POLBIONICA

THE FUTURE BELONGS TO BIOMATERIALS

POLBIONICA
Researchline™ Bioreactor
for research and development*

Wondering how to **properly take care** of a tissue or bionic model after 3D printing? We have the **perfect solution** for you!

Our latest **Bioreactor** in our line of devices for research applications is a device that allows adequate preparation for the culture and incubation of tissue models and bionic organs in vitro. The device makes it possible to carry out studies assessing the functionality and viability of cells in created three-dimensional bionic models (constructs) with a vascular (flow) system. It allows responses to both preset physico-chemical parameters and biological active substances added to the cell medium. By automating measurements and their regulation, the bioreactor allows for standardised and reproducible culture processes.

Compact and convenient to use the **Polbionica ResearchLine™ Bioreactor** consists of two complementary parts:
1. a basic body enabling the implementation and control of the set functions (providing power, medium, gases, sensors; together with a touchscreen control unit) and
2. a disposable sterile perfusion set (closed chamber, containers, drains, connectors) for the preparation and execution of the culture/incubation or testing.

Two chambers are available to the user, depending on the purpose of the study. One is designed for large models (e.g. a bionic organ), the other for smaller models (e.g. tissue). The entire system is controlled by a software-based control module, which performs calculation and control functions.

A directed and controlled flow and exchange of the culture medium is the working environment ultimately influencing better replicative capacity of the cells. The ability to sample and control the actual state of the cells in real time is an additional advantage of the **ResearchLine Bioreactor™**.

we implement
ISO 13485
Medical Devices, QMS

KEY FEATURES OF THE DEVICE:

1. temperature control in the range of 4–40°C — such a range allows working with cell lines, spheroids, organoids and microorganisms such as pancreatic islets. The ability to control and change temperature conditions allows constructs to be maintained at a high level of viability and metabolic changes to be analysed, thanks to the reduced temperature and slowing down of metabolic pathways,
2. control of gas concentration — CO_2 concentration at a constant and controlled level is key to maintaining proper functionality and cell viability in bioprinted bionic constructs. Thanks to the solution used, the user has constant access to the results of the CO_2 concentration measurement and is therefore able to continuously control this culture parameter,
3. the device has an automatic cell medium exchange system. This significantly reduces the possibility of contamination of tissue models and organs inside the chamber,
4. in addition, a system of specially designed connectors allows samples to be taken in a non-invasive way for the models / constructs inside the chamber. This allows the user to sample and supplement the cell medium without having to pull out the chamber and disturb the constructs,
5. pressure control — the designed system ensures that the medium flows freely through the bionic constructs / organs. The pressure control option allows the user to continuously monitor the condition of the model and also protects the organ / model from mechanical damage caused, for example, by too rapid flow throughout the system,
6. chamber — the bioreactor is equipped with 2 types of chambers:
   - for the culture and incubation of bionic organs. Special pads inside the chamber ensure the stability of the organ, allowing biological and strength testing
   - a chamber for testing the cytotoxicity and activity of biologically active molecules, chemicals. The designed chamber allows 3 tissue models to be tested in parallel.

Polbionica is a member of the following clusters:

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* Polbionica is developing, in parallel, the design of a more advanced **MedLine™ Bioreactor** for the cultivation and storage of bionic organs manufactured using 3D bioprinting technology under near-physiological conditions. This bioreactor, which is a planned medical device (MD), will be used after the bionic organ printing process, prior to the recipient implantation stage.