

Your **Power** for Health


greiner bio-one



Cell & Tissue Culture Labware

No Compromises – Just True Solutions

Greiner Bio-One – Your Leading Partner in Cell Biology and Tissue Culture

Research & Development



- Team of competent and experienced biologists, physicists, chemists and engineers
- Constant development of new products for cell and tissue culture
- Research and application laboratories
- In-house construction facility supporting 3D CAD and mouldflow simulation
- Cooperation with leading universities, research institutions and technology partners
- Tailor-made solutions – OEM-services from branding to product development

Technology



- Injection moulding and extrusion-blow moulding
- Physical and chemical surface modifications
- Aseptic coating with biologically active proteins
 - Collagene
 - Poly-D-/L-Lysine
 - Fibronectin
 - Laminin
 - Streptavidin
- Fabrication of material composites
 - Plastic-foil
 - Plastic-filter
 - Plastic-glass
- Ultrasonic fusion and laser welding
- Pad, silkscreen and ink-jet printing, laser marking of products
- Micro and nano structuring

Production



- Modern, fully automated manufacturing
- High-skilled employees with excellent professional qualifications
- Controlled production environment (seed number, particle number, air pressure, temperature, humidity)
- Clean-room with laminar airflow
- Production facilities in Germany, Austria, Hungary, Brazil, Thailand and USA
- Continuous investment at the production facilities

Quality Standards



- Certified according to DIN EN ISO 9001:2008 and DIN EN ISO 13485:2003 + AC:2007
- In-house QC laboratories
- Regular monitoring of product performance in cell culture
- Products free of detectable DNase, RNase, human DNA and endotoxins
- Validated sterilisation process
- Raw material testing and traceability from raw material to final product
- International product certifications (e.g. CE-label for IVD and medical products)

Experience & Tradition



- More than 50 years of experience in the manufacturing of laboratory equipment
- Organically grown global network of material suppliers, technology and science partners (e.g. Boehringer Ingelheim Pharma GmbH & Co. KG, Genomics Institute of the Novartis Research Foundation (GNF), Essex Pharma GmbH, Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB)
- Involvement in fundamental innovations in cell biology and cell culture

Sales & Distribution



- Global distributor and service network
- Worldwide warehousing network and logistical partners in more than 100 countries
- Global fast and save shipment
- Technical support provided through international sales team, service hotline and website
- Online product catalogue and EDI for improved purchasing

Success Depends on the Appropriate Equipment



Our highly experienced application specialists routinely develop new application papers. Thus, we support our customers in their choice of the most appropriate cell culture labware as well as experimental protocols for a variety of scientific questions¹.

¹Application protocols can be accessed under http://www.greinerbioone.com/en/germany/articles/literatures/application_notes/.

**Cell and
Antibody
Production**

Rollerbottles

**Quality Control
and Mycoplasma
Detection**

Mycoplasma Kit

**Cell and Sample
Storage**

Cryo.s™

Cell Separation

Leucosep™
and OncoQuick®

**Cultivation of
Sensitive Cells**

Advanced TC™,
CELLCOAT®

**3D Cell Culture and
Tissue Engineering**

ThinCert™ cell culture
inserts and plates

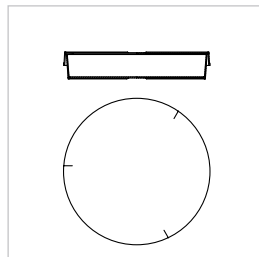
CELLSTAR® – a Story of Unbreakable Success



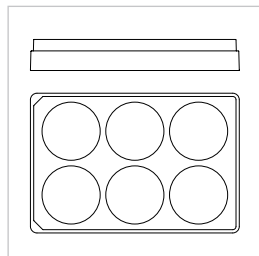
During its 50-year tradition in the development and manufacturing of products for cell biology and tissue culture Greiner Bio-One not only witnessed, but also took an active part in the evolution of biotechnology as one of the leading technologies of our century. These years were attended by ingenious ideas, such as the introduction of the first disposable labware in 1963, the first 96 well plate with round bottom wells in 1966 and the market launch of the first miniaturised 1536 well screening plate in 1997. Today Greiner Bio-One faces up to the future with technologically advanced, high-value solutions for biological, pharmaceutical and medical research.

The CELLSTAR® Product Line

Cell culture dishes
Sizes: ø 35, 60, 94, 100, 145 mm
for adherent or suspension culture



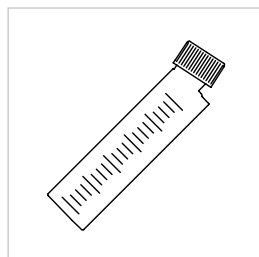
Multiwell plates
6, 12, 24 or 48 wells
for adherent or suspension culture



Microplates
96, 384 or 1536 wells
for adherent or suspension culture
transparent, black or white
different bottom materials
(polystyrene, µClear® films, glass)



Tissue culture flasks
25, 75 or 175 cm² growth area
for adherent or suspension culture



Classical applications in cell biology such as the cultivation and manipulation of immortalised cells in adherent and suspension culture became standard practice in laboratories around the world.

With its product line CELLSTAR® Greiner Bio-One offers the ultimate solution for these classical and standard cell culture techniques. A broad spectrum of formats covers the entire range of applications in cell biology including the propagation of cells, the performance of cell-based assays and elementary imaging procedures.

The secrets of the ongoing success of the CELLSTAR® product line is its high quality and reliability. This is achieved through the use of virgin, ultrapure and non-cytotoxic polymers from trustworthy suppliers with whom Greiner has been dealing for many years. Our experience of producing consistent cell culture treated surfaces alongside with the highest standards for quality control of outgoing goods enable us to supply our customers with products they trust and value.

Consequently all cell culture products feature lowest levels of detectable endotoxins or other contaminants.

Cultivation of Sensitive and Primary Cells

Technological development, innovation and ingenuity are key to Greiner Bio-One's successful business. In cell biology the needs of the cells are the driving force of the innovation process. Greiner Bio-One's research and development (R&D) activities are therefore focused on the steady improvement of labware to provide cells a physiological cell culture environment. The outcome of these R&D activities are proprietary technologies and product lines such as Advanced TC™ and CELLCOAT® allowing the improvement of cell attachment and the restoration of physiological culture conditions in vitro.



CELLCOAT® and Advanced TC™ are two platforms available for the cultivation of sensitive cell lines and primary cells. While products in the CELLCOAT® range are coated with extracellular matrix proteins or mimetics such as Collagene Type I, Fibronectin, Laminin, Poly-D-Lysine and Poly-L-Lysine; Advanced TC™ is an animal-free, physicochemical polymer modification proprietary to Greiner Bio-One. Both solutions trace different paths, but have one common goal – the promotion of essential cellular features, such as:

- Morphology and adherence
- Proliferation
- Transgene activity
- Differentiation status

Advanced TC™ is the first solution for improving assay performance as well as all applications demanding an animal-free substrate supporting sensitive cell lines and primary cells.

CELLCOAT® on the other hand is the ultimate solution for cell culture applications requiring the most native culture conditions.

<p>Before washing After washing</p> <p>CELLCOAT® PDL</p> <p>TC-treatment</p>	<p>Improved attachment of neuroblastoma cells on PDL coated cell culture labware: Cells were cultivated on TC treated and PDL coated multiwell plates, subjected to a vigorous washing step and visualised using MTT vital stain.</p>								
<p>Hep G2 HEK 293 w/o serum</p> <p>Advanced TC™</p> <p>Competitor</p>	<p>Improved attachment and cellular morphology on Advanced TC™ cell culture labware: Hep G2 and HEK 293 cells were cultivated on Advanced TC™ cell culture labware and competitor products and visualised with crystal violet stain.</p>								
<p>Luciferase activity in relative units</p> <table border="1"> <thead> <tr> <th>Condition</th> <th>Luciferase activity (relative units)</th> </tr> </thead> <tbody> <tr> <td>TC treatment</td> <td>~1.0</td> </tr> <tr> <td>Advanced TC™</td> <td>~3.5</td> </tr> <tr> <td>CELLCOAT® PDL</td> <td>~3.0</td> </tr> </tbody> </table>	Condition	Luciferase activity (relative units)	TC treatment	~1.0	Advanced TC™	~3.5	CELLCOAT® PDL	~3.0	<p>Increased transgene activity on CELLCOAT® and Advanced TC™ cell culture substrates: HEK 293 cells were cultivated on different cell culture substrates and transfected with the pCMV-GLuc plasmid encoding a secreted Luciferase. Luciferase activity was assessed by means of light emission after substrate reaction.</p>
Condition	Luciferase activity (relative units)								
TC treatment	~1.0								
Advanced TC™	~3.5								
CELLCOAT® PDL	~3.0								

High Quality Solutions for Microscopy



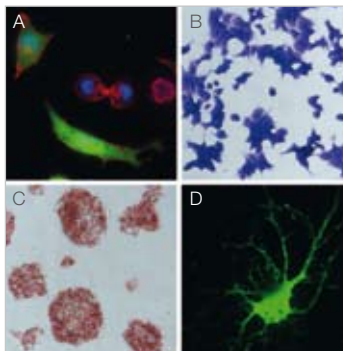
Greiner Bio-One's primary expertise focuses on the development and manufacturing of labware from high-grade polymers. All products have to be of the highest quality as they are used in research and *in vitro* diagnostics. To ensure this, one of Greiner Bio-One's main policies is the continued supply of high quality, pure raw polymers with which to manufacture the products. Besides the actual injection moulding, Greiner Bio-One masters numerous other technologies for finishing the polymer products and make them applicable for different life-science applications, such as the fabrication of glass-polymer composites for microscopy.

CELLview™ dish – a high quality composite of polymer and optical glass.



Multiplex analysis: Different cell culture experiments performed in a CELLview™ dish with four compartments.

- A: Immunocytochemistry of CHO cells
- B: Crystal violet staining of HEK 293 cells
- C: Alkaline phosphatase staining of murine embryonic stem cells
- D: GFP transfection of primary cortical neurons



CELLview™ cell culture dishes are a high quality platform for multiplex and live cell imaging experiments. They combine the convenience of a standard size 35 mm disposable plastic dish with the premium optical quality of glass, providing researchers with superior high resolution microscopic images of their *in vitro* cultures.

The innovative design of the CELLview™ cell culture dishes with the embedded coverslip guarantees a single-plane flat bottom with a consistent working distance and maximal planarity.

The subdivided version facilitates the simultaneous analysis of four experimental setups, minimising systematic and cellular deviations as well as reducing the amount of cells, reagents and analysis time.

The provided TC and Advanced TC™ surfaces make additional protein coatings dispensable, while improving general cell attachment and optimal cultivation conditions.

Cell Culture Inserts for Complex and Meaningful *in vitro* Models

A stated aim of *in vitro* research is the restoration of native conditions in cell culture and the creation of physiologically relevant and meaningful cell based models. Established *in vitro* models help to replace ethically doubtful live-animal experiments. Today, in some research sectors, such as the development of new cosmetics, live-animal experiments could almost completely be replaced by *in vitro* approaches. With its innovative cell culture labware such as ThinCert™ cell culture inserts, Greiner Bio-One strongly supports such developments.

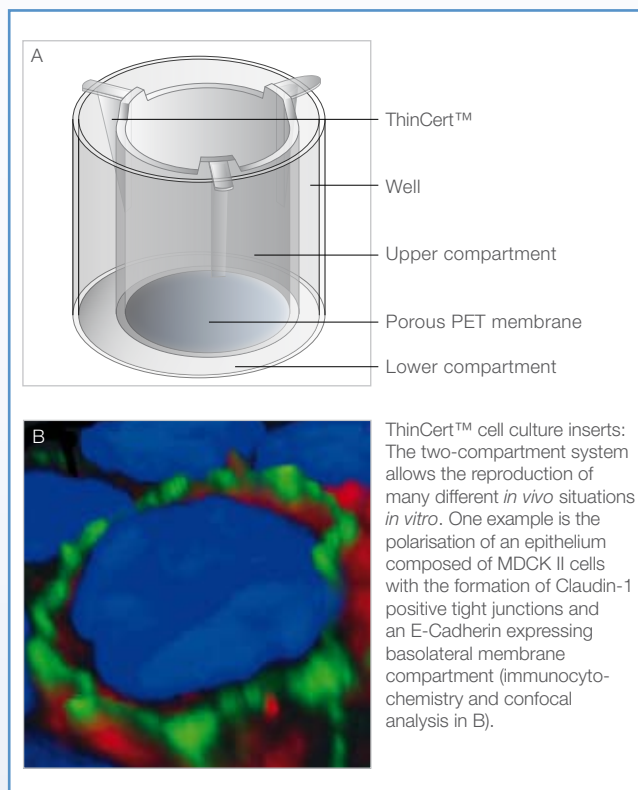


When placed in a well plate, ThinCert™ cell culture inserts, with porous PET membranes, form a two-compartment system to readily mimic a variety of *in vivo* situations, such as:

- Migration and relocation of cells
- Paracrine signalling between different cell populations
- Formation of tight cell-cell junctions and epithelial polarisation
- Vectorial transport between two lumens
- Tissue growth and differentiation at the air-liquid-interface

ThinCert™ cell culture inserts combine consistent high quality with a user-friendly format. The PET membrane is firmly attached to the insert housing, but can be easily cut out and subjected to downstream processing, such as immunocytochemistry and sectioning.

Today, a large variety of *in vitro* models have been established with ThinCert™ cell culture inserts and are routinely used to study cancerogenesis, inflammation, infection and toxicology.



Solutions for Automated Cell Culture



Modern cell culture technology has many overlaps with other technologies, such as process automation and information management. Greiner Bio-One maintains extensive global collaborations with technology partners, thus ensuring compatibility of its cell culture labware and the technology platforms it is used with. One example of a joint development is the AutoFlask™ – a novel cell culture flask for automated cell culture systems which has been developed by Greiner Bio-One in close collaboration with the Genomics Institute of the Novartis Research Foundation (GNF), San Diego (USA).

CELLMASTER™ roller bottles for mass cell culture



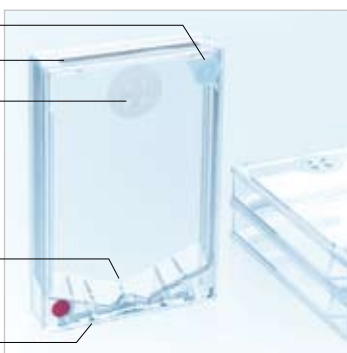
Septum

Barcode

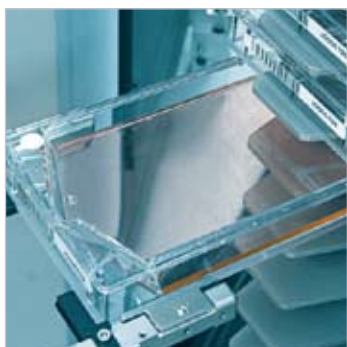
Hydrophobic Filter

Centrifugation Pocket

Barcode



The Autoflask™ for automated cell culture.



Cell culture at the industrial level requires optimised processes that give the best cost-benefit ratios. Specific cell culture labware such as CELLMASTER™ roller bottles meet this requirement. In roller bottles cells grow adherent to the inner lateral surface, while rotation of the device guarantees uniform cell growth as well as alternating supply with nutrients from the culture medium and oxygen from the enclosed air. The enlarged inner lateral surface allows the production of large amounts of cells or cell products in one roller bottle.

While roller bottles have been widely used for years and are common in industrial mass cell culture and vaccine production, new technologies emerged pursuing other approaches for cost reduction and improved efficiency. With respect to such developments process automation plays an important role, requiring innovative cell culture labware.

The Autoflask™ from Greiner Bio-One is a novel cell culture flask with a microplate footprint. Therefore it can be easily used in conjunction with automated cell culture systems. Its valuable features include:

- Barcodes for flask identification and traceability
- Filter membrane for optimum gas supply
- Slit septum for safe liquid transfer
- Centrifugation pocket for in-flask cell pelleting and harvesting

Secure and Efficient Sample Identification


Cell culture and cell based in vitro models are important fundamentals of basic and applied research in biology, pharmacology and medicine. The ambitious aim of this research is to better understand the nature of the healthy and diseased organism as well as to find ways to cure or relieve disease symptoms. Greiner Bio-One is a reliable and appreciated partner in the global field of research and biotechnology as well as in the pharmaceutical and diagnostic industry – providing sophisticated equipment and CE marked tools and kits for in vitro diagnostics and clinical trials.



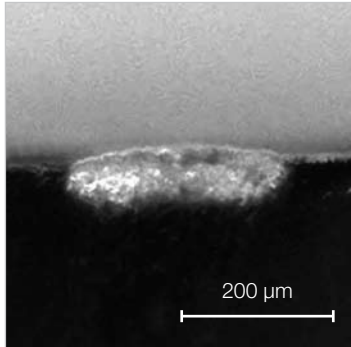
The recent release of machine readable Datamatrix codes on Cryo.s™ facilitates the identification of patient samples and reduces the possibility of human introduced misinterpretation of sample information. Datamatrix codes are applied with a laser directly into the polymer of the Cryo.s™ tube, thus providing a very robust and permanent identification mark with maximum data capacity.

Cryo.s™ with Datamatrix utilise the ECC200 version of the Datamatrix symbology with advanced algorithms for error correction and the capability to recover decrypted information from symbols that have suffered damage to more than 20% of this area. At Greiner Bio-One, all Cryo.s™ with Datamatrix are subjected to a strict quality control before leaving the factory. Part of this quality control is the proof scanning and verification of all Datamatrices according to the AIM DPM2 Quality Guidelines guaranteeing 100% readability of the codes.

Cryo.s™ with Datamatrix combine a long-lasting tradition in tube manufacturing with the latest technology for secure sample identification and as such are an example of the ongoing forward-looking R&D activities at Greiner Bio-One.



Cryo.s™ tubes with Datamatrix for cryogenic sample storage and secure sample identification: The Datamatrix symbol on the tube bottom can encode several alphanumeric characters representing sample information or a unique sample ID.



Cross section through a single element of a Datamatrix symbol: In the region of the Datamatrix element, the polymer is modified with a laser, thus appearing as a white mark surrounded by the native black polymer. The complete Datamatrix symbol is an array of such single elements.

200 μm



For further information please visit our website www.gbo.com/bioscience or contact us:

Germany (Main office)

Greiner Bio-One GmbH
Maybachstraße 2
D-72636 Frickenhausen
Phone (+49) 70 22 948-0
Fax (+49) 70 22 948-514
E-Mail info@de.gbo.com

Austria

Greiner Bio-One GmbH
Bad Haller Straße 32
A-4550 Kremsmünster
Phone (+43) 75 83 67 91-0
Fax (+43) 75 83 63 18
E-Mail office@at.gbo.com

China

Greiner Bio-One GmbH
Phone (+86) 21 62 72 70 58
Fax (+86) 21 62 72 73 55
E-Mail info@cn.gbo.com

Netherlands

Greiner Bio-One B.V.
Phone (+31) 1 72 42 09 00
Fax (+31) 1 72 44 38 01
E-Mail info@nl.gbo.com

Belgium

Greiner Bio-One BVBA/SPRL
Phone (+32) 24 61 09 10
Fax (+32) 24 61 09 05
E-Mail info@be.gbo.com

France

Greiner Bio-One SAS
Phone (+33) 1 69 86 25 50
Fax (+33) 1 69 86 25 36
E-Mail infos@fr.gbo.com

UK

Greiner Bio-One Ltd.
Phone (+44) 14 53 82 52 55
Fax (+44) 14 53 82 62 66
E-Mail info@uk.gbo.com

Brazil

Greiner Bio-One Brasil
Phone (+55) 19 34 68 96 00
Fax (+55) 19 34 68 96 01
E-Mail office@br.gbo.com

Japan

Greiner Bio-One Co. Ltd.
Phone (+81) 3 35 05 88 75
Fax (+81) 3 35 05 89 74
E-Mail info@jp.gbo.com

USA

Greiner Bio-One North America Inc.
Phone (+1) 70 42 61 78 00
Fax (+1) 70 42 61 78 99
E-Mail info@us.gbo.com