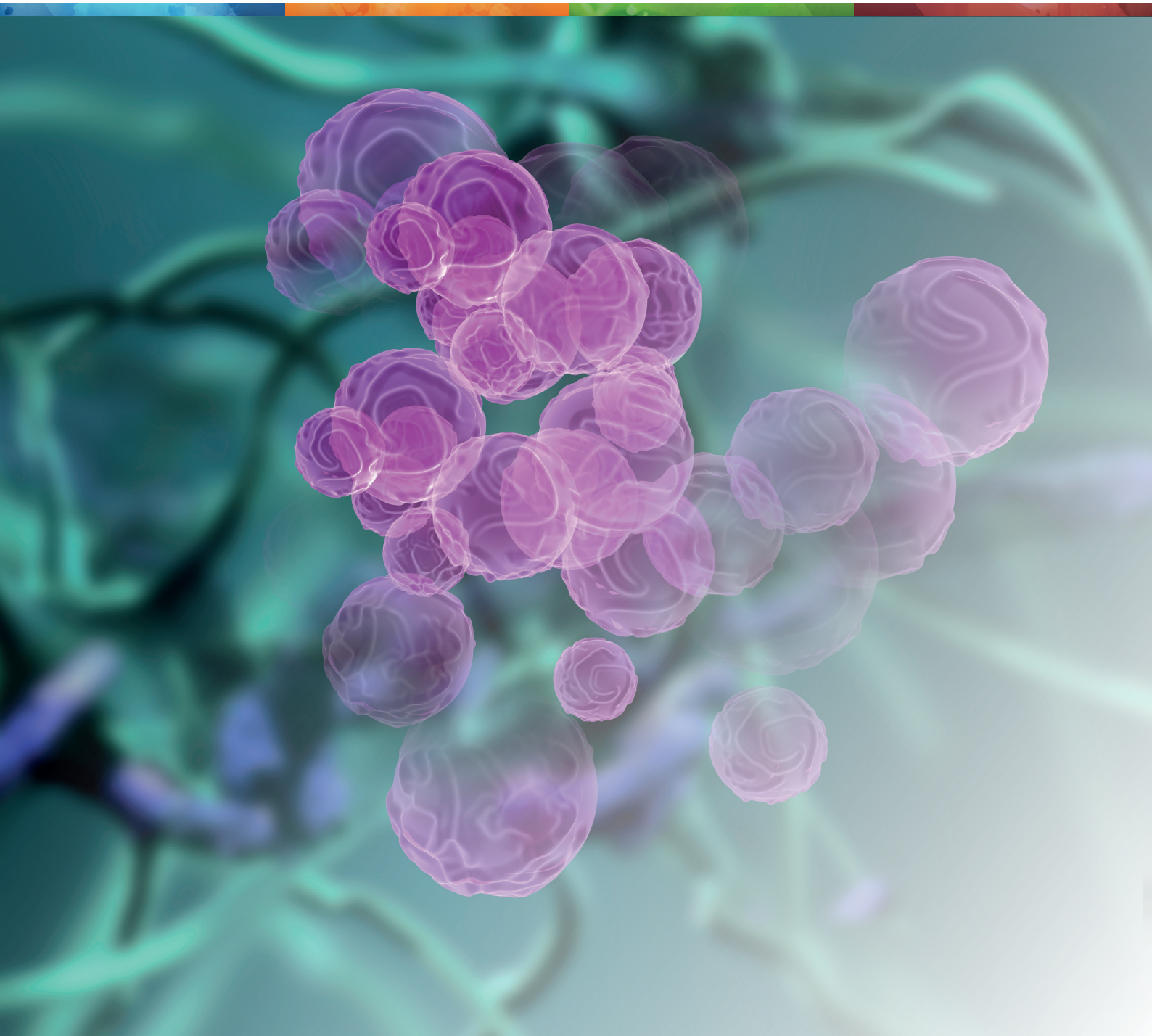
Microbiology Cell Biology Biotechnology Process Control

I&L Biosystems

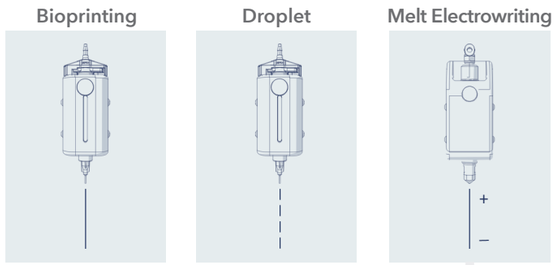
3D Cell Culture and Assays
Tissue Engineering



Axolotl Biosystems

3D Bioprinter

Bioprinting is creating solid models or cell scaffolds according to computer generated 3D models with the usage of biocompetible polymeres, bioinks and cell suspensions.



ALL COMBINED IN THE SAME PLATFORM...

... SCAFFOLDS CAN BE CREATED WITH ANY TYPE OF POLYMERS AND INNER STRUCTURE.

Brioprinting

Build Volume	130 x 90 x 80 mm
Layer Resolution	<10 µm
XYZ Positioning Resolution	1.25 µm
Printhead Slots	Up to 6, Can perform multiphased bioprinting
Air Pressure Range	0 – 120PSI
Needle Calibration	Automatic

Brioprinting Living Tissues

- Bone and Cartilage Productions
- Soft Tissue Productions
- Controlled Dispension of Drugs
- 3D Organ Bioprinting

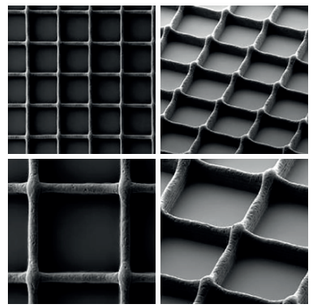
Bone Marrow Stromal Cells, Mesenchymal Stem Cells, Cardiac Progentior Cells, Human Umbilical Vein Endothelial Cells, Chondroctyes, Fibroplast

Printing Materials

PCL
PLLA
PEG/PEGDA
Silk Fibroin
Propylene Glycol
Alginate
Nanocellucose
Collagen & Gelatin Solutions
Cell Suspensions
Ceramic Based Cement
Metal Based Cement

and more...

Melt Electrowriting



Print your meltable polymers on **submicron level** in a real 3D shape without any harmful solutions.

Printheads & Print Surface

HD Camera Toolhead	UV Curing Toolhead	UV Crosslink Toolhead	Heated Printhead	Melt Electrowriting Toolhead	Cooled Printhead
Resolution 1920*1080	365 nm 395 nm 405 nm	405 nm	Up to 265°C	Up to 30 kV	Down to 3°C

Print Surface Type	Petri Dish, Well-Plate, Glass Slide, Custom Surface
Printbed Surface Temperature	From -10°C (with module) to 60°C

Noozles & Needles

Inner diameter of bioprinting needles	14G to 34 G
Lenght option of bioprinting needles	0,5 inch, 1 inch
Stainless Steel nozzles for printing scaffold	S100, 200, 250, 300, 400 micron
Brass nozzles for printing scaffold	100, 200, 250, 300, 400 micron

CONTROL • PROTOCOL • MODE • PRINT

Hardware

Sterilization	UV-C
Air Filtering	HEPA and prefilter with 0,2 micron membranes
Connectivity	USB

Software

Supported File Types	STL and .gcode
Infill Density Range	%0 to %100
Infill Pattern Types	Rectilinear, Grid, Aligned Rectilinear, Honeycomb, Concentric, Cubic, Wave

Protein Fluidics Inc.
Pu.MA System

Automated 3D Cell-Based Assays

The Pu·MA System 3D allows media, metabolite or reagent exchanges in a specially designed flow chip to automate assays for your 3D cell models, organoids and spheroids. Fluid movements are precisely pneumatic controlled. The assays take place in a protected chamber that eliminates all temperature and mechanical perturbations of the 3D cell models during fluid transfers and incubation steps.

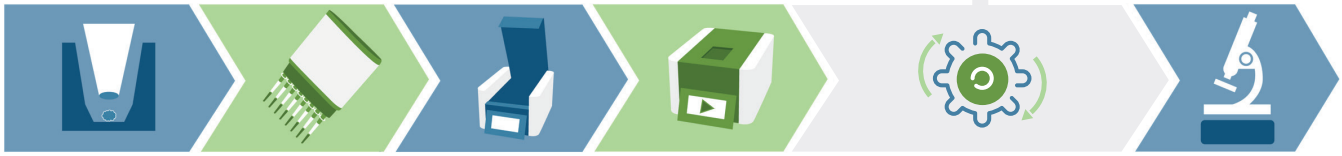
- 8-32 samples per run
- 1-5 days processing time
- 10-20 µL reagent volume
- Compact system fits any standard cell culture incubator
- Compatible with high content imaging and plate reader systems
- Compatible with Matrigel

Immunofluorescence staining

***In situ* cell lysis and Supernatant Sampling**

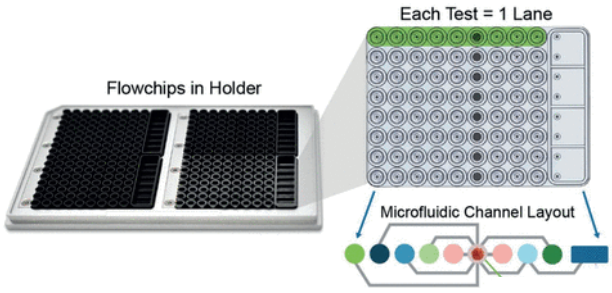
Staining for Cell viability Markers

Sequential Drug Addition

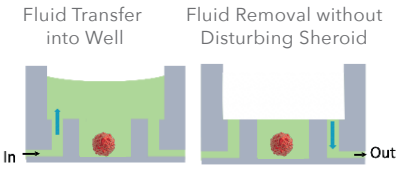


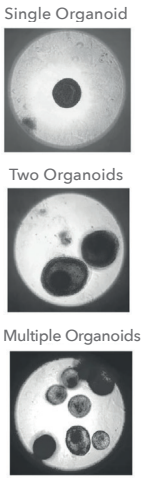
Load Cells | Load Reagents | Place Plate in System | Press Play | Automated « hands-off » steps for complex assay protocols | Ready for Analysis

Perform *in situ* media exchanges, compound additions and supernatant sampling

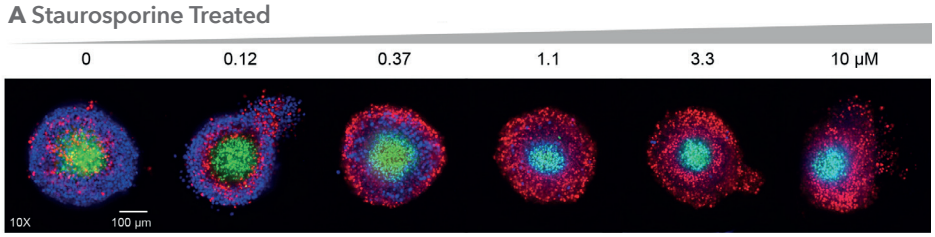


Protected sample chamber to prevent cell damage





A Staurosporine Treated

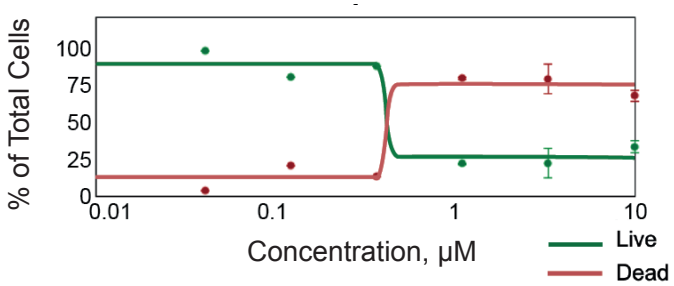


Toxicity analysis with HepG2 spheroids

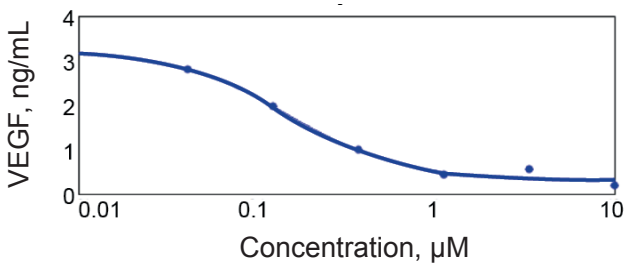
A Confocal imaging of HepG2 spheroids treated with increasing concentrations of Staurosporine (0 to 10 µM) and stained with nuclear stain (Blue), cell viability dye (Green), cell death stain (Red). B Percentage cell number live versus dead cells upon treatment . C In situ secreted factor analysis by measuring VEGF levels from the media sampled after spheroid incubation with Staurosporine treatment.

from: Application Note - Protein Fluidics

B Live/Dead Analysis



C In Situ Secreted Factor Analysis



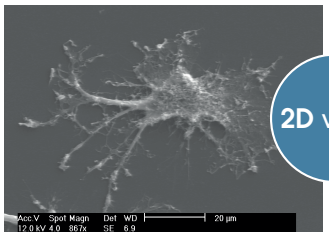
Nanofiber Solutions Inc.

Standardised 3D Scaffolds

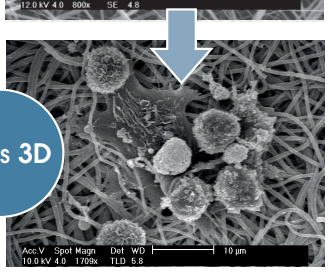
Nanofiber Solutions™ are 3D cell culture surfaces for culturing, high-throughput, real-time imaging and quantification. Nanofibers mimic the 3D topography found in vivo providing a realistic environment for all types of cells. They use either aligned or randomly oriented polycaprolactone (PCL) nanofibers integrated into standard multi-well cell culture dishes.

NanoECM™
extracellular matrix

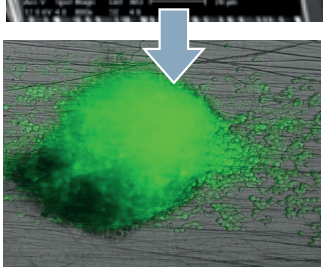
NanoAligned™
white matter, central nervous system, cardiac tissue, skeletal muscle



Umblical cord stem cells cultured standard tissue culture polystyrene



Umblical cord stem cells cultured on Nanofiber Solutions' nanofibers to maintain stem cell phenotype while allowing higher expansion rates



Human brain tumor biopsy showing migrating tumor cells along the aligned nanofiber

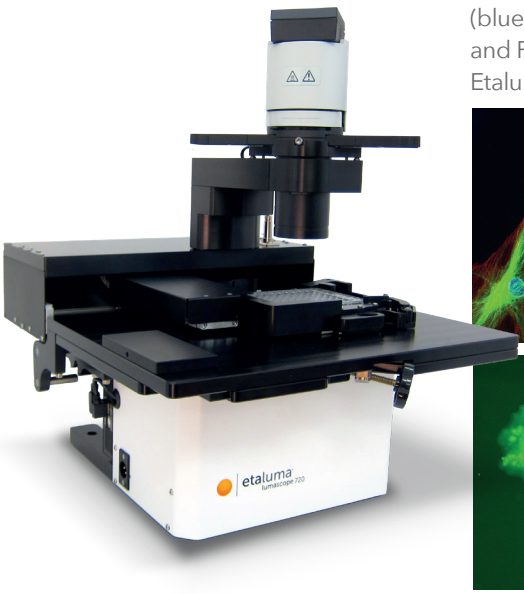
- 6-, 24-, 96- or 384-well plates
- Optically transparent, compatible with light/visible microscopy
- 700 nm diameter polycaprolactone (PCL) fibers
- NanoHep™ (300 nm diameter) increases viability and enzyme expression for hepatocytes
- Fiber layers on the bottom of the plate is ~20 microns thick
- Polymers will not degrade
- Polymers can be coated with extracellular matrix proteins such as laminin, collagen, fibronectin, poly L-Lysine, ligands, etc. with simple lab protocols
- Cells are easily removed using Trypsin-EDTA, or Accutase
- Plates are plasma surface treated and ready to use directly out of the package
- Each plate is UV light, gamma irradiated or e-beam treated and are shipped sterile.

Etaluma
Lumascopes

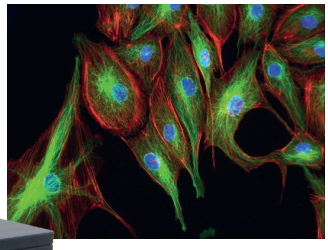
High Resolution, Inverted Fluorescence Microscopy

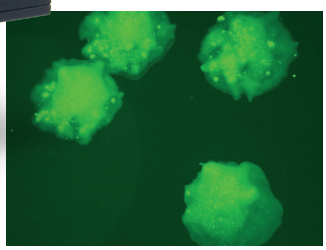
Easily record your photos, time-lapse series, and live videos directly to your computer.

- Walk-away automation
- Blue, green & red fluorescence, brightfield, phase contrast
- 1.25x, 2.5x, 4x, 10x, 20x, 40x, 60x, and 100x(oil) magnification
- Image size: 100x100 to 1900x1900 pixels
- Video rates: up to 30 fps
- Autofocus, z-stacks, ROI, tiling…
- No pixel shift
- Powered by a USB connection
- Footprint: 46,8 cm x 37,4 cm x 43,8 cm



BPAE Cells showing DNA (blue), alpha-tubulin (green) and F-actin (red)
Etaluma LS 620 40x





Spheroids
Etaluma LS 720

Quintech Life Sciences
TisXell Bioreactor

Bi-Axial Rotating Bioreactors with Perfusion

- Biaxial, uniaxial or swing modes of operation
- Continuous perfusion from 3 to 500 mL/min
- Working volume: 50, 250, 500 and 1000 mL
- Oxygenator column unit to facilitate gaseous exchange
- Sensor bank for optional temperature, pH and oxygen probes
- Customizable scaffold holders

Applications

Bone Regeneration

Biomaterial Testing

Adipose Tissue for Breast Reconstruction

Bone marrow Stromal Cells

Cartilage Regeneration

Heart Patch Research

Co-culture hfMSC and co-culturing with EPC

Stem Cell Expansion

Unique features

- Provides biaxial revolution in two independent axes
- Allows for flexible operation modes
- Permits efficient nutrients and waste exchange within the 3D scaffolds
- Unique spherical vessel design promotes a conducive growth environment

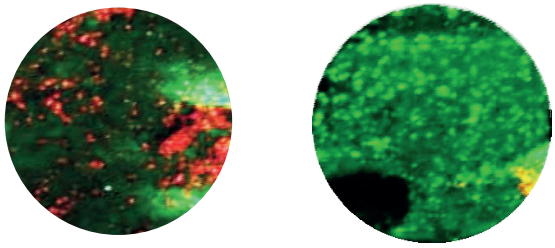
Key benefits

- Accelerates cell growth and proliferation
- Supports homogenous cell culture at surface and core of 3D scaffolds
- Maintains functionality and viability of tissue constructs or implants
- Reduces formation of necrotic neo-tissue
- Promotes integration of implants to surrounding tissue

For Bone Cells

- Enhanced Cell Proliferation and Viability

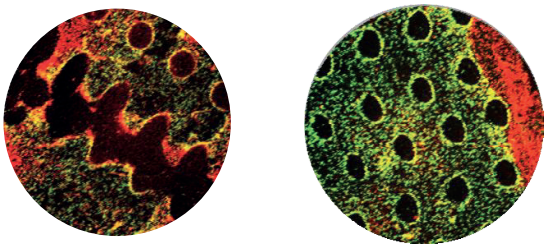
Conventional **TisXell™**



Increased necrosis in conventional culture conditions after 28 days

- Increased Osteogenic Properties

Conventional **TisXell™**



3 months after tissue engineered bone graft

„I have used TisXell for several years as part of my research in regenerative medicine of cartilage. The aim is to synthesize chondrocytes from stem cells in biodegradable 3D scaffolds. Tisxell was already known for its applications in bone tissue engineering. I wanted to adapt it for cartilage tissue engineering, with success.

The characteristics of TisXell are ideal for the in vitro synthesis of chondrocytes because this device allows both continuous irrigation by laminar flow in the heart of the cellularized scaffold and exerts a mechanical stimulation due to its biaxial rotation, which is favorable to the synthesis of cartilage."

Nathalie Luciani, Researcher, Université Paris-Diderot

Rheolution Inc.

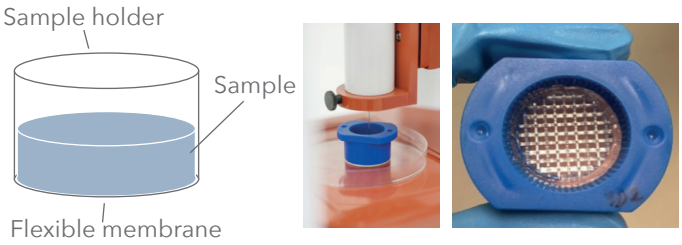
ElastoSens™ Bio – Soft Matter Analytics

Real-time & Non Destructive Viscoelasticity Testing

ElastoSens™ Bio is a benchtop instrument that precisely characterizes in real-time the viscoelastic properties of soft materials without contact and without destroying samples. Samples are contained into removable sample holders that can be disconnected, stored out of the instrument and re-connected for re-testing as many times as required. You can remotely monitor and analyze your test with the Soft Matter Analytics™ tablet.

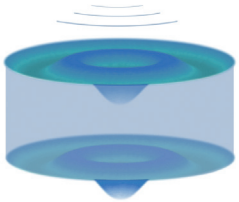
1. Sample loading

Pour or directly print your sample into the sample holder



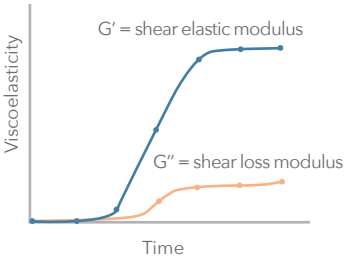
2. Vibration

Contact free vibrations are applied to the sample. Sample resonance is captured by a laser and ultrasounds



3. Data processing & Display

Raw data is processed and viscoelasticity is displayed in real time



Enables retesting of your sample

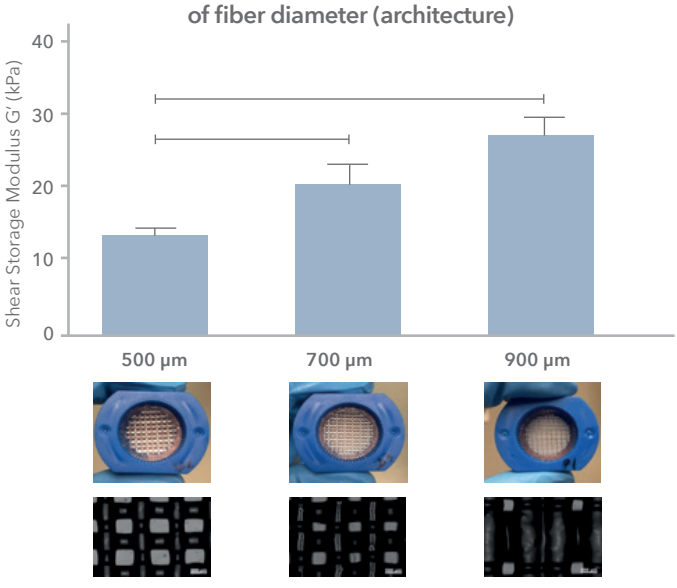
Peltier temperature advanced control 4 °C - 70 °C

3 Built-in photostimulation sources 365nm, 385nm, 405nm

Built-in gas entries for environmental control

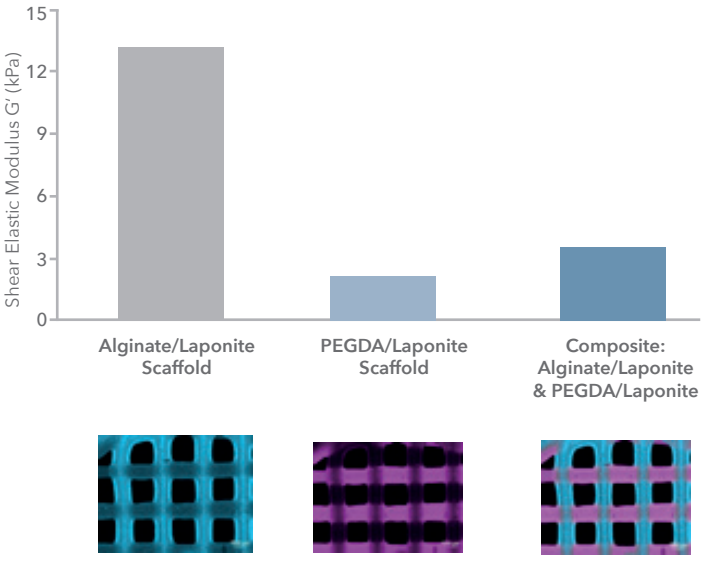
Bio - Mode

Testing of 3D bioprinted scaffolds as a function of fiber diameter (architecture)



Viscoelastic properties of 3D bioprinted scaffolds with different fiber diameters (different porosity) were assessed. Viscoelasticity was processed via the shear elastic modulus (G′)

Testing of 3D bioprinted multimaterial scaffolds



Viscoelastic properties of 3D bioprinted scaffolds with either a single material or composite materials were assessed.

Present across Europe

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