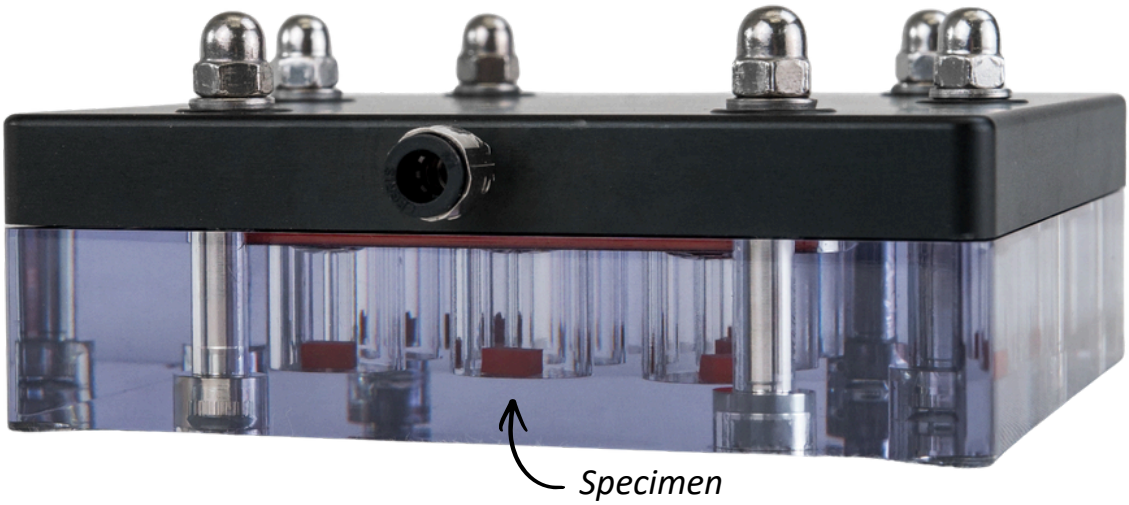
MechanoCulture TR

Hydrostatic Pressure Stimulation Bioreactor

Incubator-Ready
Hydrostatic Pressure Stimulation

Up to 500 kPa
Hydrostatic Pressure

9 Separated Wells
for Parallel Culture Studies



Mechanobiology | Hydrostatic Pressure | Tissue Engineering
Long-Term Culture | Biomaterials | Pressure Stimulation

Run programmable hydrostatic pressure stimulation protocols in nine individual wells while maintaining sterile, incubator-based culture conditions.

CellScale
biomaterials testing



Membrane-Mediated Hydrostatic Compression

Pressure is applied through a flexible membrane and transmitted through media to the specimen. This supports repeatable hydrostatic compression stimulation across nine individual wells.

PC-Independent Incubator Operation

Protocols are programmed on a PC and uploaded before the run, allowing the MCTR to operate inside an incubator without an active computer connection during stimulation.

Sterile Sealed Well Plate Design

Culture-contacting components are designed for sterile workflows, with autoclavable materials and replaceable membranes and O-rings supporting repeated use in long-duration culture studies.

How the MCTR Works

Specimens are submerged in media within a reusable sealed well plate. Each well is filled to the top, covered by a flexible membrane, and connected to the pressure chamber. When the top chamber is pressurized, the membrane deflects downward against the liquid surface, transmitting hydrostatic compression to the specimen through the culture media.

Specifications

Specification	MCTR
Number of Wells	9
Stimulation Mode	Hydrostatic pressure stimulation
Maximum Pressure	500 kPa
Maximum Cycle Frequency	0.5 Hz
Culture Format	Sealed well plate with media-filled wells
Required Input	Compressed air source
Common Uses	Mechanotransduction, pressure mechanobiology, vascular and cartilage-inspired constructs, hydrated biomaterial culture

Configure Your Workflow

Well Plate Format:

Use the reusable 9-well sealed plate for:

- Parallel pressure stimulation studies
- Hydrated culture workflows
- Cohort and treatment group comparisons
- Repeatable specimen positioning

Pressure Range:

Program pressure regimens based on:

- Target hydrostatic pressure magnitude
- Expected biological response
- Study duration
- Pressure stimulation mechanobiology goals

Programmable Control:

Build customizable hydrostatic pressure regimens with:

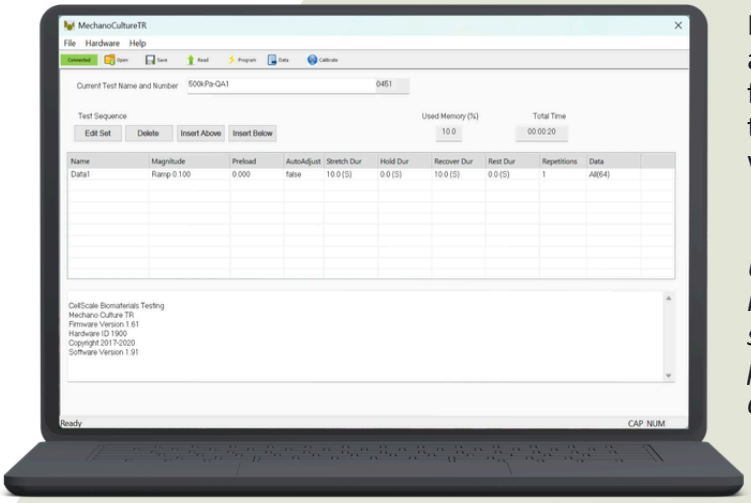
- Cyclic pressure stimulation
- Pressurization, hold, recovery, and rest phases
- Frequency control up to 0.5 Hz
- Defined cycle counts and duty cycles

Study Design:

Use the 9-well format for:

- Parallel culture cohorts
- Mechanotransduction studies
- Pressure dose comparisons
- Acute or long-duration stimulation protocols

Protocol Documentation



Programmed pressure protocols provide a clear record of stimulation magnitude, frequency, cycle count, rest periods, and total run duration for comparison across wells, cohorts, and study time points.

Use protocol records to document hydrostatic pressure dosing, repeat stimulation regimens, and relate pressure exposure history to downstream biological outcomes.

MCTR Applications

Tissue Engineering and Soft Tissue Biomechanics

Use controlled hydrostatic pressure stimulation in:

- vascular tissue engineering
- cartilage and meniscus mechanics
- intervertebral disc models
- bone and musculoskeletal tissue models

Biomaterials and Advanced Materials

Study pressure-mediated response in:

- hydrogels and scaffolds
- cell-laden constructs
- injectable and regenerative biomaterials
- ECM and decellularized matrices

Mechanobiology and Remodeling

Compare biological response under hydrostatic pressure in:

- mechanotransduction studies
- fibrosis and tissue remodeling
- stem cell mechanobiology
- organoid and tissue mimetic systems

Common Sample Types



Hydrogels



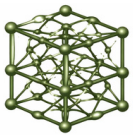
Cell-Laden Constructs



3D Matrices



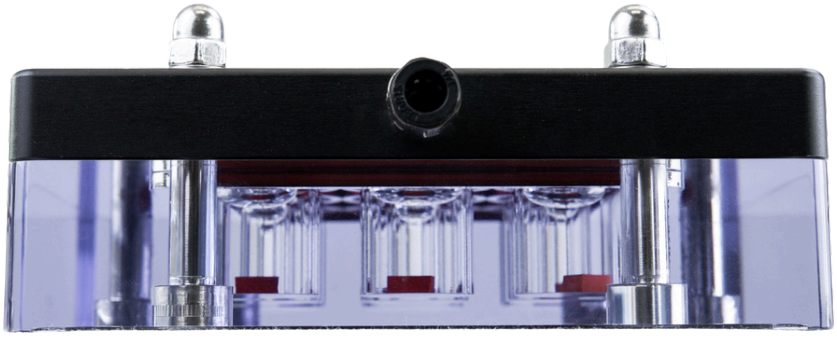
Vascular Tissues



Scaffolds



Cartilage-Like Constructs



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Book A Demo!

Talk with our team about specimen type, pressure regimen, well setup, and the best MCTR configuration for your research.