Scintica:

NGB-R

Next-Generation Bioprinting

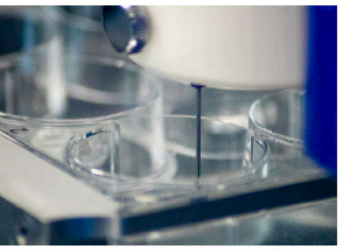
A new, disruptive 4D bioprinting approach to make complex, functional living tissues

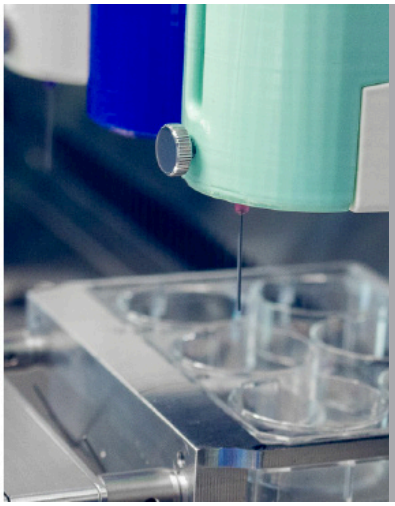
The NGB-R is a multimodal, 4D bioprinting system developed and designed specifically for tissue engineers, researchers, and biologists. Combining laser-assisted, micro-valve, and extrusion bioprinting, the NGB-R enables true versatility of bioprinting (from cells to spheroids) and offers the possibility of using a large number of biomaterials and hydrogels. The NGB-R also includes an embedded microscope for in-line monitoring and relies on a complete software suite for managing bioprinting protocols, from biological CAD to data analysis of manufacturing.

Overview

Bioprinting allows for the fabrication of scaffolds, cells, tissues, and organs with high accuracy, reproducibility and specificity. These technologies utilize cells or cell factors as a "bioink" to fabricate prospective tissue structures. Recently, immense progress has been made in printing various types of tissue, including vasculature, heart, bone, cartilage, skin and liver, but many conventional tissue engineering and 3D bioprinting techniques are still limited to coarse resolution of 300-500 µm.

The Next Generation Bioprinting (NGB) platform from Poietis has been developed to overcome current tissue manufacturing shortfalls and solve critical limitations of existing 3D bioprinting technologies thanks to single-cell resolution and learning-based methods. This platform integrates automation and robotics, and numerous online sensors – including cell microscopy – and Artificial Intelligence. In addition, it integrates all bioprinting techniques (laser-assisted bioprinting, bioextrusion and micro-valve bioprinting), a world's first in the bioprinting market.





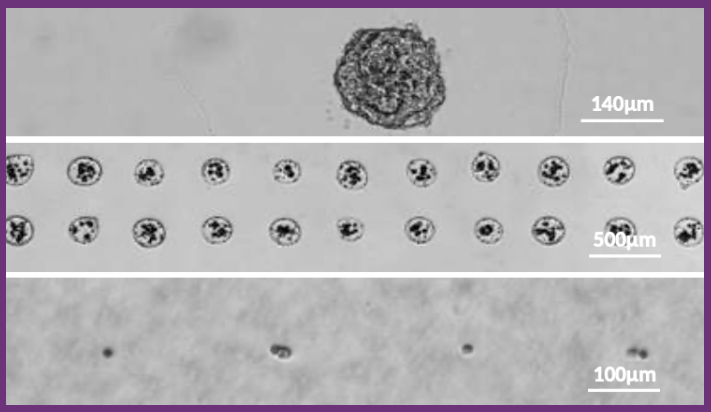
Cell resolution: 1 to 100 cells/droplet
Printing speed: 10,000 droplets/second
Precision: 10 µm
Droplet volume: from pL to nL
Viscosity: 20 to 300 mPa.s min
Cell concentration: up to 100 millions/mL
Min. bioink volume: 4µL

Why add Laser-Assisted Bioprinting (LAB) to your current work?

Poetis' laser assisted bioprinting (LAB) technology overcomes many of the technical limitations of extrusion based bioprinting methods and makes it possible to print living cells and biomaterials with a cell-level resolution. It is therefore the bioprinting technology that offers the highest resolution. Further, LAB allows cells to be positioned in three dimensions with micrometric precision allowing users total control over cell density, distribution and patterns within the printed tissues.

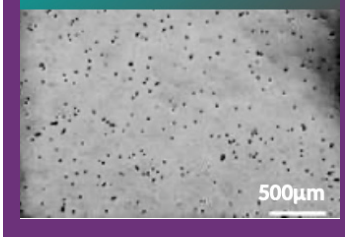
Laser-assisted bioprinting usually consists of three parts: a pulsed laser source, a cartridge (composed of an ink film spread on a glass plate), and a receiving substrate. The focusing of a laser pulse on a cartridge results in the formation of an ink jet towards a receiving substrate on which cell microdroplets are collected. By controlling the physical conditions of the ejection (energy, viscosity, etc), the volume of the droplets is controlled precisely (~ picoliter). The cell patterns are obtained by rapid scanning of the cartridge by the laser, which results in the formation of 10,000 droplets per second.

All resolution and precision levels available

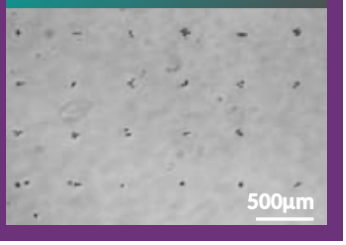


Ideal for cell-loaded bioinks

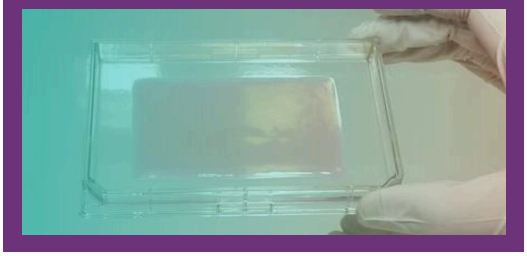
Bio-extrusion
random cell distribution



LAB
precise cell distribution



>95% cell viability



> *Poietis' technology is currently used to allow for automated reproduction of Mimeskin™ containing dermal and epidermal cells linked to active ingredient performance evaluation.*
>
> **David Herault, BASF**

> *We envision combining Prometheus' cell-based technologies together with Poietis' bioprinting technology to treat skeletal defects effectively.*
>
> **Frank Luyten, KU Leuven**

> *Poietis' technology has the potential to deeply transform hair-treatment approaches by bioprinting hair follicles to regenerate hair, one of the most difficult and complex challenges in Tissue Engineering.*
>
> **Luc Aguilar, L'Oréal**