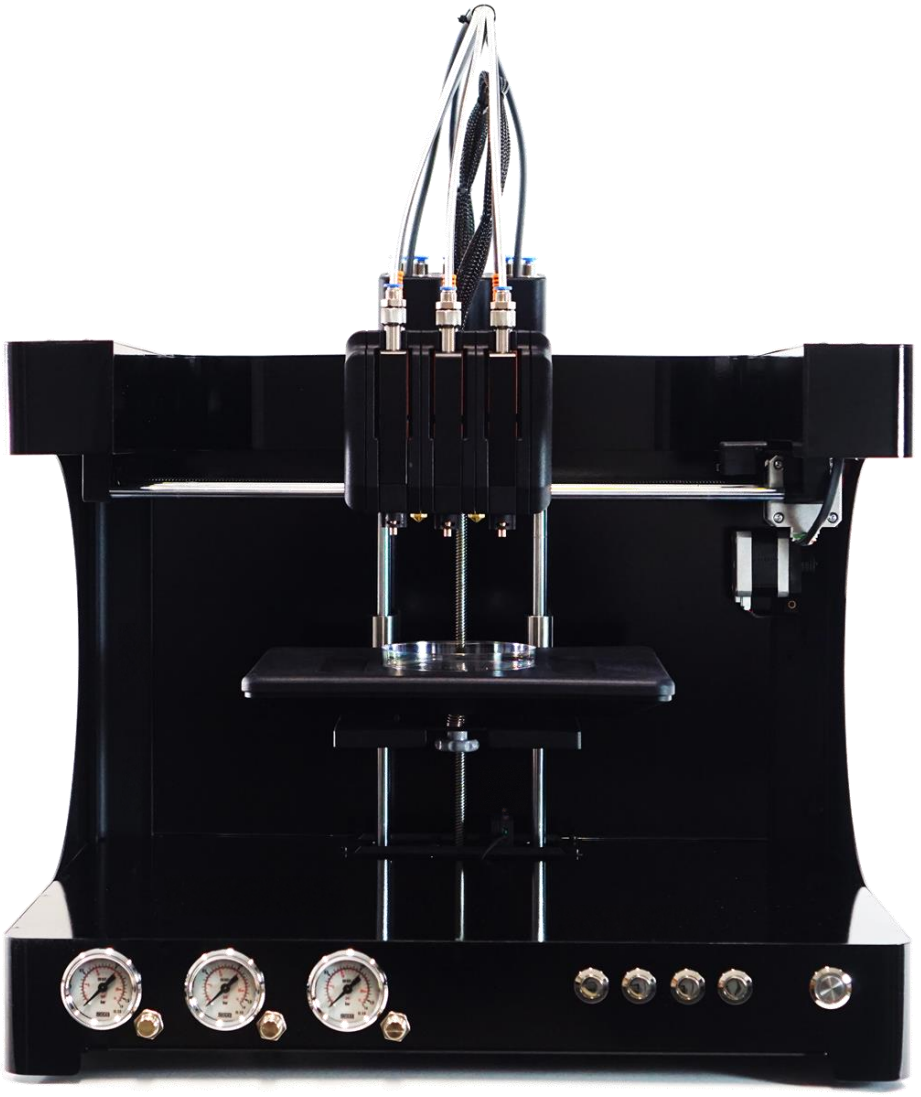
Black Drop

Regenate



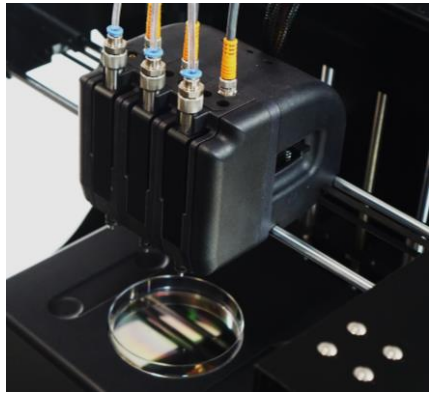
Introducing Regenate 3D-Bioprinter

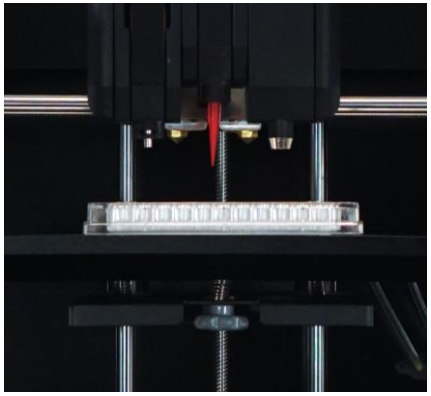
Modular 3D-Bioprinter adapted to your research

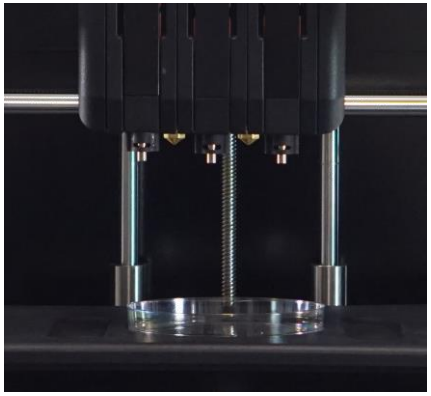
Regenate 3D-Bioprinter was designed by biomedical engineers for 3D-bioprinting scientists, researchers, and laboratory assistants working in academia or industry.

The combination of intuitive design and the renowned accuracy of German engineering makes this printing system and its accompanying software user-friendly, facilitating rapid mastery for new operators.

Since it offers a broad range of adjustable settings, it's at the same time a highly valuable tool for scientists, that seek to customize the printing process to their specific needs.







Key Features

Black Drop The bioprinting company

Multimodal printer heads

- Drop-on-demand (up to 6 printer heads)
- Microextrusion (up to 6 printer heads)
- Hot-melt extrusion (up to 2 printer heads)
- UV-crosslinking (365nm to 405nm)
- Customized printing modalities (e.g. spheroid placement)
- Individual printer head offset (Z-axis)

Multi-material printing with high resolution

- Bioinks
  - Protein-based bioinks: Collagen, Fibrin, Laminin, Fibronectin, Fibroin etc.
  - Polysaccharide-based bioinks: Agarose, Alginate, Chitosan etc.
  - Sacrificial material and progenes: Gelantin, Poloxamers (e.g. Pluronic) etc.
  - Bioink addictives: nanoparticles etc.
- Thermoplastic biopolymers: PCL, PLA
- Hybrid 3D-Bioprinting of fiber reinforced tissues for medical applications

Modular printing platform (heating & cooling integrated)

- Planar printing table
- Printing on cell culture dishes / well plates
- Printing into bioreactors and microfluidic chips
- Printing into liquid support bath (e.g. submerged bioprinting, FRESH bioprinting, etc.)
- 4D-bioprinting onto rotating objects

Ultra-high post-printing cell viability

- Predictive nozzle shear stress and cell viability rate estimation due to integrated power-law algorithms
- Can be applied to existing or novel bioinks (if the rheological properties are entered)
- Post printing cell viability up to 99%

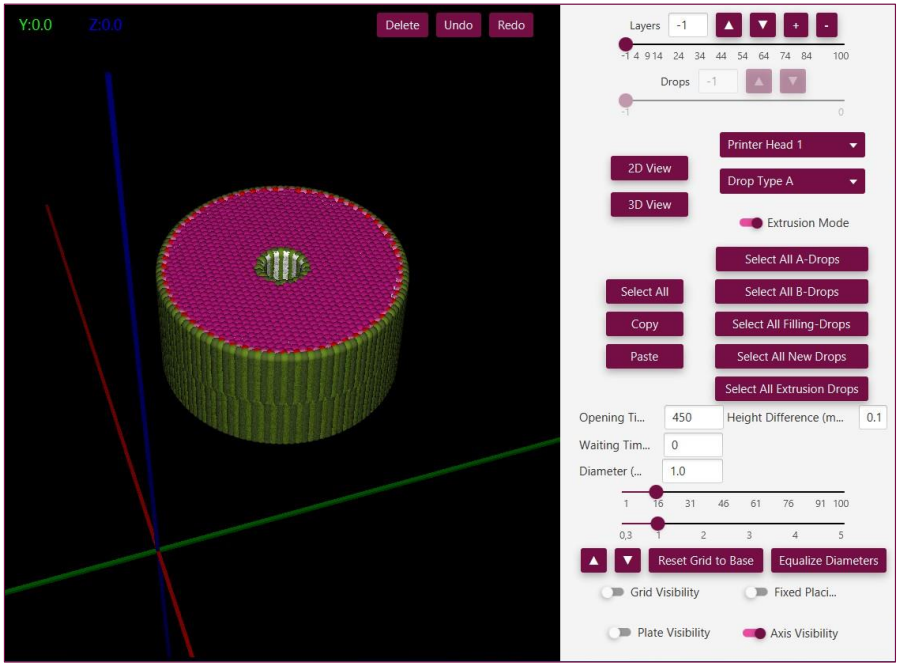
Software Specifications

Empowering you through intuitive design and smooth user experience

Regenate intuitive design makes it an accessible tool for users with limited or no prior knowledge, making it the perfect choice for researchers and scientists.

Regenate software with standard mode, expert mode and additional features, gives to the users flexible control over the bioprinting process.

With Bio-CADrop, users can take advantage of advanced tools and capabilities, including 3D-modelling and simulation, without incurring the costs typically associated with CAD licenses.



Standard mode

- Simple handling for quick testing using the Black Drop bioink and biomaterials platform
- Ideal for bioprinting beginners

Expert mode

- Enables the development of customized bioprinting processes and printing strategies
- Ideal for developing and testing novel bioink formulations
- Applicable to users with expertise in 3D-bioprinting, bioinks and anatomy / tissue specific slicing algorithms

Full Spectrum medical imaging software

- Visualization of medical imaging data (e.g. DICOM)
- Segmentation of organs and tissues
- ROI selection
- Calculation of support structures for printing of free standing organs or tissue
- STL-Export function

Bio-CADrop

- The Black Drop software suite offers a unique CAD-feature to generate printable 3D-data sets from the scratch without the need for expensive CAD tools
- Each droplet or group of droplets can have its own specific properties which allows for an effective simulation of the printing process

Bioinks

Bioinks developed by experts...tailored to your needs

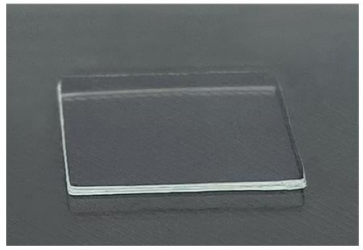
Black Drop supplies a variety of bioinks for different applications. The material can be delivered in two ways, either in a flask to be loaded in the printer on-site, or preloaded and ready to use in the sustainable and reusable Black Drop BioPrintingCartridge system.

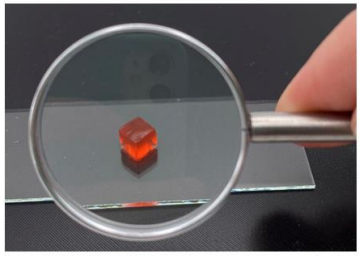
Flask Delivery

Delivery of a specific volume of bioink in a flask (5 ml, 10 ml, 20 ml). Depending on the ordered bioink type the delivery comprises an applicator that helps mixing separate substances on-site.

Cartridge Delivery

The bioink is delivered inside the BioPrintingCartridge. You only need to mount it to the printer and start printing immediately. Please note: cartridge delivery is only possible for selected Black Drop BioInks and countries.





Blue Drop

- Polysaccharide based hydrogels with a high level of mechanical strength.
- Available as Blue Drop Alginate and Blue Drop Agarose.
- Both can be blended with crosslinker (CL) for Collagen or Fibrin.

Green Drop

- Highly biofunctional, mammal tissue derived hydrogels.
- Pure or blended with a polysaccharide (PS) to improve printability and shape fidelity.
- Available as Green Drop Collagen (+/- PS) and Green Drop Fibrin (+/- PS)

Nano Drop

- Polysaccharide based hydrogels with integrated gold or iron nanoparticles (2-5 nm).
- Gold nanoparticles offer multiple reaction sides for coupling peptide-sequences via click chemistry.
- Iron nanoparticles promote endothelial cell adhesion and capillary network formation.

Cure Drop

- Fully recombinant and photo-curable collagen.
- Excellent biofunctionality, no animal donors.
- Photo crosslinking within seconds at a broad wavelength range (365 - 405 nm).
- High solubility at physiological pH and ultra-low viscosity up to high concentrations of 10 %.

Bioprinting Strategies

Your printer, your way…

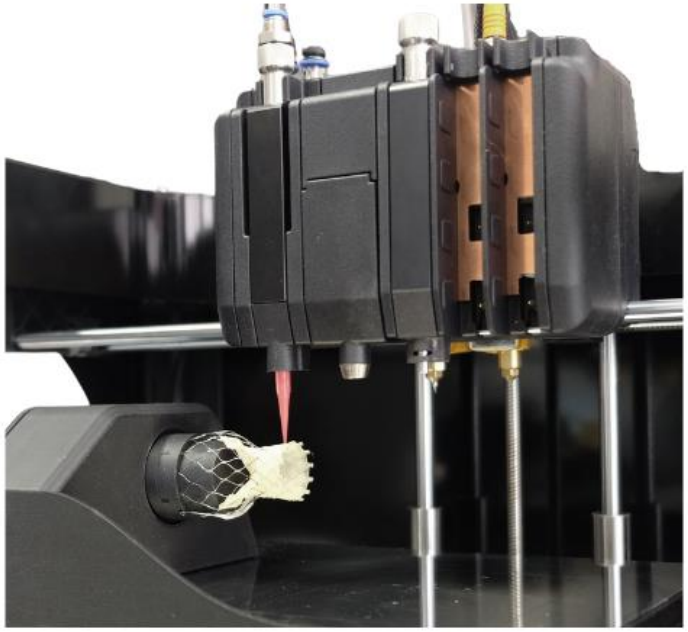
Black Drop Regenate supports all commonly applied bioprinting strategies such as direct, submerged / FRESH, or hybrid bioprinting. The intuitive user interface helps you to quickly switch between different modes of operation.

Design your own hardware

If you seek additional flexibility, Black Drop offers customized printer head or printing platform implementation and software integration.

Develop your own software and processes

The Black Drop Software Suite contains a development kid (3DK) that provides full access to all classes relevant for programming your printer, developing your own process and designing individual experiments.



Direct bioprinting

- Direct bioprinting of bioinks and polymers.
- Drop-on-demand printing for reduced shear stress and ultra-high post-printing cell viability.
- Microextrusion for biofabrication of low and medium viscous bioinks.
- Screw-extruder based bioprinting of highly viscous bioinks and pastes.

Submerged / FRESH bioprinting

- Supports printing into liquid filled containers for submerrged or FRESH bioprinting.
- Standard lab ware or individually designed liquid containers can be applied and mounted to the printing platform.
- Intelligent software settings enable multi-material submerged bioprinting.

Hybrid bioprinting

- Parallel printing of cell-laden bioinks with mechanically reinforcing polymer strands.
- Unprecedented mechanical strength for load bearing tissue types (e.g. muscle, cartilage, or bone).
- Melt-electrowriting like features without limits in height or scale.

Individual strategies

- Bioprinting into / onto individually designed printing platforms for tailored applications.
- Printing into microfluidic chips for organ-on-a-chip research.
- Printing into dynamic bioreactors for post-printing conditioning using peristaltic pumps.
- 4D-substrates and rotating printing platforms.

Applications

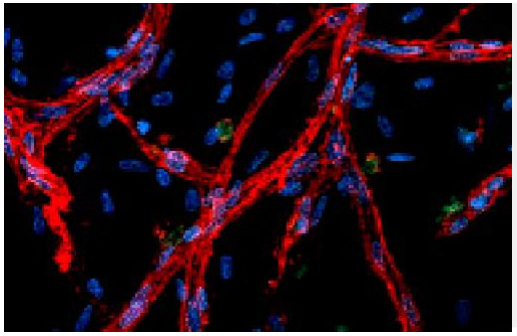
Regenate's durability, high precision and fast and efficient printing speed makes it the perfect tool for advanced research.

Regenerative Medicine

Regenate is the right tool, if you want to create detailed 3D-cell cultures or single-cell arrays. Regenate bioprinter was designed taking into account the best practices for sterility while ensuring high cell viability.

Drug Discovery

Regenate’s unique features makes it the perfect tool for drug development and development of specific disease models to evaluate the efficacy and toxicity of drugs.



Tissue Engineering

Regenate’s unique hybrid 3D-bioprinting approach combining medical-grade polymers with biologically functional bioinks enables the fabrication of fiber-reinforced tissue precursors with customizable mechanical properties, meeting the varying demands of both soft and hard tissue implants.

About Black Drop

Black Drop is a biotechnology company that provides 3D-bioprinters, bioinks, tissues models and other bioprinting related products.

At the forefront of bioprinting innovation, our company is located in the heart of Europe, where our team is dedicated to advancing the field in ways that will improve people's lives.
Our approach to bioprinting is also designed with sustainability in mind, as we believe it is important to find alternatives to animal testing to ensure the well-being of all living creatures.

Since its inception, the company has collaborated with various customers from academia, pharmaceutical, and industrial labs to continually enhance its products and services, with the goal of creating life-saving solutions.

Black Drop mission is to support researchers and scientists enhancing their research outcomes through provision of the necessary tools to bioprinting the future, now!

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