

# 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<sup>2</sup>). Smaller chambers offer higher throughput (up to 24 wells).



## NanoSurface Cytostretcher-LV

### Up To 6 Parallel Cultures

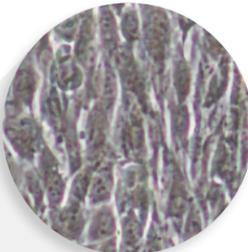
Configure with up to six 25 mm<sup>2</sup> wells or one 144 mm<sup>2</sup> chamber.

### 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<sub>2</sub> concentration. An included thermal camera allows for quick and continuous monitoring of sample temperature.



# Flexible Software Allows for Unprecedented Experimental Control



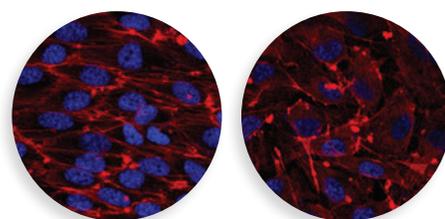
NaOMI – the NanoSurface Operational Mechanics Interface allows for intuitive control of stretching routines and protocols for NanoSurface Cytostretcher instruments.

- 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

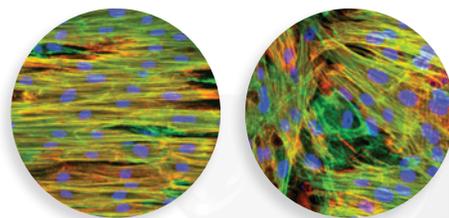
## Nanopatterned or Flat Stretch Chambers

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

