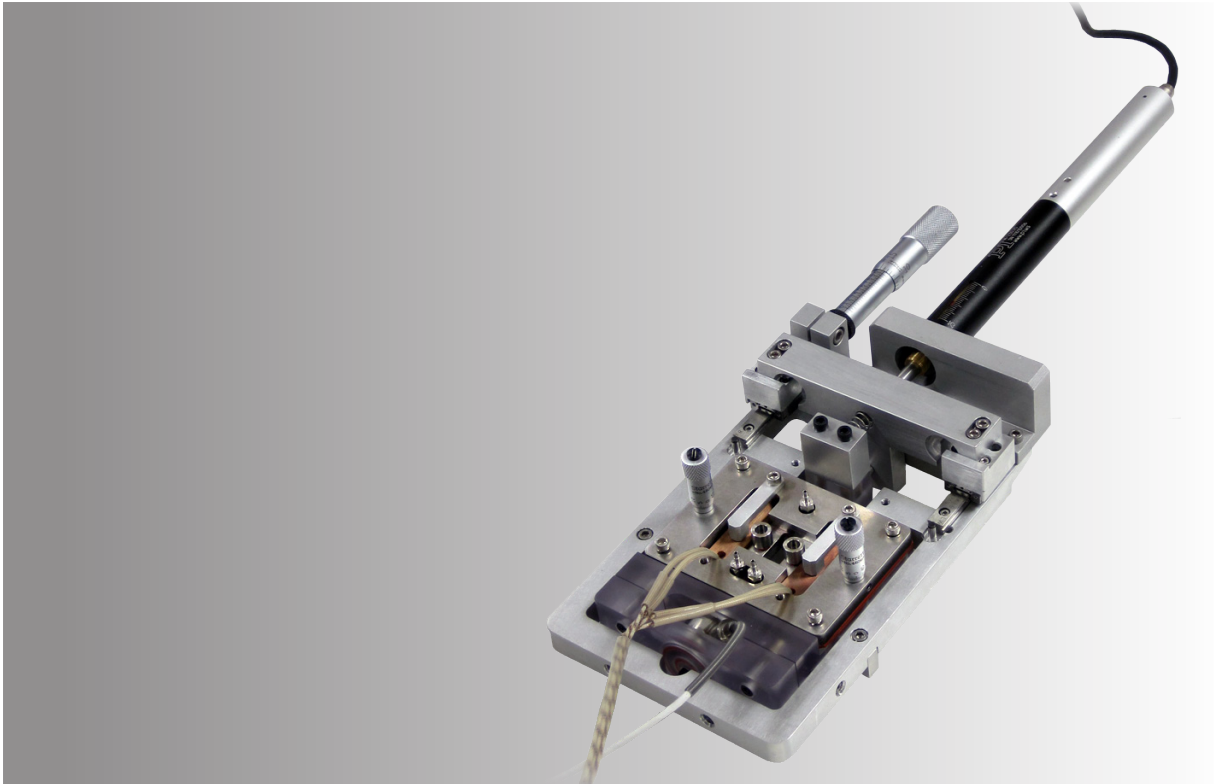


BioTense

System Brochure



BioTense

Bioreactor

A state-of-the-art perfusion bioreactor for studying mechanotransduction in mechanobiology

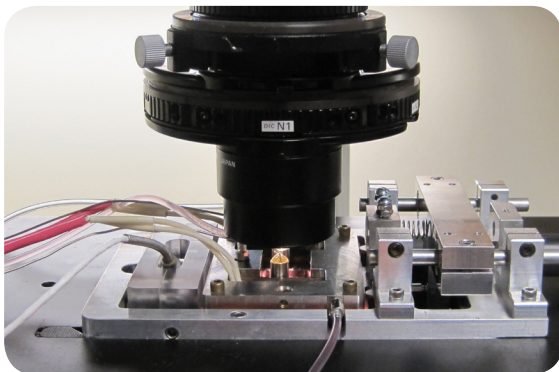
Applications

The BioTense Perfusion Bioreactor is a next generation instrument designed to help tissue engineers and cell biologists perform high resolution investigation in mechanobiology. BioTense sits atop the XYZ stage of an inverted microscope. Unique to the BioTense is its ability to apply uniaxial mechanical stimulation and allow for the direct observation of cell/matrix interaction at high magnification over long periods of time. To date, the instrument has successfully recorded a) the process of fibroblasts populating, growing to confluence and stratifying on different substrates; b) complex and organized cell sheet motions; and c) coordinated extracellular matrix production.

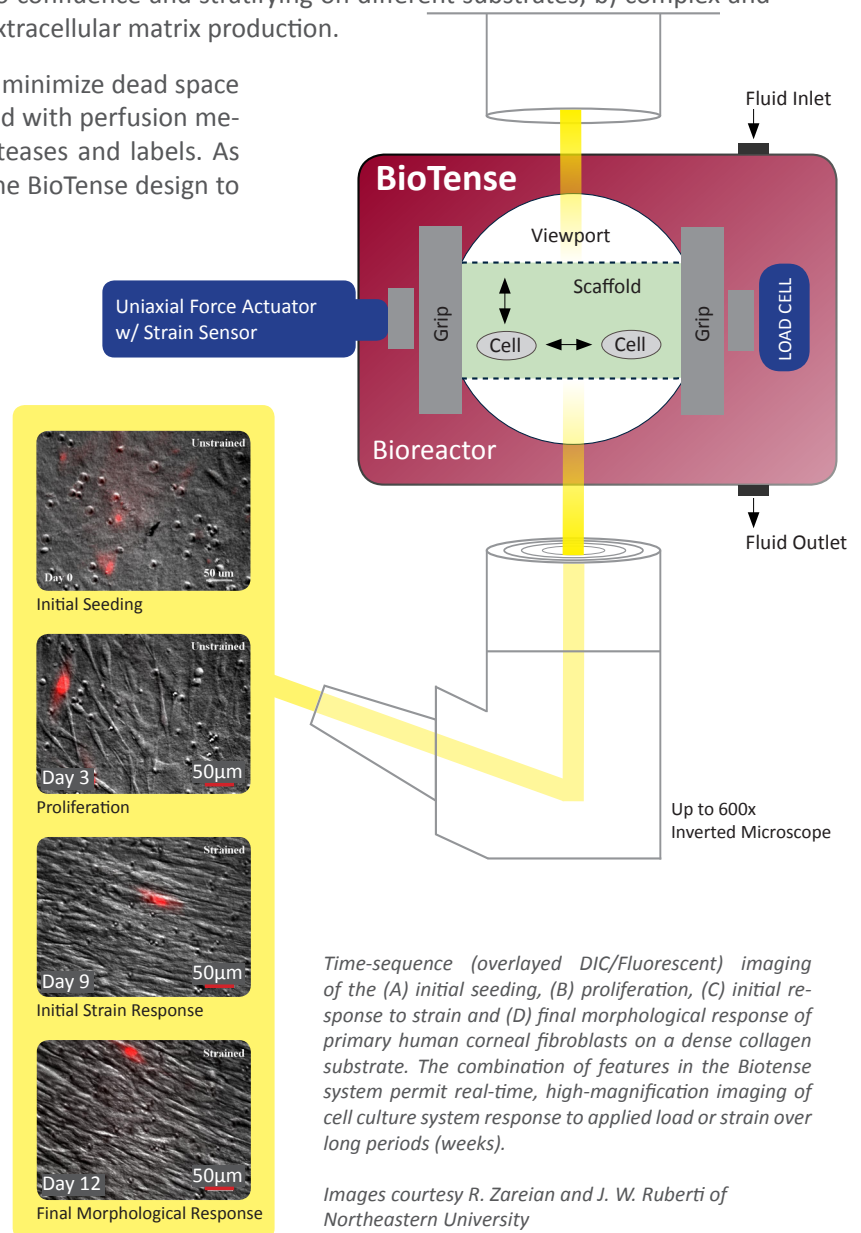
The BioTense has an adjustable height chamber to minimize dead space (< 2mL possible) which reduces the costs associated with perfusion media, exogenous stimulatory/inhibitory agents, proteases and labels. As with all of our testing systems, ADMET will tailor the BioTense design to meet your needs.

Key Features

- Enables cells to proliferate and differentiate over long periods of time
- Maintains desired concentrations of nutrients through a perfusion process
- Exposes tissues to uniaxial force and strain fields
- Provides a window to directly observe cellular activity at high magnification
- Accurately controls reactor temperature
- Minimizes dead space volume with an adjustable height chamber



BioTense sitting atop XYZ stage of inverted microscope



BioTense

Bioreactor

Features

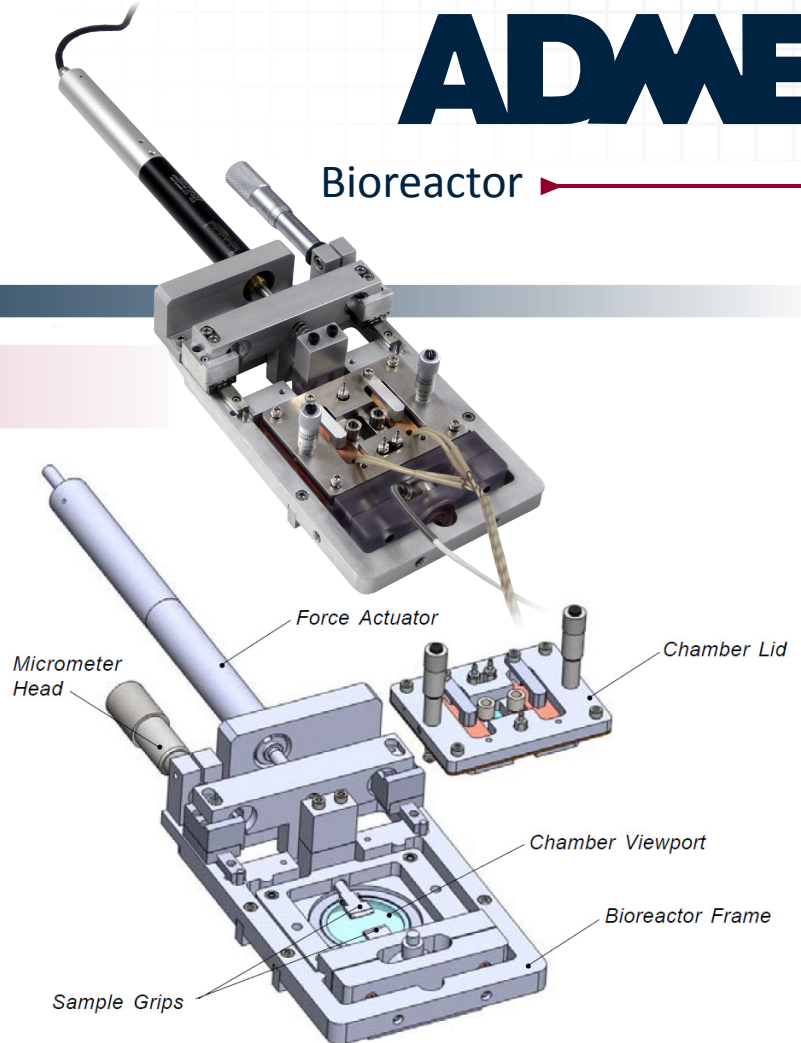
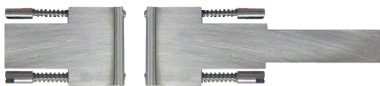
Main Chamber: Consists of a chamber lid, chamber viewport and bioreactor frame. The chamber lid includes the heating elements, thermocouples and window for viewing the test specimen. The chamber viewport is vertically adjustable and permits the objective to approach the sample to within the working distance of a high NA 60x objective. The frame is the structural member that supports and locates all major components. It thermally isolates the bioreactor from the microscope and is used to locate the bioreactor on the microscope stage. All components that contact chamber fluids are biocompatible and can be sterilized between uses.

Optical Access: The key feature of the BioTense is its adjustable viewport which enables continuous, long term imaging with a high powered optical microscope up to 600x.

Chamber Volume: To minimize dead space, the adjustable viewport and grips are designed to ensure that the sample is the lowest object in the chamber. With judicious selection of sample sizes a chamber volume as little as 2mL is possible.

Actuator Control: ADMET's MTESTQuattro® controller records force, strain and temperature data in real-time. It features a fast acting PID closed loop controller with user programmable control profiles. Ramp, ramp and hold, step, cyclic sinewave and sawtooth waveforms are possible. Each control segment can be force or strain based. Refer to the MTESTQuattro® brochure for more information.

Sample Grips: BioTense provides threaded connections for easy grip attachment. ADMET offers several grip designs to accommodate various tissue/scaffold types. Our engineers will also work with you to design grips that meet your specifications.



Uniaxial Force Actuator: A manual or computer closed loop servo controlled actuator can be supplied with each BioTense. Both actuators provide a maximum tensile force of 7N and stroke of 25 mm. The closed loop servo actuator has a maximum speed 1.2 mm/s and includes an integrated displacement transducer with 0.0046 μm resolution. The lower cost manual actuator employs a micrometer head for force actuation. A displacement transducer can also be integrated with the manual actuator for recording strain. Both systems come equipped with ADMET's MTESTQuattro® controller. Miniature load cells are provided with each BioTense with capacities ranging from 0.001N to 5N.

Temperature Control: The chamber lid includes two heating elements and thermocouples each. One thermocouple is connected to the temperature controller. The second thermocouple is operated by a temperature limiter. The limiter will shutdown the temperature controller when the temperature exceeds a user settable value. This prevents thermal damage to the microscope.



Sales and Service

Training and Service: ADMET testing systems are easy to learn and use. We provide free introductory on-line training and, if needed, additional on-site training. Our manuals, tutorials, and troubleshooting guides are updated regularly. We provide free phone and email product support through the life of the system. ADMET's on-site service and calibration team includes over 100 individuals in over 40 locations in the USA.

Sales: For more information about the BioTense bioreactor and other ADMET products, please call 1-800-667-3220. Our sales engineers can also be contacted by email at sales@admet.com

Test with Certainty.



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