MechanoCulture J1

Tension Stimulation Bioreactor

Incubator-Ready Tension Stimulation for Long-Term Culture

Logged Force and Displacement for Stiffness Tracking

6 Separated Chambers with Per-Well Protocol Control

Mechanobiology | Cell Stretching | Tissue Engineering
Long-Term Culture | Biomaterials | Soft Tissue Stimulation

Run programmable cyclic strain protocols in six independent chambers while maintaining sterile, incubator-based culture conditions

CellScale
biomaterials testing

How the MCJ1 Works

Specimens are mounted with grips in a reusable chamber plate with media, placed on the controller, and run inside the incubator using a saved stimulation protocol. The system can monitor the force-displacement data in order to determine the stiffness profile of each specimen as a function of time. An optional cooling pump can be added to limit actuator heat transfer during long runs.

Transparent Chambers and Hydrated Culture Compatibility

Clear chambers enable verification throughout stimulation. Sealed ports support hydrated culture workflows and media exchange during long studies.

PC-Independent Incubator Operation

Protocols are downloaded before the run, allowing operation inside an incubator without a PC connection. This supports long-duration culture studies.

Independent 6-Chamber Tension Stimulation

Each chamber has an independent actuator and load cell for per-well protocols. Chambers can be configured individually or disabled when not in use.

Choose Your Model

Specification	Small	Standard
Chamber Width	15 mm	39 mm
Chamber Volume	30 mL	150 mL
Clamp Force	up to 20 N	up to 100 N
Max Grip Separation	39 mm	55 mm
Actuator Stroke	25 mm	25 mm
Common Uses	Smaller engineered constructs and substrate stretching workflows	Scaffold-based constructs, larger tissue samples, and broader specimen formats

Configure Your Workflow

Chamber and Grip Format:

Choose Standard or Small chambers and grips based on:

- Specimen size
- Construct format
- Working volume

Load Cell Range:

Select 10 N, 20 N, 50 N, or 100 N load cells based on:

- Expected specimen response
- Level of sensitivity needed

Programmable Control:

Build customizable regimens with:

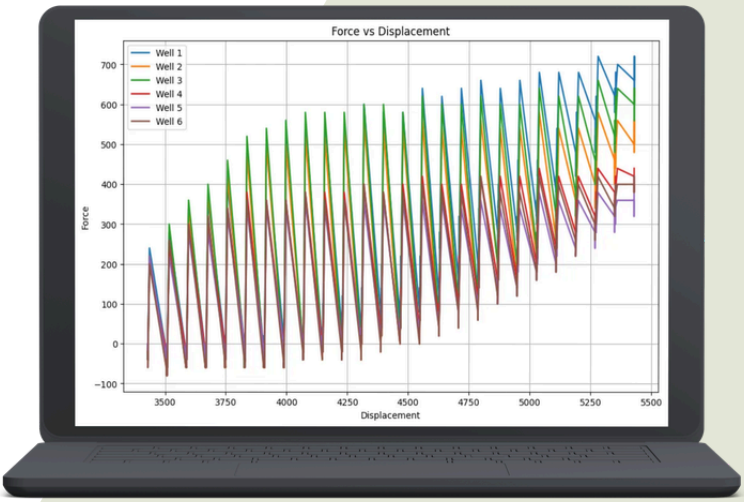
- Cyclic or intermittent loading
- Stretch, hold, recovery, and rest phases
- Force or displacement control matched to construct stiffness and study goals

Study Design:

Use independent chamber controls for:

- Cohort and treatment group comparisons
- Protocol screening and parallel studies
- Logged force and displacement tracking after each run

Typical Outputs



Force-displacement data, time-based protocol records, stiffness trends across culture duration, and downloadable CSV outputs for comparison across chambers, cohorts, and stimulation regimens.

Use logged outputs to compare specimens, follow stiffness trends, and relate mechanical conditioning to biological response over time

MCJ1 Applications

Tissue Engineering and Soft Tissue Biomechanics

Use controlled cyclic strain and stiffness tracking in:

- cardiac tissue engineering
- tendon and ligament constructs
- skin and wound healing models
- lung and pleural tissue models

Biomaterials and Advanced Materials

Study mechanical conditioning and adaptation in:

- hydrogels
- 3D bioprinted and bioink constructs
- ECM and decellularized matrices
- fatigue and durability workflows

Mechanobiology and Remodeling

Compare biological response under controlled stretch in:

- stem cell mechanobiology
- mechanotransduction studies
- fibrosis and tissue remodeling
- drug screening and delivery mechanics

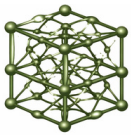
Common Sample Types

Cardiac Tissues

Hydrogels

3D Bioprints

Tendons & Ligaments



Scaffolds

Soft Tissue Samples

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Book A Demo!

Talk with our team about specimen type, chamber format, grip selection, and the best MCJ1 configuration for your research workflow