSC marker), and the highest expression of RUNX2 (osteogenic differentiation marker) and BGLAP (mature osteoblast marker), as compared to other serum-free and serum-containing media.

Chondrogenic Differentiation

The MSCgo™ Chondrogenic Differentiation Medium is a complete kit, including basal medium and optimized supplement mix, containing all growth factors and supplements necessary for chondrogenesis of hMSCs from a variety of source tissues. Chondrogenic differentiation of hMSC in 3D spheroid culture results in the formation of cartilage with a typical extracellular matrix rich of Aggrecan, a proteoglycan used as an indicator for cartilage formation and can be detected with Alcian Blue, a dark-blue dye.

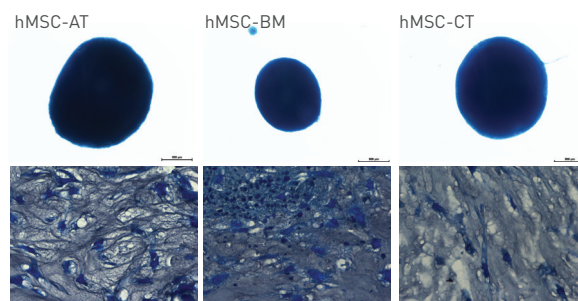


Figure 4: Chondrogenesis. A. Cartilage differentiation from hMSCs after a 21-day assay using MSCgo Chondrogenic Differentiation Medium followed by Alcian Blue staining. B. Histological images of mature chondrocytes surrounded by a cartilage matrix after a 21-day assay using MSCgo Chondrogenic Differentiation Medium followed by Toluidine Blue staining [40X].

Ordering Information

Cat. #	Product	Qty
05-440-1B	MSCgo™ Osteogenic Differentiation Medium	100 mL
05-442-1B	MSCgo™ Rapid Osteogenic Differentiation Medium	100 mL
05-220-1B	MSCgo™ Chondrogenic XF Medium	100 mL
05-221-1D	MSCgo™ Chondrogenic XF Supplement Mix	10 mL
05-330-1B	MSCgo™ Adipogenic XF Medium	100 mL
05-331-1-01	MSCgo™ Adipogenic XF Supplement Mix I	0.1 mL
05-332-1-15	MSCgo™ Adipogenic XF Supplement Mix II	1.5 mL

How to Order

Biological Industries | T. 972-4-996-0595 | F. 972-4-996-8896 | info@bioind.com

Biological Industries USA | T. 860.316.2702 | F. 860.269.0596 | orders@bioindusa.com

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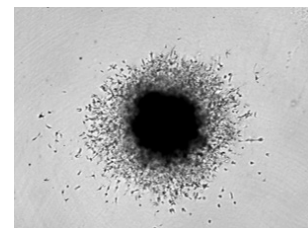
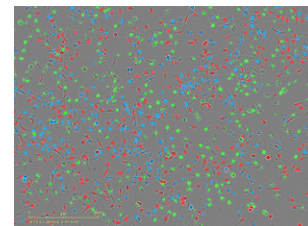
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Immunocytochemistry
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Neurite Dynamics
Neuronal Activity
Angiogenesis

3D Cell Models

Spheroid Growth & Viability
Spheroid Invasion

Cell Movement & Morphology

Chemotaxis Migration & Invasion
Scratch Wound Migration & Invasion

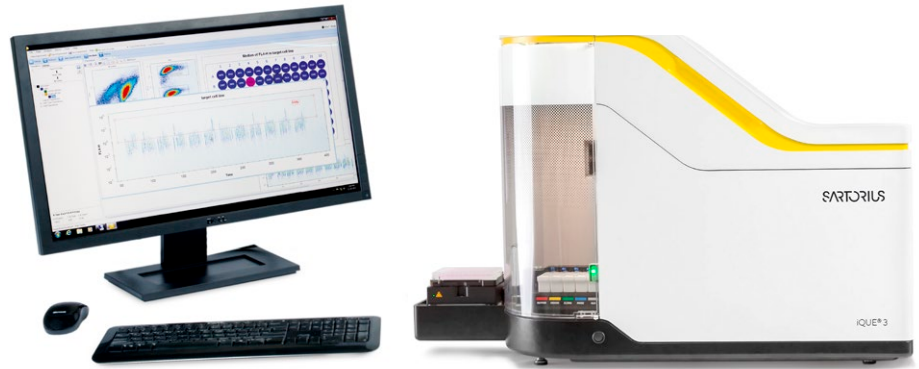
Specifications subject to change without notice.

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iQue® 3

Faster, Smarter, Flow Cytometry

Advanced High Throughput Flow Cytometry Solution Speeds Up Your Entire Workflow



The iQue® 3 Platform is the most advanced flow cytometry platform—with a focus on speed from setup, to acquisition and analysis. It combines a patented sampling method, which allows for the fastest sample acquisition in the industry. It has the ability to handle 96, 384, or 1536-well plates, and enables continuous plate loading through connection with any automation system. The Enhanced Rinse Station (ERS) provides continuous monitoring of liquid levels to ensure sufficient volumes prior to each run.

When used with the pre-configured iQue® reagent kits, samples can be analyzed instantly through the use of customizable templates following acquisition.

The included iQue Forecyt® Software enables dynamic data visualizations with an ease of use that allows all users to identify samples of interest without having to export to multiple software packages.

The iQue® Advantage

Speed



- Faster plate processing, minutes, not hours
- Mix and read samples
- Faster time to results

Miniaturization



- Consumes less reagents
- Conserves precious cells
- Saves money

Content



- Rich, multiplexed, per-cell content
- Cell and beads together
- Secreted protein analysis

Usability



- Automated workflow
- Validated reagents
- Easiest software you will ever love

Insight



- Link information
- Run scenarios
- Create knowledge
- Make decisions

iQue® 3 Platform

The iQue® 3 Platform is an integrated instrument, software and reagent system that enables rapid, high content, multiplexed analysis of cells and beads in suspension. Our unique, software-assisted automation and experiment-based analyses deliver the deep insight needed to answer complex biological questions.

The iQue® 3 BR (Blue-Red laser configuration) is a phenotypic screening and profiling workhorse that is ideal for applications that require up to 6-color detection, including antibody and biologics discovery, cell health assessment, secreted protein analysis using iQue® Qbead-based assays, and many more applications. Our platform delivers the iQue Forecyt® Software Workflow Advantage: a single data management workflow from input to output, which means you work faster and work smarter—not harder.

Content is king with the iQue® 3 VBR and VYB (Violet-Blue-Red and Violet-Yellow-Blue laser configurations). Three-laser systems offer up to 13-color detection and are ideal for functional and phenotypic applications that demand more choice and flexibility in experimental design. These systems combine high performance multi-color analysis with the iQue Forecyt® Software Workflow Advantage making them hands-down the choice of scientists in immune-based drug discovery, immuno-oncology, and cell therapy applications.

The iQue® 3 HD (Blue-Red laser configuration) provides the ultimate assay miniaturization and is the only high content, per-cell, 1536-well capable suspension screener available.

iQue® 3 Technical Specifications

iQue® 3 Configuration		Blue and Red		Violet, Blue and Red			Violet, Yellow and Blue		
Detectors	Lasers	488 nm	640 nm	405 nm	488 nm	640 nm	405 nm	561 nm	488 nm
	445/45 nm			■			■		
	530/30 nm	■		■	■		■		■
	572/28 nm	■		■	■				
	586/20 nm						■	■	
	615/24 nm			■	■				
	615/20 nm						■	■	■
	660/20 nm						■	■	■
	675/30 nm	■	■	■	■	■			
	780/60 nm	■	■	■	■	■	■	■	
	Forward light scatter (relative size)	■			■			■	
	Side light scatter (relative granularity)	■			■			■	
Optical	Fluorescence sensitivity	FITC < 75 MESF; PE < 50 MESF; APC < 20 MESF							
	Minimum particle size detection	0.5 µm							
	Cell detection rate	Up to 35,000/second							
	Dynamic range of detection*	> 7 decades							
* This wide dynamic range and a Zoom function permit operation of the system without user adjustments of the voltage or gain of the detectors.									
Sampling	Plate compatibility	96-well, 384-well or 384-well, 1536-well (iQue® 3 HD BR)							
	Sampling	Continuous air-gap delimited							
	Minimum assay volume requirements	10 µL							
	Minimum sample aspiration	1 µL							
	Minimum plate sampling time*	< 5 minutes 96 wells				< 20 minutes 384 wells			
	Carryover	< 2% for typical no-wash assays. Actual amounts are cell and assay dependent and are easily managed by including interwell rinses to reduce carryover to < 0.1%							
	Automated plate shaker	Up to 3,000 rpm (Up to 5000 rpm on iQue® 3 HD BR)							
Features	<ul style="list-style-type: none"> ▪ Foil-sealed plate processing ▪ Volumetric cell counting (< 10% CV) 								
* The time required for sampling plates is both sample type and experiment dependent. A range of well-sampling times can be designated from 0.5 seconds–minutes.									
Enhanced Rinse Station	Features	<ul style="list-style-type: none"> ▪ Reduces evaporation ▪ Monitors fluid levels 			<ul style="list-style-type: none"> ▪ Automated QC bead vortexing 				
iQue Forecyt® Software	Features	<ul style="list-style-type: none"> ▪ Auto compensation ▪ Real-time whole-plate data analysis ▪ Dynamic linked gating ▪ Interactive heat maps, profile maps 			<ul style="list-style-type: none"> ▪ Cross plate analysis ▪ Export files in FCS, CSV or iQue Forecyt® formats ▪ Customizable PDF data report ▪ iQue Forecyt® Enterprise Edition compatible 				
Operational	Computer workstation, Windows compatible	Xeon processor, dual 256 GB SSD (RAID 0), 16 GB RAM, 27" monitor 2560 x 1400							
	Weight (less computer)	205 lbs, 93 kg							
	Dimensions	39" W x 25" D x 26" H 99 cm W x 63 cm D x 66 cm H							
	Power requirements	100 115 230 VAC, 50–60 Hz							
	Environment requirements	Temperature: 15–32° C (59–90° F), Relative humidity: 80% maximum							
Features	<ul style="list-style-type: none"> ▪ CE labeled ▪ 21 CFR logging option compatible 			<ul style="list-style-type: none"> ▪ Robotic integration option compatible ▪ iQue® Qmax refill module option compatible 					

iQue® technology is protected by the following patents and other patents pending:

6,890,487, 6,878,556, 7,368,084, 7,842,244, 8,021,872, 8,268,571, 8,637,261, 8,823,943, 9,012,235, D,722,515

Microsart® ATMP Mycoplasma

Rapid Real-time PCR
Mycoplasma Detection Kit
for testing ATMPs



Benefits

- 3 hours time-to-result
- Designed for ATMP testing
- Easy handling and highest level of security

Product Information

A standard DNA extraction followed by a TaqMan® probe real-time qPCR is used for the detection of Mycoplasma DNA. 200 µL sample volume can be used as starting material for DNA preparation. The isolated DNA is amplified in a qPCR cycle and the evaluation can be performed with the standard cycle software.

Introduction

Microsart® ATMP Mycoplasma utilizes quantitative, real-time PCR (qPCR) as the method of choice for sensitive and robust detection of Mycoplasma contaminations. The Microsart® ATMP Mycoplasma kit was validated according EP 2.6.7 in combination with EP 2.6.21 with respect to detection limit for all listed Mycoplasma species, specificity and robustness for cell cultures and autologous cell transplants (e.g. chondrocytes).

Applications

The Microsart® ATMP Mycoplasma real-time PCR kit is especially designed for all hospitals, institutions and companies which are involved in testing Mycoplasma contamination according to EP 2.6.7 in cell-based therapeutics.

High Performance

The Microsart® ATMP Mycoplasma kit was developed for EP compliant Mycoplasma testing. A detection limit of less than 10 cfu/mL for all Mycoplasma species mentioned in the European Pharmacopoeia fulfills the requirements for sensitivity and specificity.

Fast Result

The Microsart® ATMP Mycoplasma kit is a fast and easy to use real-time PCR kit. The total procedure from DNA extraction to the PCR result takes only a few hours.

TaqMan® Probes

The application of TaqMan® probes adds specificity to the PCR detection system. Highly specific results are already generated during the cycling process – no subsequent melting curve analysis is needed.

Contamination Prevention

The kit contains dUTP instead of dTTP, so the option is available to degrade amplicons from previous analyses by using uracil-DNA glycosylase (UNG). Thus, the occurrence of false-positive results can be minimized. UNG is not included in the kit.

Summary

The Microsart® ATMP Mycoplasma kit is the perfect solution for all QC labs which perform Mycoplasma testing of cell-based therapeutics.

Technical Specifications

Each kit contains all required reagents for 25 reactions including polymerase as part of the Mycoplasma Mix. The expiry date of the unopened package is specified on the package label. The kit components are stored at +2 to +8°C. After opening and rehydration the kit components need to be stored below -18°C. The LOT specific Certificate of Analysis can be downloaded from the manufacturer's website (www.minerva-biolabs.com).

Kit Component	25 Reactions
Order No.	SMB95-1003
Mycoplasma Mix	1 × lyophilized
Rehydration Buffer	1 × 1.0 mL
Positive Control	1 × lyophilized
Internal Control	1 × lyophilized
PCR grade Water	1 × 1.5 mL

Ordering Information

Mycoplasma Kits

Description	Quantity	Order No.
Microsart® ATMP Mycoplasma	25	SMB95-1003

Accessories

Description	Quantity	Order No.
Microsart® AMP Extraktion	50 extractions	SMB95-2003

Related Products


Description	Quantity	Order No.
Microsart® AMP Mycoplasma	25	SMB95-1001
Microsart® Research Mycoplasma	25	SMB95-1005

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Phone +49 551 308 0

USA

Sartorius Corporation
565 Johnson Avenue
Bohemia, NY 11716
Phone +1 631 254 4249
Toll-free +1 800 635 2906

 For further information, visit
www.sartorius.com

Microsart® ATMP Bacteria | Fungi | Sterile Release Microsart® Research Bacteria | Fungi

Rapid Detection of
Total Fungi in ATMPs
Prior Treatment



Benefits

- All critical bacterial and fungal contaminants detected in one test
- 3h-result: prior to treatment
- Specific TaqMan® probes reduce false-positives
- Non-infectious validation standards
- Less pipetting: controls already included

Product Information

Microsart® ATMP: Contaminated ATMPs pose life-threatening risks for immunocompromised patients. Microbial release test results prior to treatment are critical to patient safety. Microsart® ATMP Bacteria and Fungi or combined Microsart® ATMP Sterile Release that is ready prepared for single samples, enable the detection of bacterial and fungal contamination within 3 hours validated according to EP 5.1.6 and EP 2.6.27. During kit validation sensitivity (5 to 99 CFU/ml) was proven for 19 bacterial and 7 fungal species including 6 standard USP and EP strains. Comparability to the compendial method was demonstrated. The kit is not suitable to replace sterility testing according EP 2.6.1 or USP <71> yet. The Microsart® ATMP kits should be used as precheck test to get rapid QC results for ATMPs.

Microsart® Research Bacteria and Fungi are used for fast and reliable direct detection of microbial contamination in cell cultures, cell culture supernatants and cell media components in research and development or whenever there is no need for regulation conform testing (i.e. according to EP/USP/JP).

Kit Components and Storage

Each kit contains all required reagents for the qPCR reaction. Due to lyophilization they are less temperature sensitive and ensure highest performance stability. Color-coded tubes with master mix, buffers, positive control and negative control, make the handling as simple as possible. For details, see kit components table on page 2.

The expiry date and the storage conditions of the unopened package are noted on the package label. The kit components are stored until use at +2° C to +8° C and must be stored after rehydration or opening at < -18° C. Please note: The master mix, also called Bacteria | Fungi Mix, should be protected from light all the time.

Test Principle

Microsart® ATMP | Research utilizes real-time PCR. The detection procedure can be performed within 3 hours, including less than 1 hour hands-on time. In contrast to the detection by cell cultivation method, samples do not need to contain vital bacteria.

The assay can be performed with any type of real-time PCR cyclers able to detect the fluorescence dyes FAM™ and ROX™.

Bacteria or fungi are specifically detected by amplifying a highly conserved 16S|18S rRNA coding region in the bacterial | fungal genome. The amplification is detected at 520 nm (FAM™ channel). The kit includes primer and FAM™ labeled TaqMan® probes which allow the specific detection of more than 95% of all known bacterial and fungal species so far described as contaminants of cell cultures and media components. Eukaryotic DNA is not amplified by this primer | probe system.

False negative results due to PCR inhibitors or improper DNA extraction are detected by the internal amplification control which is part of the PCR master mix. The amplification of the internal amplification control is detected at 610 nm (ROX™ channel).

Product Versions

- Microsart® ATMP Sterile Release – contains all reagents for testing 10 patient samples for bacterial and fungal contamination including DNA extraction
- Microsart® ATMP Bacteria – contains all reagents for 100 qPCR reactions to test for bacterial contamination without DNA extraction
- Microsart® ATMP Fungi – contains all reagents for 100 qPCR reactions to test for fungal contamination without DNA extraction
- Microsart® Research Bacteria – contains all reagents for 25 | 100 qPCR reactions to test for bacterial contamination without need of DNA extraction
- Microsart® Research Fungi – contains all reagents for 25 | 100 qPCR reactions to test for fungal contamination without need of DNA extraction

The lot specific Certificate of Analysis can be downloaded from the manufacturer's website (www.minerva-biolabs.com).

Kit Components

Order No.	Cap color	Microsart® ATMP Sterile Release SMB95-1007 (10 patient samples)	Microsart® ATMP Bacteria SMB95-1008 (100 rxn)	Microsart® ATMP Fungi SMB95-1012 (100 rxn)	Microsart® Research Bacteria (25 100) SMB95-1009 (25 rxn) SMB95-1010 (100 rxn)	Microsart® Research Fungi (25 100) SMB95-1014 (25 rxn) SMB95-1013 (100 rxn)
ATMP Bacteria Mix	red	10 × lyophilized	4 × lyophilized	-	4 × lyophilized	-
ATMP Fungi Mix	orange	10 × lyophilized	-	4 × lyophilized	-	4 × lyophilized
Rehydration Buffer	blue	10 × 0.3 ml	4 × 0.5 ml	4 × 0.5 ml	4 × 0.5 ml	4 × 0.5 ml
Positive Control DNA	green	10 × lyophilized	1 × lyophilized	1 × lyophilized	1 × lyophilized	1 × lyophilized
Internal Control DNA	yellow	10 × lyophilized	4 × lyophilized	4 × lyophilized	4 × lyophilized	4 × lyophilized
PCR grade Water	white	20 × 0.3 ml	5 × 1.5 ml	5 × 1.5 ml	5 × 1.5 ml	5 × 1.5 ml
Lysis Buffer	transparent	10 × 1.8 ml	-	-	-	-
Suspension Buffer	violet	10 × 0.4 ml	-	-	-	-
Processing Tubes	-	10 × 3	-	-	-	-

Related Products

DNA Extraction Kit

Order No.	Description	Quantity
SMB95-2001	Microsart® ATMP Extraction	Reagents for 50 extractions
SMB95-2003	Microsart® AMP Extraction (only for Mycoplasma qPCR)	Reagents for 50 extractions

Mycoplasma Detection Kits for qPCR

Order No.	Description	Quantity
SMB95-1001 1002	Microsart® AMP Mycoplasma	25 100 reactions
SMB95-1003 1004	Microsart® ATMP Mycoplasma	25 100 reactions
SMB95-1005 1006	Microsart® Research Mycoplasma	25 100 reactions

Microsart® Validation Standard according to EP 2.6.7 and USP <63> for Mycoplasma species and EP 2.6.1, EP 2.6.27 and USP <71> for other bacteria and fungi

3 vials with 10 CFU/vial for Mycoplasma species and 6 vials with 99 CFU/vial for other bacteria and all fungi

Order No.	Description
SMB95-2005	<i>Bacillus subtilis</i>
SMB95-2006	<i>Pseudomonas aeruginosa</i>
SMB95-2007	<i>Kocuria rhizophila</i>
SMB95-2008	<i>Clostridium sporogenes</i>
SMB95-2009	<i>Bacteroides vulgatus</i>
SMB95-2010	<i>Staphylococcus aureus</i>
SMB95-2011	<i>Mycoplasma arginini</i>
SMB95-2012	<i>Mycoplasma orale</i>
SMB95-2013	<i>Mycoplasma gallisepticum</i>
SMB95-2014	<i>Mycoplasma pneumoniae</i>
SMB95-2015	<i>Mycoplasma synoviae</i>
SMB95-2016	<i>Mycoplasma fermentans</i>
SMB95-2017	<i>Mycoplasma hyorhinis</i>
SMB95-2018	<i>Acholeplasma laidlawii</i>
SMB95-2019	<i>Spiroplasma citri</i>
SMB95-2020	<i>Mycoplasma salivarium</i>
SMB95-2037	<i>Candida albicans</i>
SMB95-2038	<i>Aspergillus brasiliensis</i>
SMB95-2039	<i>Aspergillus fumigatus</i>

Order No.	Description
SMB95-2040	<i>Penicillium chrysogenum</i>
SMB95-2041	<i>Candida glabrata</i>
SMB95-2042	<i>Candida krusei</i>
SMB95-2043	<i>Candida tropicalis</i>

Microsart® Calibration Reagent

1 vial, 10⁸ genomes/vial for all bacteria and 10⁶ genomes/vial for all fungi

Order No.	Description
SMB95-2021	<i>Mycoplasma arginini</i>
SMB95-2022	<i>Mycoplasma orale</i>
SMB95-2023	<i>Mycoplasma gallisepticum</i>
SMB95-2024	<i>Mycoplasma pneumoniae</i>
SMB95-2025	<i>Mycoplasma synoviae</i>
SMB95-2026	<i>Mycoplasma fermentans</i>
SMB95-2027	<i>Mycoplasma hyorhinis</i>
SMB95-2028	<i>Acholeplasma laidlawii</i>
SMB95-2029	<i>Spiroplasma citri</i>
SMB95-2030	<i>Bacillus subtilis</i>
SMB95-2031	<i>Pseudomonas aeruginosa</i>
SMB95-2032	<i>Kocuria rhizophila</i>
SMB95-2033	<i>Clostridium sporogenes</i>
SMB95-2034	<i>Bacteroides vulgatus</i>
SMB95-2035	<i>Staphylococcus aureus</i>
SMB95-2036	<i>Mycoplasma salivarium</i>
SMB95-2044	<i>Candida albicans</i>
SMB95-2045	<i>Aspergillus brasiliensis</i>
SMB95-2046	<i>Aspergillus fumigatus</i>
SMB95-2047	<i>Penicillium chrysogenum</i>
SMB95-2048	<i>Candida glabrata</i>
SMB95-2049	<i>Candida krusei</i>
SMB95-2050	<i>Candida tropicalis</i>

User-Supplied Equipment and Material

- For DNA extraction we recommend the DNA-free Microsart® ATMP Extraction kit, Order No. SMB95-2001
- DNA-free PCR reaction tubes for the specific qPCR device
- Microcentrifuge for 1.5 ml reaction tubes, i.e. Centrisart A-14, Order No. A-14-1EU
- Pipettes with DNA-free filter tips (10, 100 and 1000 µl)
- qPCR device with filter sets for the detection of the fluorescence dyes FAM™ and ROX™ and suitable for 25 µl reaction volume


For PCR support and recommendation please contact **PCR@Sartorius.com**.

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www.sartorius.com



NutriFreez[®] D10 Cryopreservation Medium

Powerful cryopreservation media optimized for various cells and tissues



NutriFreez[®] D10 Cryopreservation Medium is an optimized freezing solution designed and validated for the cryopreservation of various tissue and cell types, including but not limited to sensitive cell types such as hESCs, iPSCs, and MSCs. NutriFreez[®] D10 Medium maintains defined and animal component-free conditions during cryopreservation, essential to maintaining consistency when culturing cells in a xeno-free system. NutriFreez[®] D10 Medium is ready-to-use and pre-formulated with DMSO, providing a protective environment for cells during the freezing, storage, and thawing process. Cells preserved with NutriFreez[®] D10 Medium show excellent attachment (Figure 1) and maintain proper pluripotency marker expression after thawing, with superior results compared to both serum-containing freezing media, other serum-free solutions, and homebrew formulations¹.

- High recovery post thaw
- Ready-to-use solution
- Serum-free and protein-free
- Chemically-defined
- cGMP-manufactured

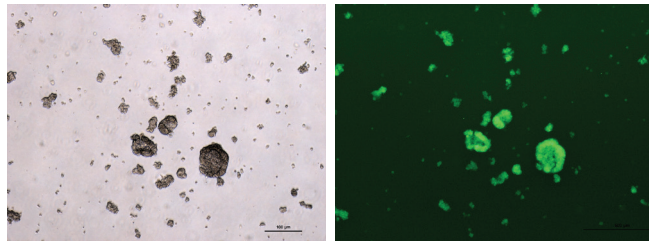


Figure 1: BG01V/hOG cells (an Oct4-GFP reporter hES cell line) frozen in NutriFreez[®] D10 Medium and thawed into NutriStem[®] hPSC Medium on Matrigel. Images taken just 1 hour post-thaw show excellent survival and attachment of the hES cells, with high expression of Oct4 (green).

Applicable Cell Types

- Human Embryonic Stem Cells
- Induced Pluripotent Stem Cells
- Human Mesenchymal Stem Cells
- Peripheral Blood Mononuclear Cells
- Human Endothelial Cells
- T cells, including Chimeric Antigen Receptor (CAR T) Cells and Tumor Infiltrating Lymphocytes (TILs)
- Neuron Cells
- Hybridomas
- CHO Cells
- Vero Cells
- Multiple mammalian cell lines: MRC-5, HEK-293, HepG2, HeLaBSC-1, BGM3T3, MA-10BHK-21

Ordering Information

Cat. #	Product	Qty
05-713-1A	NutriFreez [®] D10 Cryopreservation Medium	500 mL
05-713-1B		100 mL
05-713-1E		50 mL
05-713-1C		20 mL
05-713-1D		10 mL
05-714-1A	NutriFreez [®] D10 Cryopreservation Medium, w/o phenol red	500 mL
05-714-1B		100 mL

1. Nishishita N, et al. An effective freezing/thawing method for human pluripotent stem cells cultured in chemically-defined and feeder-free conditions. *AJSC* 2015;4(1):38-49.

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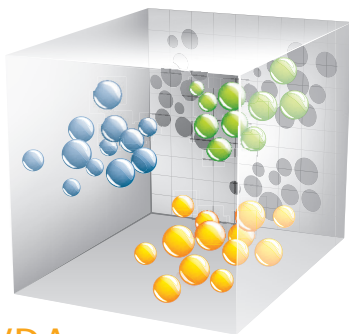
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SARTORIUS

SIMCA[®] helps you see what others don't

Every day your business creates a wide variety of data from many different sources. This data holds the key to better performance.

The challenge is to interpret this information in a meaningful way. But with so many parameters in play, it's hard to find a solution that's both powerful and smart enough. SIMCA gives you the ability to combine and analyze all these different data sources. It helps you to isolate, understand and act upon the hidden gems that hold the secret to greater business success.



MVDA
Multivariate
Data Analysis

Who is using SIMCA?

Wherever you create data you can use SIMCA. That's why companies in many different industries have worked with us to help their business grow.

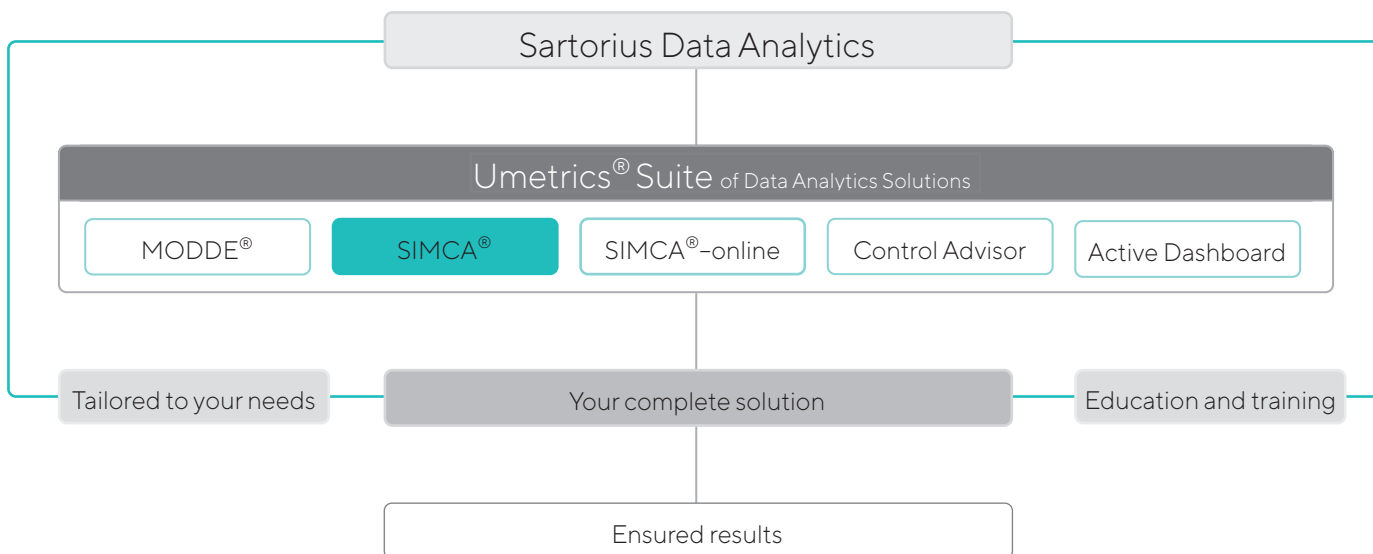
- A major bio-process company improved process yield by 75%, reduced cycle time by 40% and trebled plant output.
- An international food processing company resolved a logistics issue and saved USD 1 million per year in shipping costs.
- A wastewater treatment company used SIMCA to improve their processes for a cleaner, safer environment.



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- Flexibility to handle complex data in many forms
- Powerful multivariate tool
- An easy way to script your workflow
- Seamless model update integration with SIMCA[®]-online

More than Software



“ Using SIMCA to solve problems has saved us millions of dollars over the years.

Timothy Michaelson, Senior Manufacturing Excellence Consultant at International Paper



Our complete solution includes everything you need through the whole process and provides results quickly.

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