NanoSurface **Cultureware**

Nanoscale Topography Promotes Physiological Structure and Function

"Cells in the Dish Should Resemble Cells in the Body"

NANOSURFACE BIOMEDICAL

Recapitulate the Extracellular Matrix with NanoSurface Cultureware

Nanoscale topography mimics the aligned architecture of the ECM.

NanoSurface Cultureware provides your cells and tissues a biomimetic surface to improve the physiological relevance of your experiments. Shortly after plating, cells cultured on NanoSurface Cultureware exhibit enhanced structural and phenotypic development when compared to cells grown on conventional dishes. NanoSurface topography promotes cytoskeletal reorganization, cellular alignment, and functional development. NanoSurface Cultureware is available in familiar standard formats, featuring glass-bottom wells for high-quality imaging.

NanoSurface dishes promote the structural and phenotypic development of many cell types:

- Skeletal muscle cells
- Smooth muscle cells
- Neuronal cells
- Cardiomyocytes
- Endothelial cells
- Fibroblasts
- Cancer cells
- Induced pluripotent stem cells
- Mesenchymal stem cells
- Human embryonic stem cells
- And many more

NanoSurface Cultureware Benefits

Reproducibly Structured Cell Cultures
Highly uniform, precise, and accurate nanopatterns ensure that your results are consistent from plate to plate.

High-Quality Imaging
Compatible with high-magnification, high-NA transmitted light and fluorescence microscopy techniques. No spectral loss across commonly used fluorophores.

Industry Standard Culture Formats
Cultureware comes in a variety of ANSI/SLAS compliant form factors to guarantee compatibility with existing instrumentation and hardware.

Biomimetic Technology
Nanoscale topography mimics the aligned architecture of the extracellular matrix.

NanoSurface Cultureware vs. Conventional Dish

NanoSurface Cultureware features a nanopatterned culture surface which provides a cellular microenvironment that mimics the aligned architecture of the native extracellular matrix – improving physiological relevance by promoting development. Cells can align, elongate, grow, and even migrate along the pattern while exhibiting more physiologically representative structural and functional phenotypes.

Conventional cultureware does not utilize biomimetic surface topography, which results in random structural orientation. The disorganized isotropic cell and tissue architectures result in immature functional phenotypes that do not reproduce in vivo function. These inaccuracies lead to imprecise, hard-to-reproduce results and wasted time and effort.

Product Specifications

Product Type	Product Code	Approximate Pattern Growth Area (cm^2)	Total Well Volume (µL)	Working Volume (µL)
25mm Coverglass	ANFS-CS25	4.90	–	–
35mm Single Dish	ANFS-0001	3.14	17000	3000
6-well Plate*	ANFS-0006	3.14	17000	3000
24-well Plate*	ANFS-0024	1.65	3400	1000
96-well Plate*	ANFS-0096	0.33	360	200

**ANSI/SLAS compliant. All numbers approximate and subject to revision.*

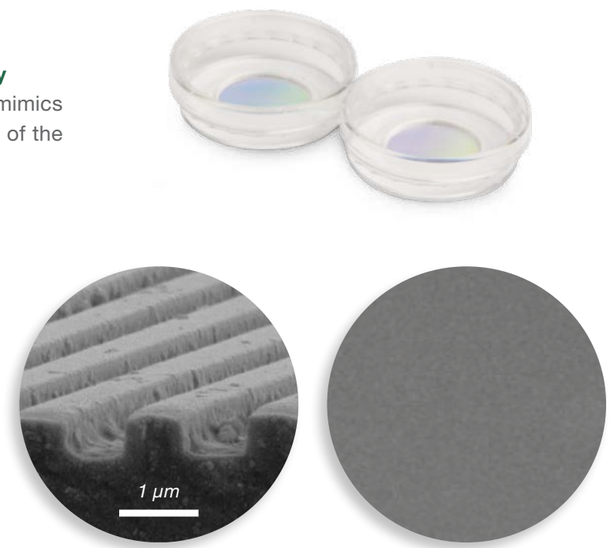


Fig. 1: *NanoSurface Cultureware (left) vs. Conventional dish (right).*

NanoSurface Cultureware Conventional Dish

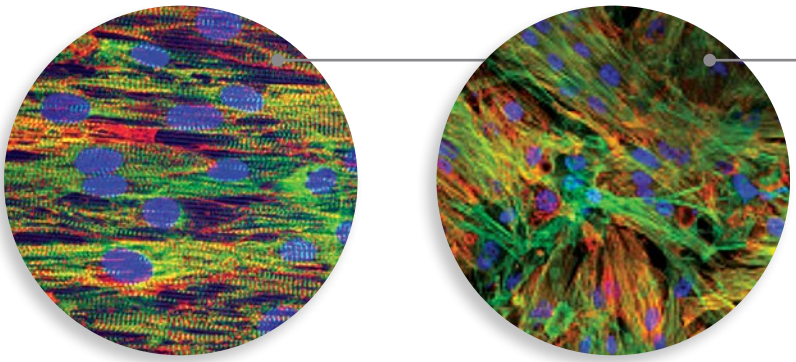


Fig 2: CDI iCell cardiomyocytes on a NanoSurface dish (left) vs. conventional dish (right). Cardiomyocytes elongate in the direction of the nanopattern, develop structurally organized cytoskeletal networks, anisotropic cell shapes, striated and physiologically-spaced sarcomeres, and exhibit polarized expression of gap junction proteins. These and other changes lead to cardiac cells with more physiological and mature electrical and mechanical properties such as faster action potential conduction in the direction of the nanopattern, and improved contraction force and velocity.

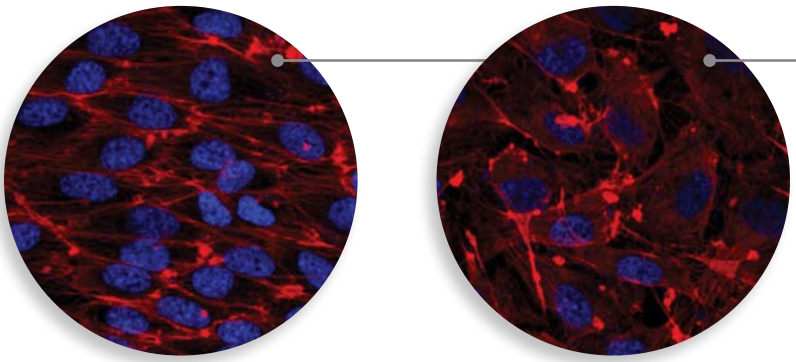


Fig. 3: Endothelial cells on a NanoSurface dish (left) vs. conventional dish (right). Endothelial cells form aligned layers with physiological anisotropy, and exhibit lower expression of inflammatory cytokines.

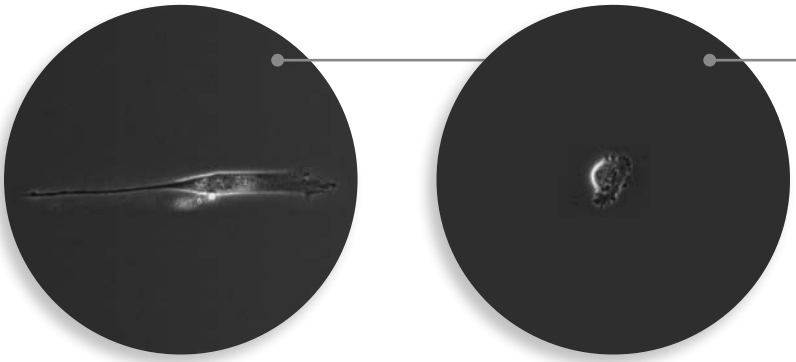


Fig. 4: Directed migration of cancer cells on a NanoSurface dish (left) vs. on a conventional dish (right). Glioblastoma cells grown on traditional flat cultureware lose their migratory phenotype in culture, while cells grown on patterned dishes maintain it, with migration directed along the length of the pattern. Images from Smith et. al. Cell Reports 15(12):2016.

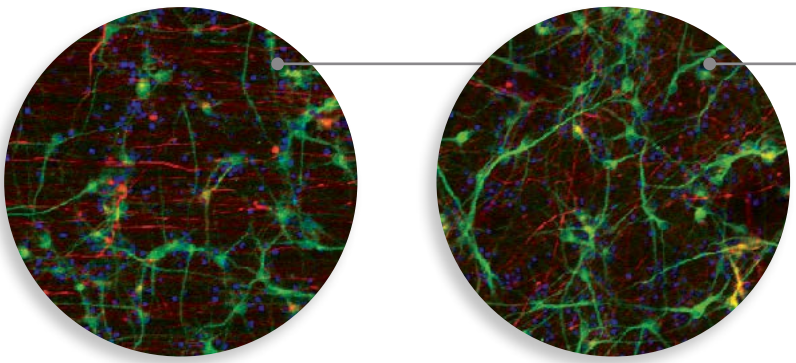


Fig. 5: Two-channel confocal image of CDI cortical neurons cultured on NanoSurface Cultureware (left) vs. on a conventional dish (right). On NanoSurface Cultureware, neurofilaments (red) align along the direction of the nanotopography while dendrites (MAP2 stain; green) do not.

NanoSurface dishes benefit many cell types, including cardiomyocytes, skeletal and smooth muscle cells, endothelial cells, undifferentiated stem cells, cancer cells, fibroblasts, epithelial cells, and many more.

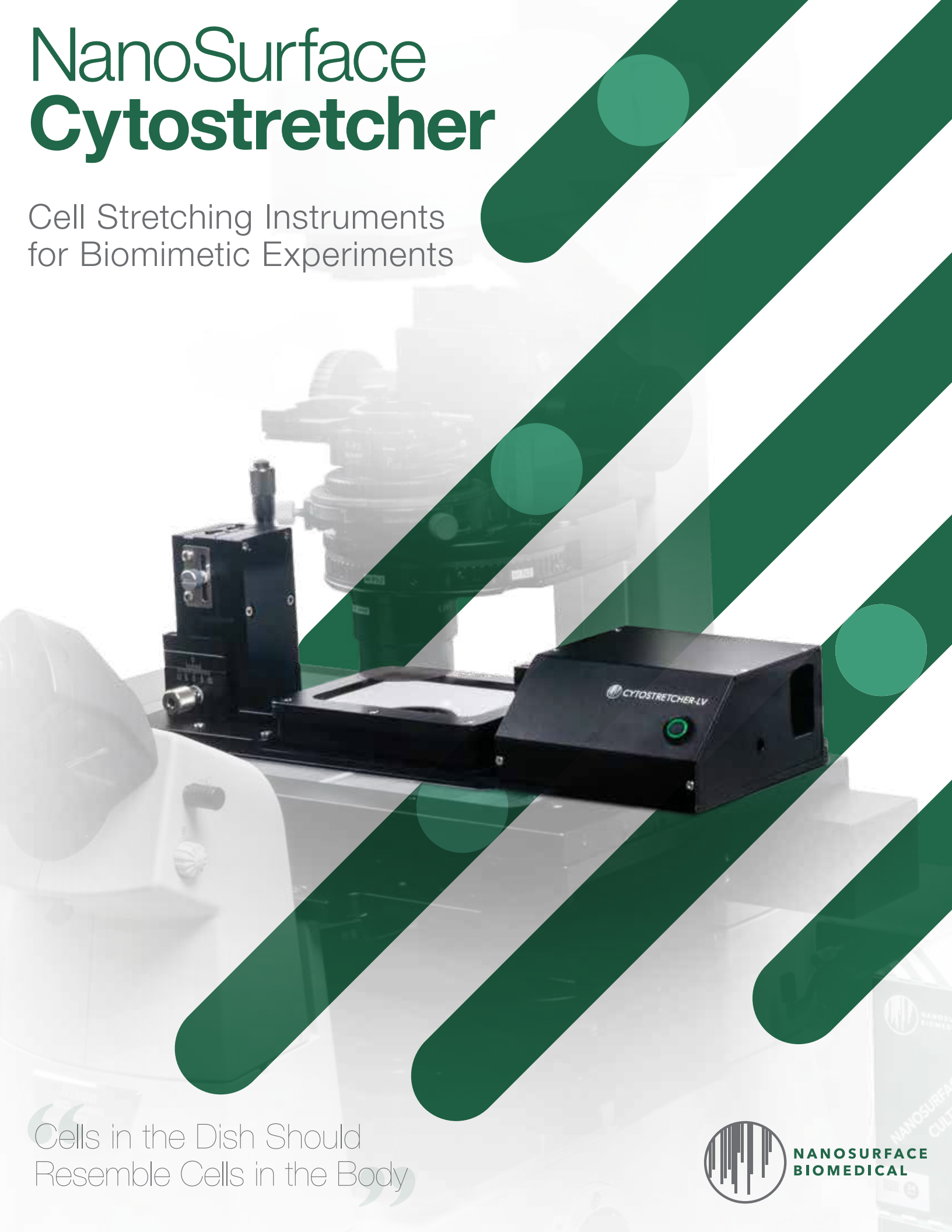
NANOSURFACE BIOMEDICAL

For ordering and more information:
www.nanosurfacebio.com
contact@nanosurfacebio.com
+1-800-913-4403

ANSI/SLAS Compliant

NanoSurface **Cytostretcher**

Cell Stretching Instruments for Biomimetic Experiments



"Cells in the Dish Should Resemble Cells in the Body"

NANOSURFACE BIOMEDICAL

Understand the Effects of Mechanical and Microenvironmental Cues

The NanoSurface Cytostretcher allows researchers to investigate both tissue-level mechanical strain and microenvironmental cues at the same time.

The Cytostretcher family of instruments is a powerful and easy-to-use integrated solution for cell mechanics research. The Cytostretcher and Cytostretcher-LV empower you to gain new insights into the relationship between the cell and its microenvironment – important for nearly all mammalian cell types. NanoSurface's patterning technology provides structural cues that recapitulate the native ECM within flexible stretching chambers. The included NaOMI software provides total experimental control in a clean, intuitive interface.

The flexibility and power of the Cytostretcher family of instruments ensures that every cell stretching experiment can be implemented with ease and precision.

NanoSurface Cytostretcher

Compact Design
The Cytostretcher is extremely compact, easily integrating into your existing cell culture workflow. It can be operated on the benchtop or alongside other cultures inside a standard cell culture incubator – saving valuable space.

Convenient Control Unit
The Cytostretcher Control Unit is a small, lightweight module that can be magnetically attached to the exterior of a cell culture incubator.

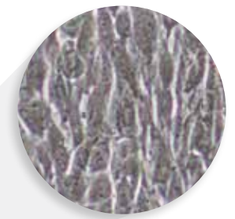
Run Multiple Experiments in Parallel
Flexible Cytostretcher Chambers are available in a variety of formats, so you can mechanically condition many cultures in parallel. Larger chambers offer more culture area (up to 25 cm^2). Smaller chambers offer higher throughput (up to 24 wells).

NanoSurface Cytostretcher-LV

Up To 6 Parallel Cultures
Configure with up to six 25 mm^2 wells or one 144 mm^2 chamber.

Maintain Focus While Stretching
The Cytostretcher-LV is the only cell mechanical stimulation system that enables consistent sample focus during stretch.

Observe Cells While Stretching
Image live cells during your stretch routines. The Cytostretcher-LV and Cytostretcher Chambers are compatible with transmitted light and high-NA fluorescence microscopy, including immersion objectives.



Live C2C12 Cells

Universal Mounting Frame K
Allows for broad compatibility with many industry standard microscopes and stages. Other mount options are available upon request.

Touch Screen Panel
A touch-panel interface provides easy control of culture conditions.

Environmental Control for Long-Term Imaging
The Environmental Control Unit (ECU) is a microscope stage-top incubator that provides complete control of biological culture conditions, including temperature, humidity, and CO_2 concentration. An included thermal camera allows for quick and continuous monitoring of sample temperature.

Flexible Software Allows for Unprecedented Experimental Control

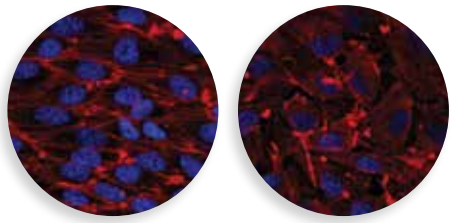
NaOMI – the NanoSurface Operational Mechanics Interface allows for intuitive control of stretching routines and protocols for NanoSurface Cytostretcher instruments.

- Intuitive user interface with powerful editing tools
- Build simple stretch protocols, or complex multi-step stretch routines – no programming skills required
- Save protocols for repeated use or later modification
- Control stretch velocity, duration, frequency, magnitude, delay times before and after stretch, and the type of waveform used to drive the stretch protocol
- Computer-free operation after protocol setup
- Protocol graph for easy visualization
- Standard USB connectivity, compatible with Windows 10

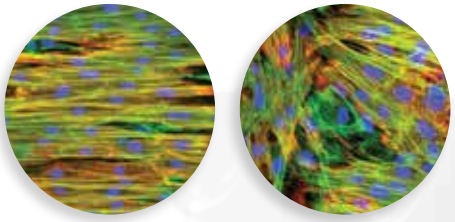
Nanopatterned or Flat Stretch Chambers

Cytostretcher Chambers are available with either NanoSurface topography that mimics the aligned architecture of the native extracellular niche or with traditional unpatterned "flat" surfaces. Patterned chambers feature topography either aligned in parallel or perpendicular to the direction of applied stretch. NanoSurface topography promotes the development of physiologically-relevant structures and phenotypes in many cell types:

- Skeletal muscle cells
- Smooth muscle cells
- Neuronal cells
- Cardiomyocytes
- Endothelial cells
- Epithelial cells
- Fibroblasts
- Cancer cells
- Induced pluripotent stem cells
- Mesenchymal stem cells
- Human embryonic stem cells
- And many more



Endothelial cell culture on a NanoSurface dish (left) vs. a conventional dish (right).



Cardiomyocyte cell culture on a NanoSurface dish (left) vs. a conventional dish (right).

Product Specifications

Instrument	NanoSurface Cytostretcher	NanoSurface Cytostretcher-LV
Size (D x W x H)	Instrument: 280 x 102 x 65 mm Control unit: 110 x 64 x 60 mm	110 x 335 x 122/34/60.5* mm **Micrometer/Body/Enclosure*
Chamber Formats	6 Chambers x 1 well, each well 5 mm x 5 mm 6 Chambers x 2 wells, each well 5 mm x 5 mm 3 Chambers x 1 well, each well 12 mm x 12 mm 1 Chamber x 1 well, each well 50 mm x 50 mm 1 Chamber x 24 wells, each well 6 mm x 6 mm	3 Chambers x 1 well, each well 5 mm x 5 mm 3 Chambers x 2 wells, each well 5 mm x 5 mm 1 Chamber x 1 well, each well 12 mm x 12 mm
Biomimetic Nanotopography	Parallel to stretch, orthogonal to stretch, unpatterned flat	Parallel to stretch, orthogonal to stretch, unpatterned flat
Stretch Protocol	Fully customizable: cyclic, ramp, sine wave, etc.	Fully customizable: cyclic, ramp, sine wave, etc.
Maximum Strain	>20%	>20%
Maximum Velocity	10 mm/s	10 mm/s
Maximum Cycle Frequency	5 Hz	5 Hz

NANOSURFACE BIOMEDICAL

For ordering and more information:
www.nanosurfacebio.com
contact@nanosurfacebio.com
+1-800-913-4403