

STÄMM

Agenda.

Introduction

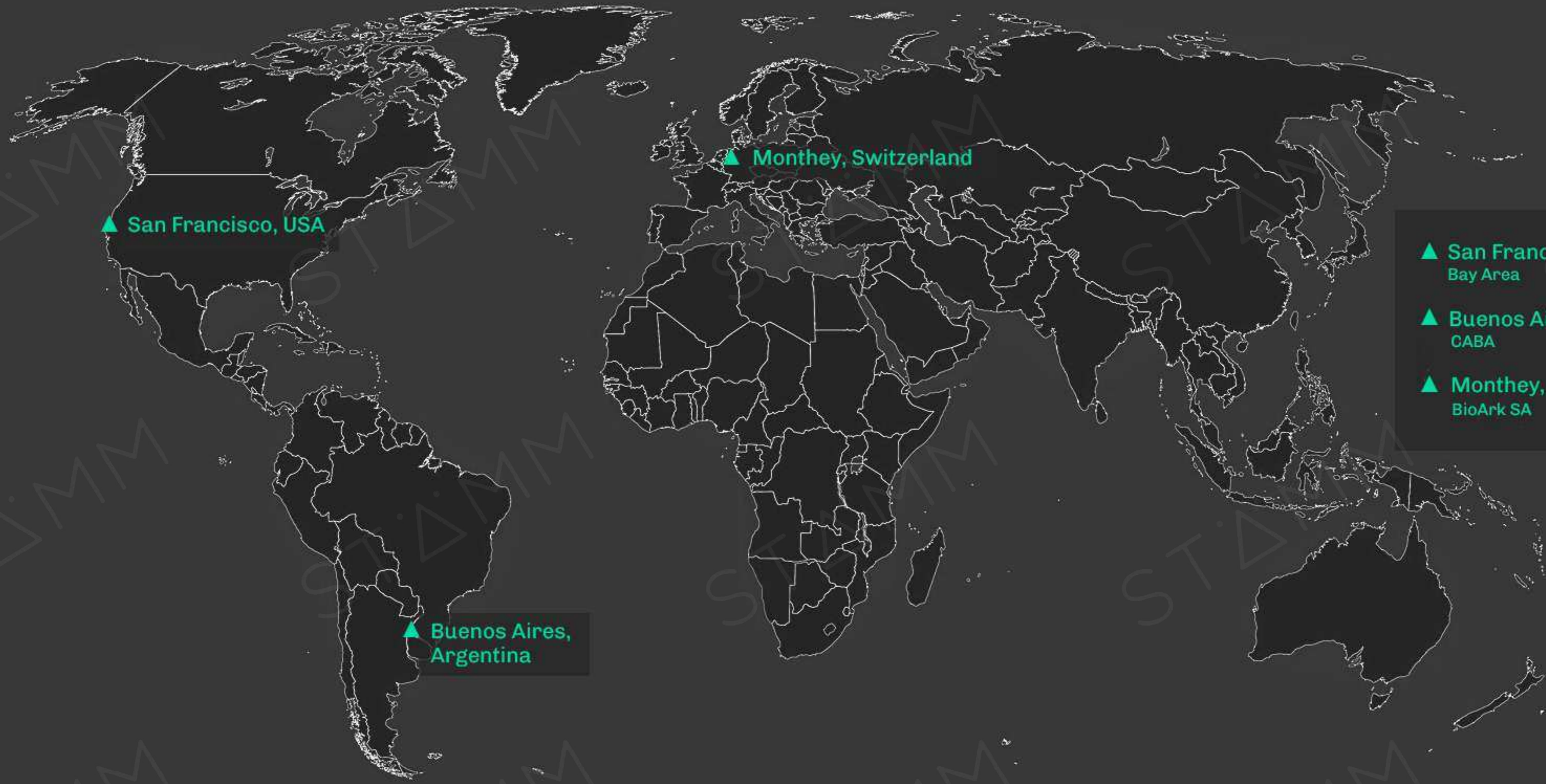
- + About Stämm.

About the our Products

- + Developments.
- + Applications and Advantages.
- + Key Data for Biomanufacturing

Next steps

- + Co-Development Partnership Goal.



- ▲ San Francisco, USA
Bay Area
- ▲ Buenos Aires, Argentina
CABA
- ▲ Monthey, Switzerland
BioArk SA

We make biomanufacturing easy, scalable, sustainable & repeatable everywhere.

The problem

Biomanufacturing infrastructure is nowhere near where we need it to be in order for humanity to source materials in a sustainable way.

The need

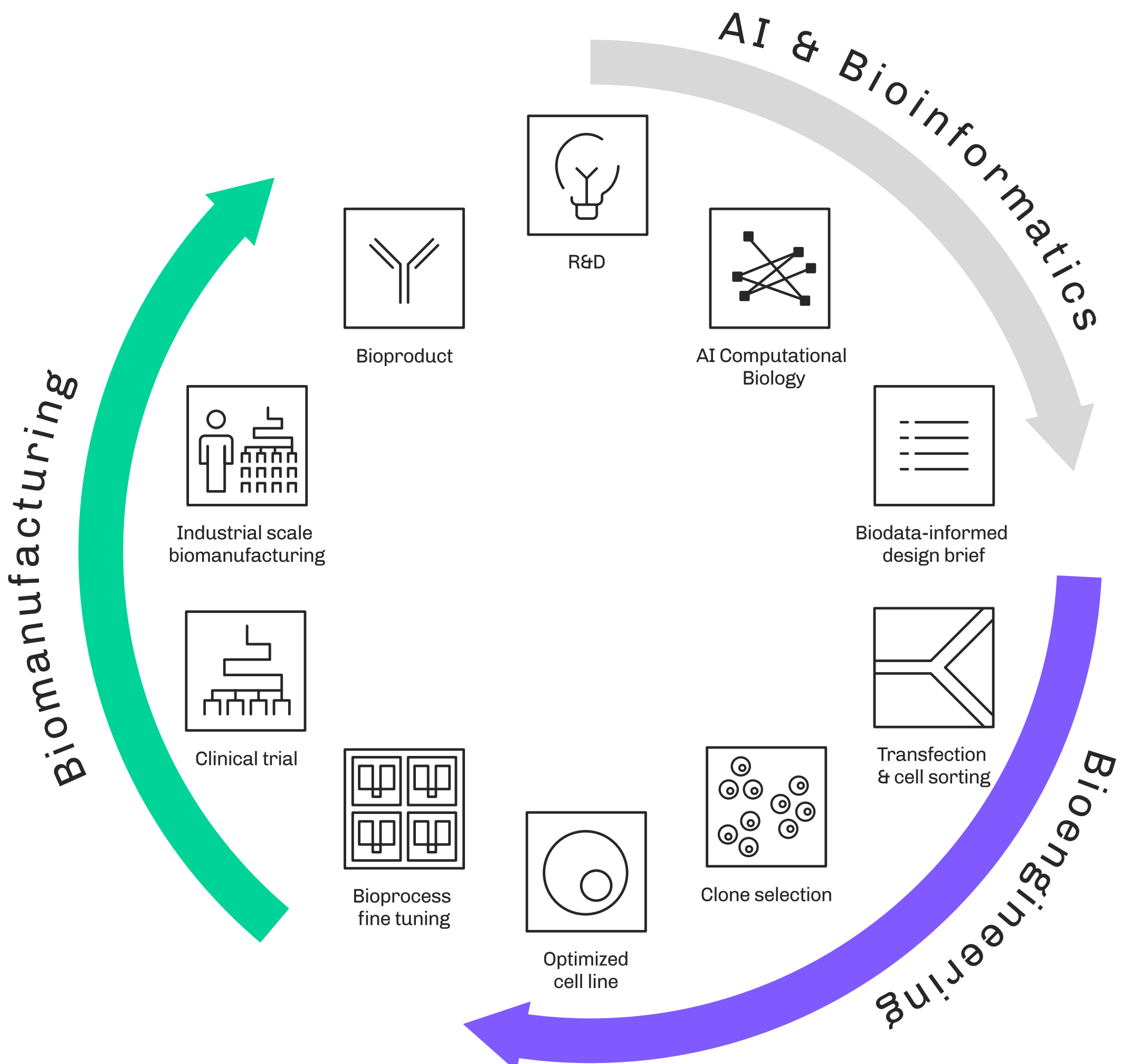
Biomanufacturing can make up to 60% of the materials demanded by the global economy, creating a **2 to 4 trillion dollar opportunity**.

Our solution

We have created both a next gen of biomanufacturing infrastructure & the fabrication technology to build that infrastructure at the scale required to solve this bottleneck.

Source: McKinsey Global Institute; The Bio Revolution: Innovations transforming economies, societies, and our lives (May 13, 2020) Note: these estimates reflect the estimated biotechnology penetration of these end-markets.

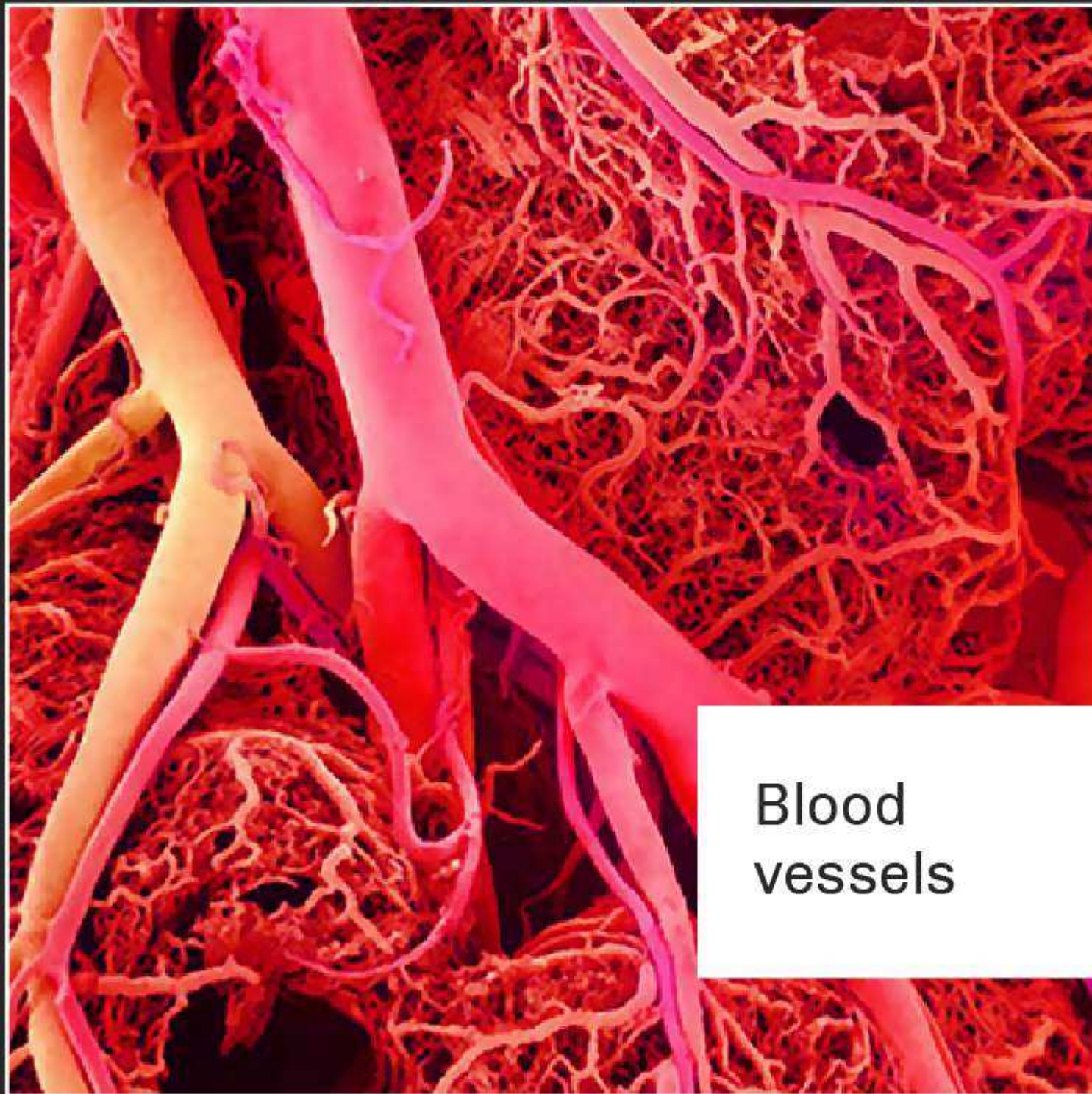
Optimize your biomanufacturing workflow.



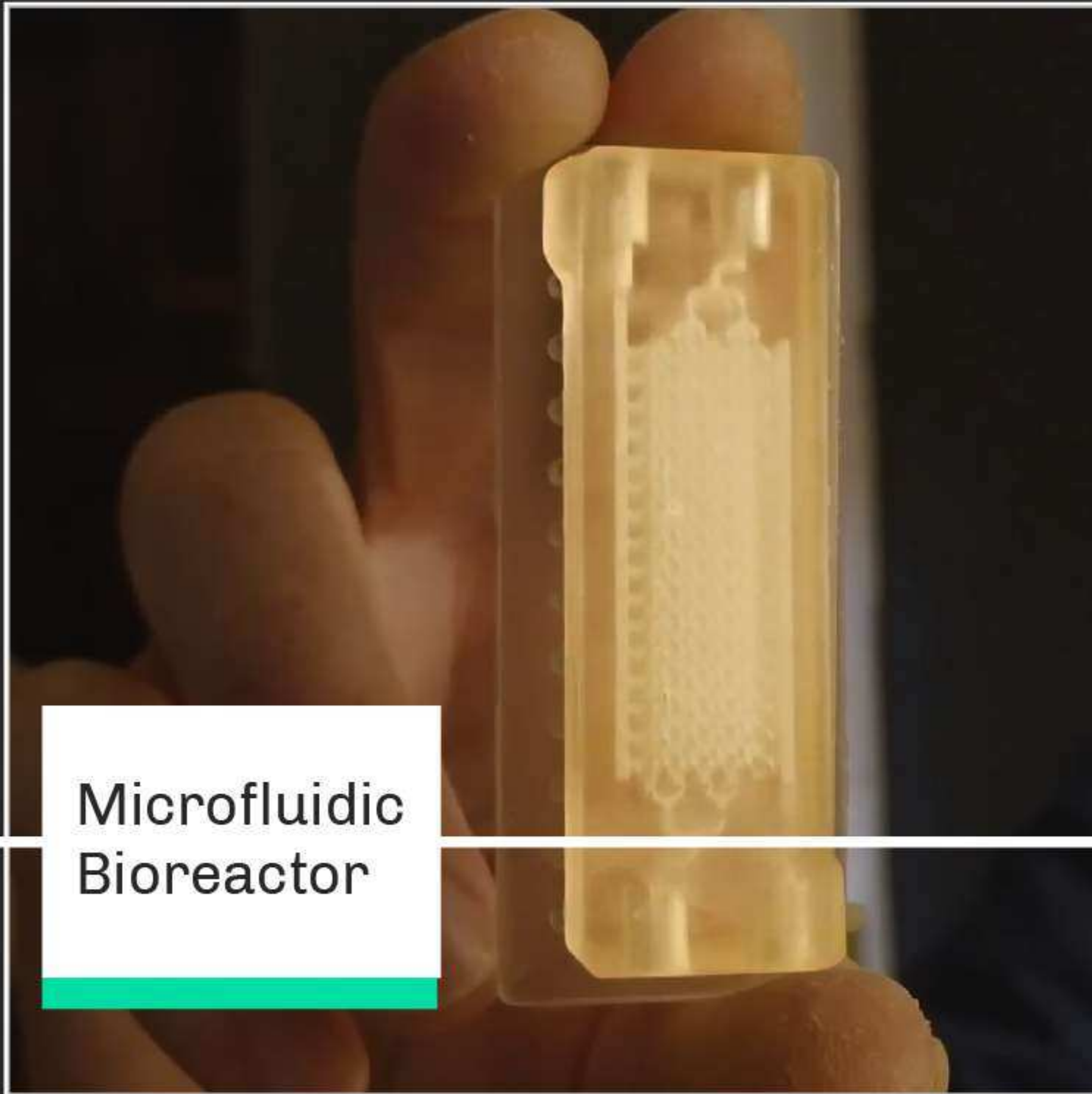
- + From bench to market.
- + Adaptability to our partners' needs.
- + Single-use, plug & play continuous bioreactors.

Biologics Continuous Manufacturing

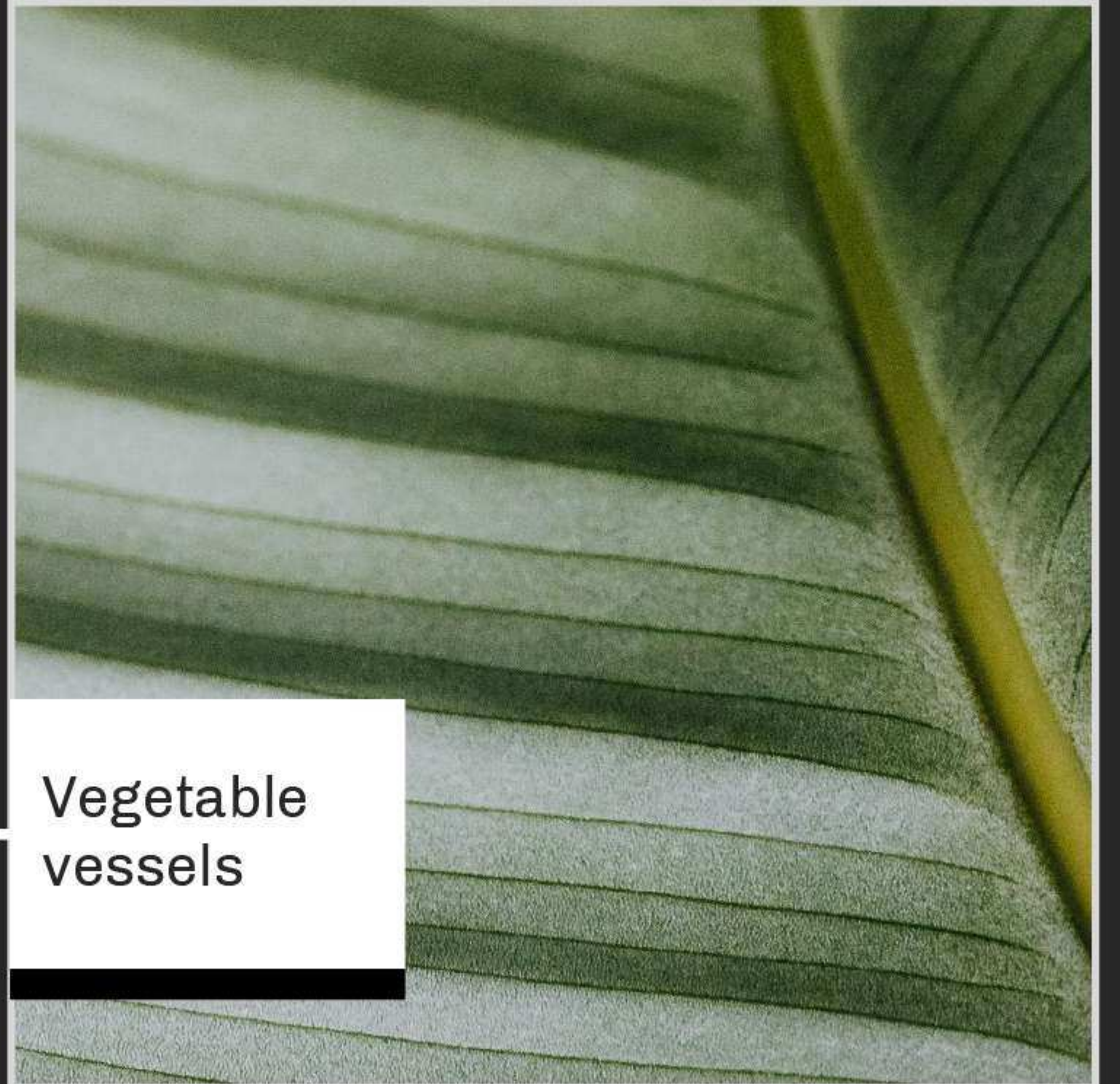
Inspired by nature.



Blood vessels

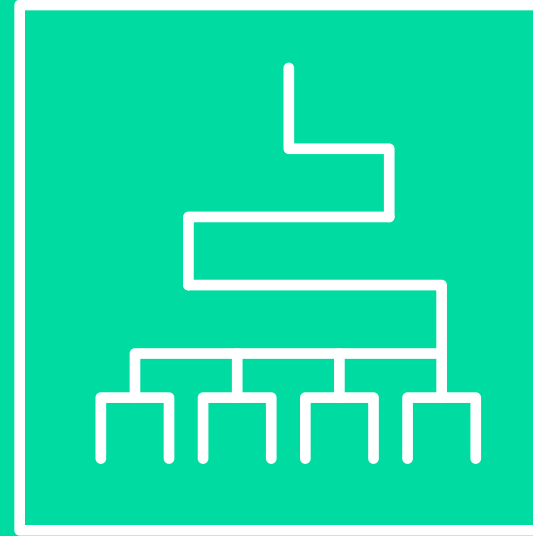


Microfluidic Bioreactor

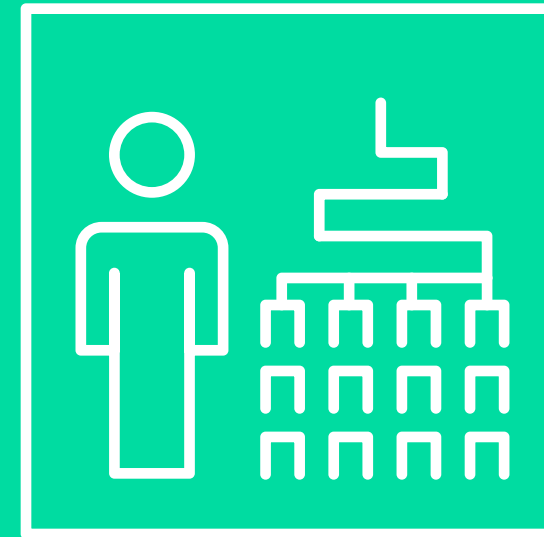


Vegetable vessels

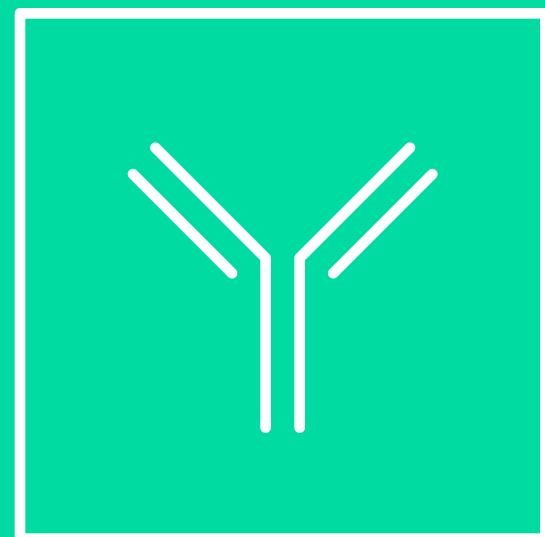
Biomanufacturing.



Clinical trial



Industrial Scale
Biomanufacturing

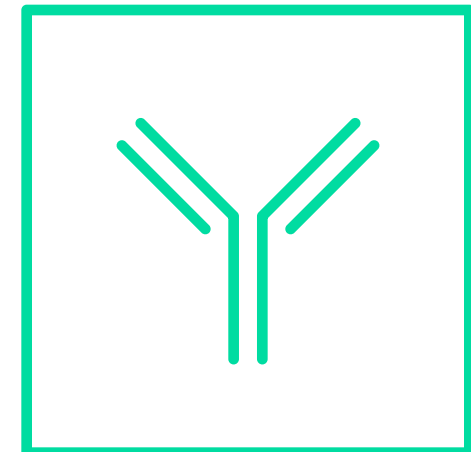
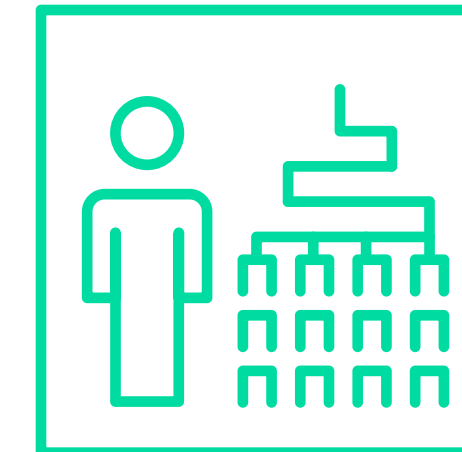
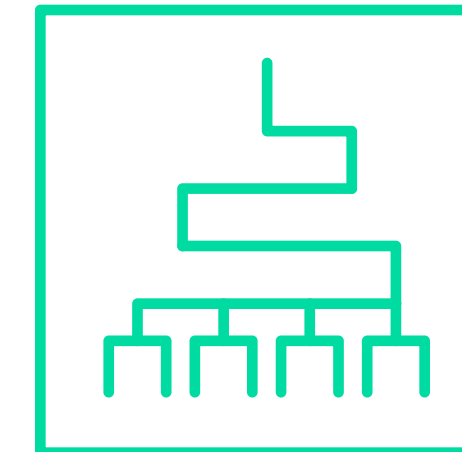


Bioproduct

Stämm provides an alternative to the known biomass production. Our solutions scale biologics in a accelerated and flexible way, making biomanufacturing **easy, scalable, and repeatable**.

Applications

- + Biologics scaling
- + Cell therapies
- + Monoclonal antibodies



Cloud
MicroBioreactor



Bioprocessor



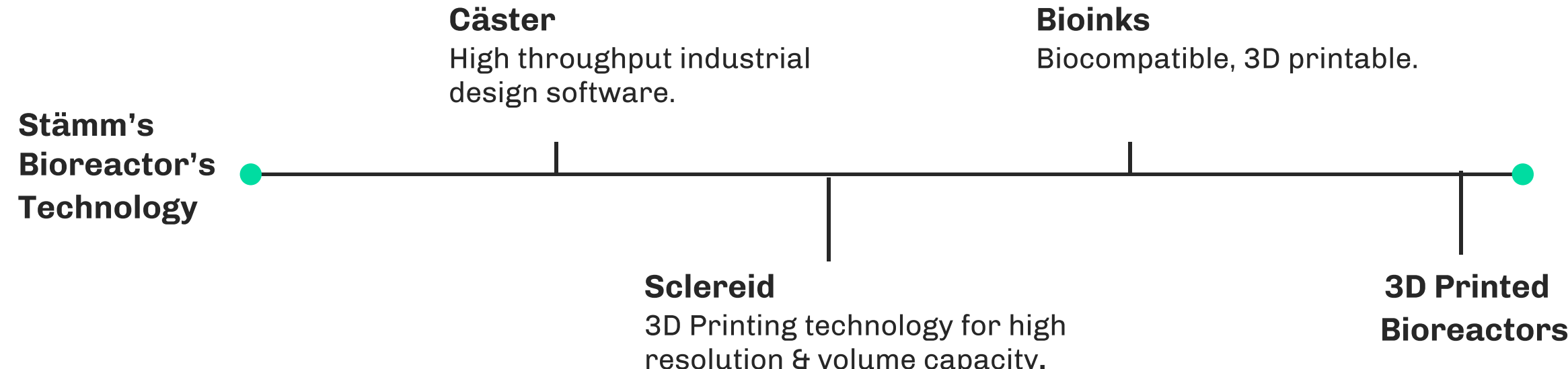
Purification

Inspired by nature, built for scale.

The technology behind our Bioreactors

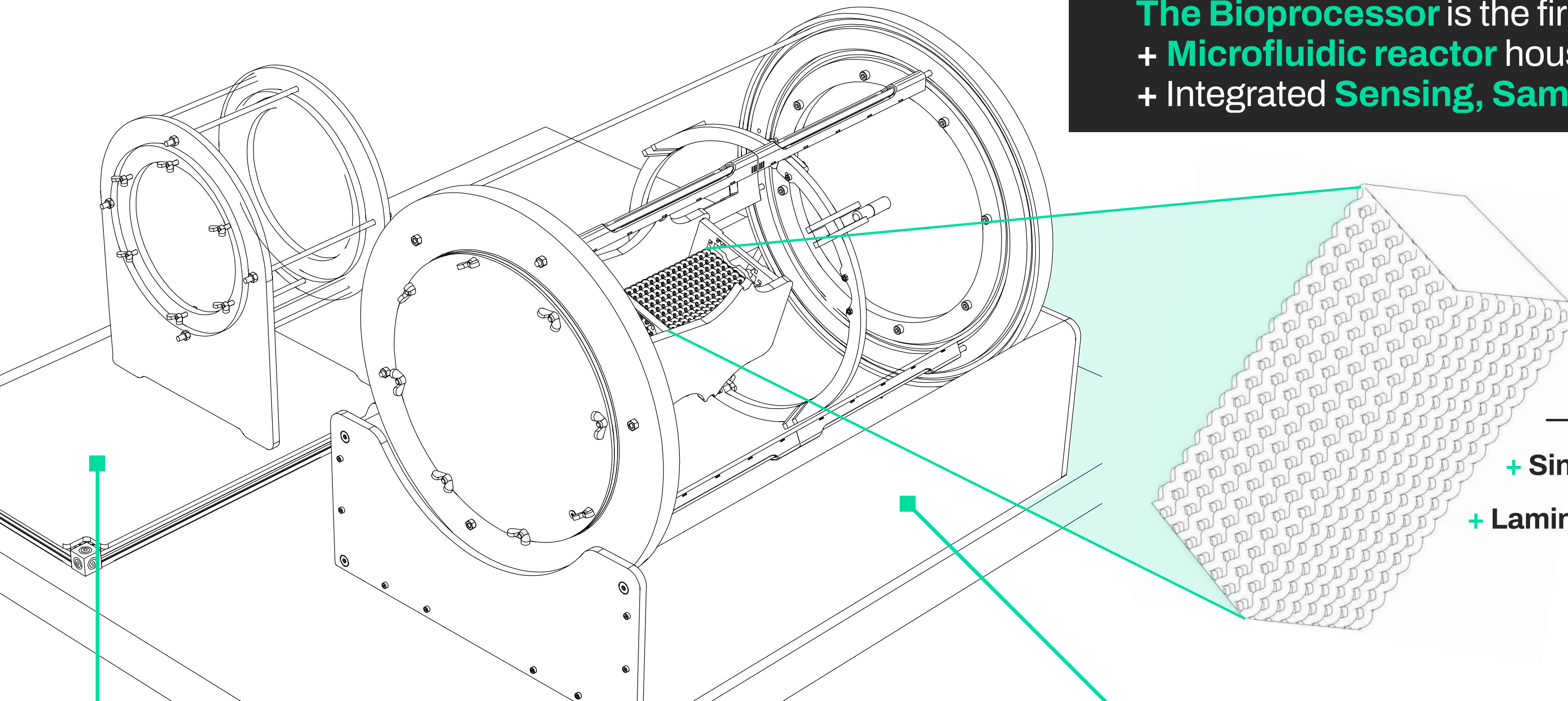
Printing 3D **biocompatible continuous bioreactors** is possible only through a series of innovative 3D printing technologies.

To achieve that, we developed our own **industrial design software** and our **micro-resolution 3D printers** to print large surfaces without compromising pixel size or bioreactor quality.



The Bioprocessor.

The Bioprocessor is the first true **continuous bioreactor**.
+ **Microfluidic reactor** housed within a **controlled environment**.
+ Integrated **Sensing, Sampling & Harvesting** Platform.



Stämm Bioreactor

- + **3D-printed microchannel structure** made out of biocompatible materials.
- + **Single-use module** that lasts up to 90 days.
- + **Laminar Flow:** Stress free nutrient and O₂ distribution.

Continuous Inoculation Module

- + Feeds **cell inoculum** to the Production Module.
- + **Cell Line On a Chip** (CLOC) for Inoculum Amplification.

Production Module

- + **Hosts a BFB** of up to 2.5L for the **scale-up** and **production** process.
- + **Environmental Conditions** and **Counter Sedimentation** control.

The Bioprocessor.

What is the Stämm **Bioprocessor**?

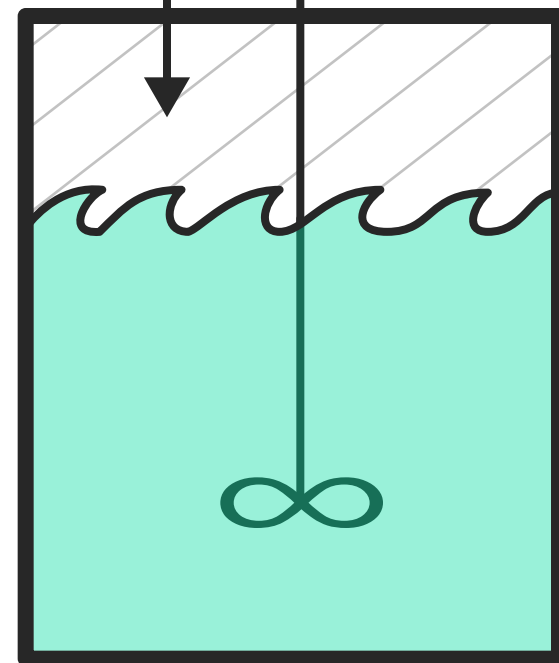
An automated, closed-system device for continuous biomanufacturing, designed to speed up production.

Benefits.

- + Daily cell harvesting.
- + CAPEX & OPEX reduction.
- + Minimizes downtime and maximizes yields.
- + Enhanced antibody productivity (per culture media L and clean room m²).

Fed-Batch

Concentrated Feed

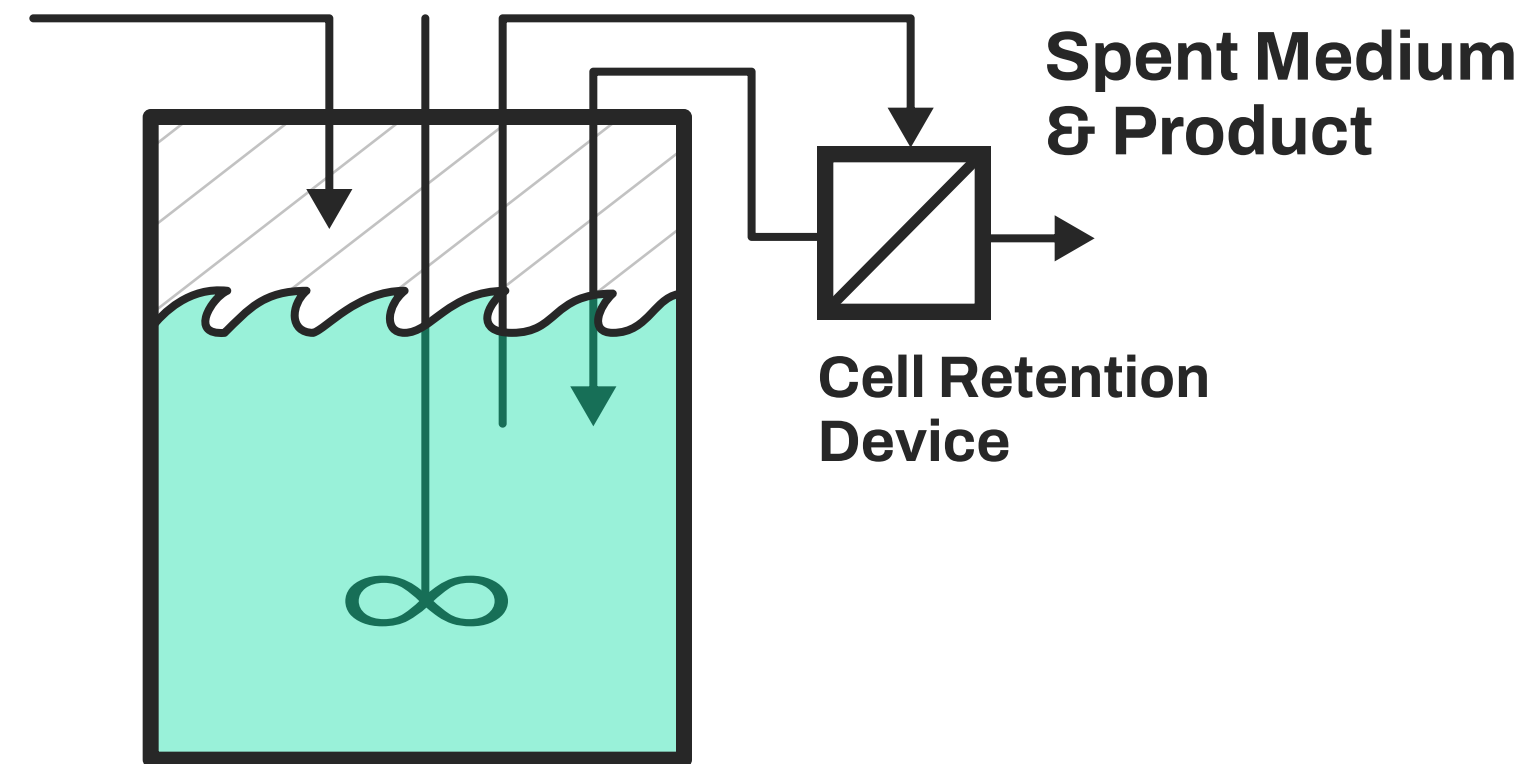


Perfusion

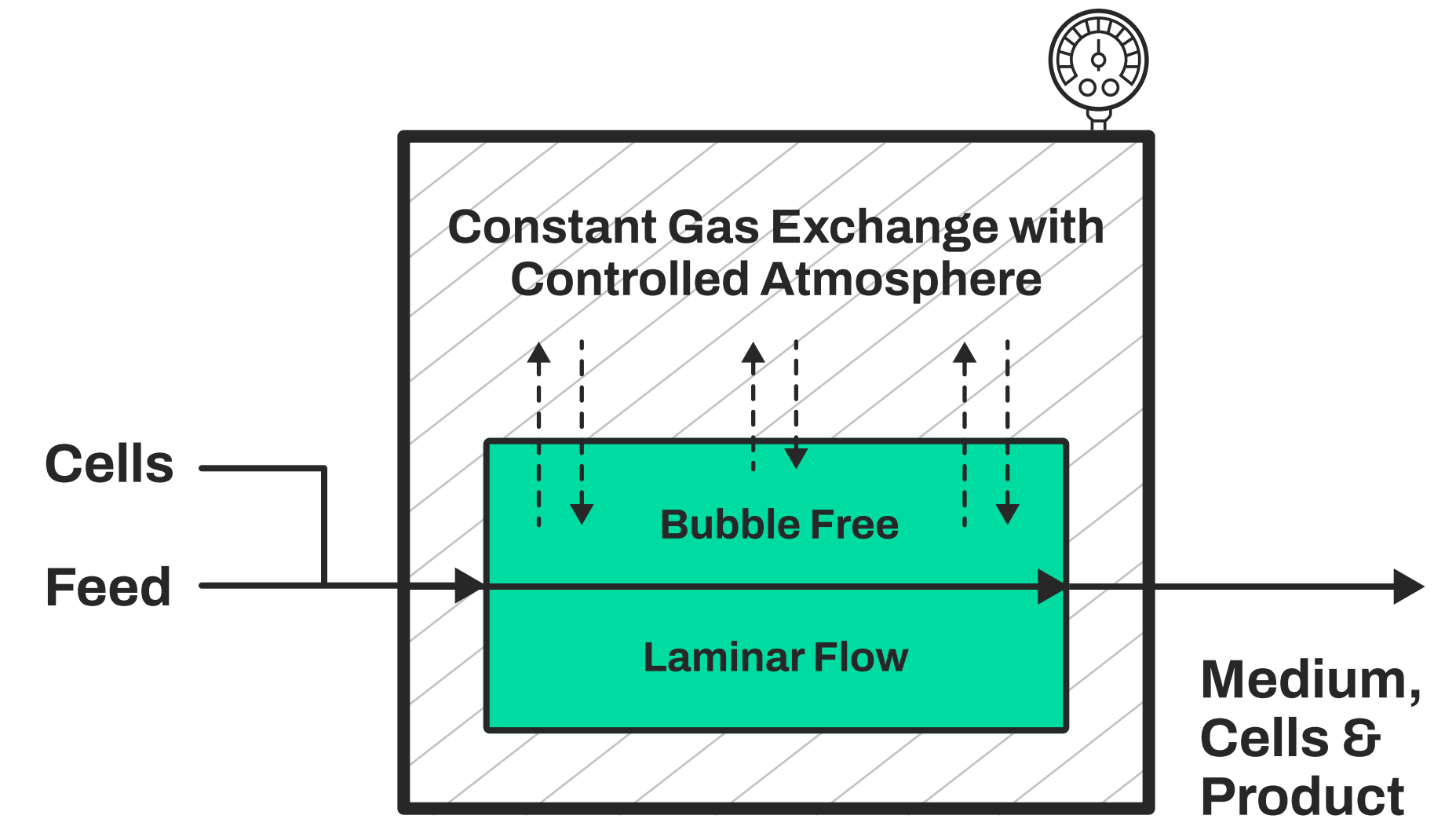
Feed

Spent Medium & Product

Cell Retention Device



Stämm's Microfluidic Bioreactor



Cloud MicroBioreactor.

What is the **Cloud MicroBioreactor**?

A compact fully automated incubator design for cell conditions parameters optimization in large reactors or small-scale assays.

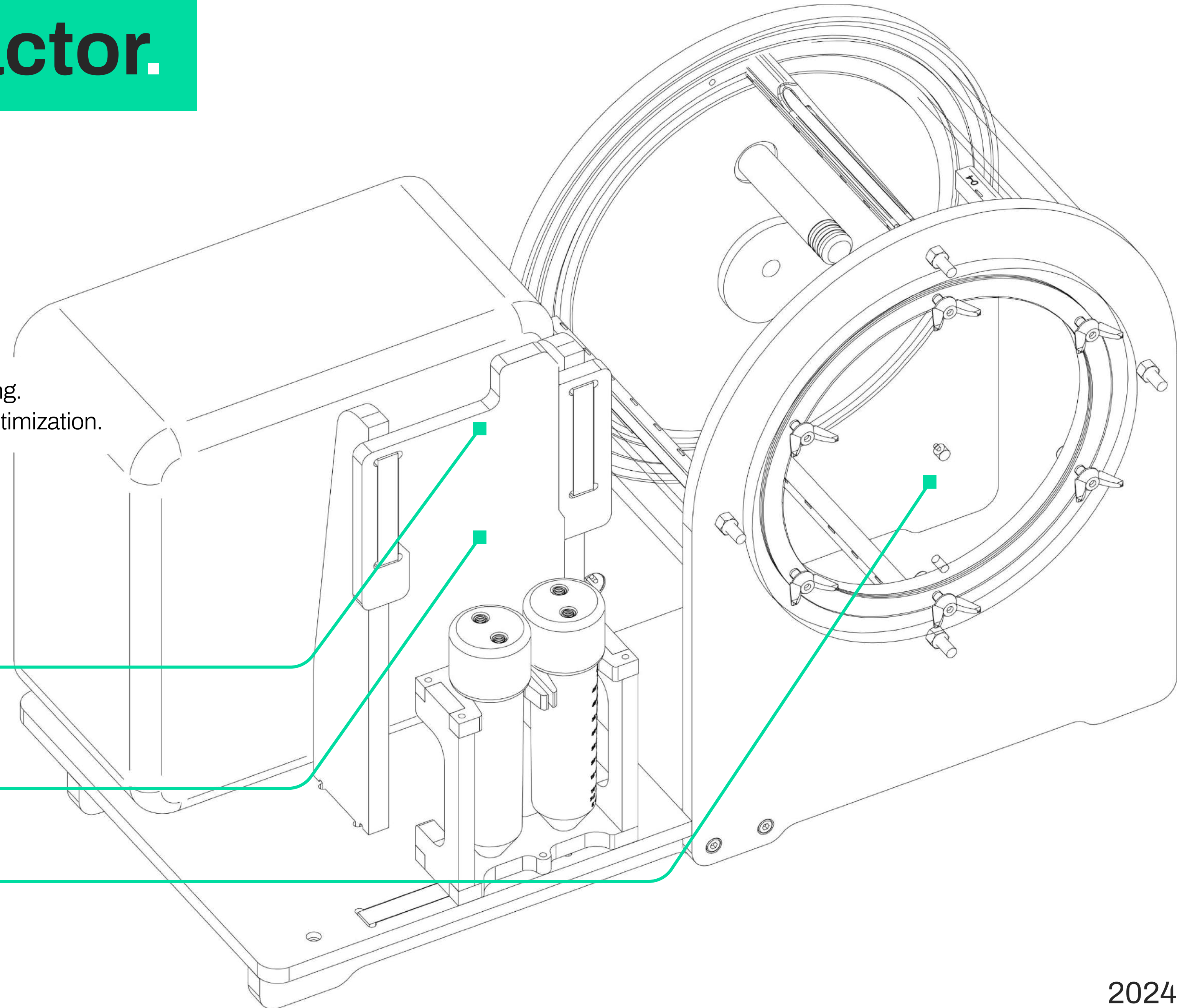
- + **User interface:** In house software for real time monitoring.
- + **Parallel Testing:** Small culture usage and reduced volume sampling.
- + **Process & culture media:** Temperature, CO2 and metabolites optimization.

Modules

Cellular parameters
and metabolites

Harvest & Feed

Production

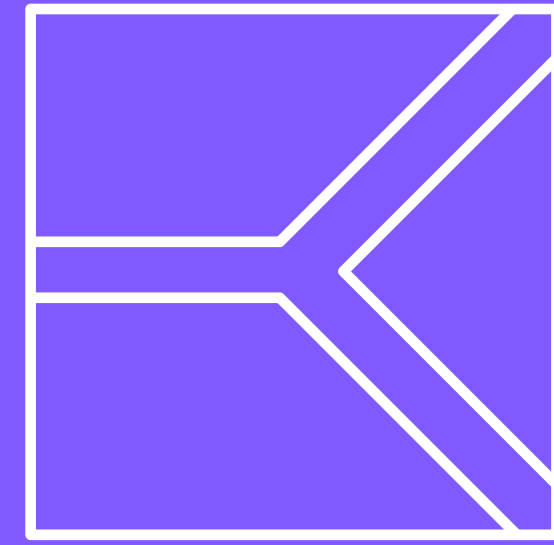


Bioengineering.

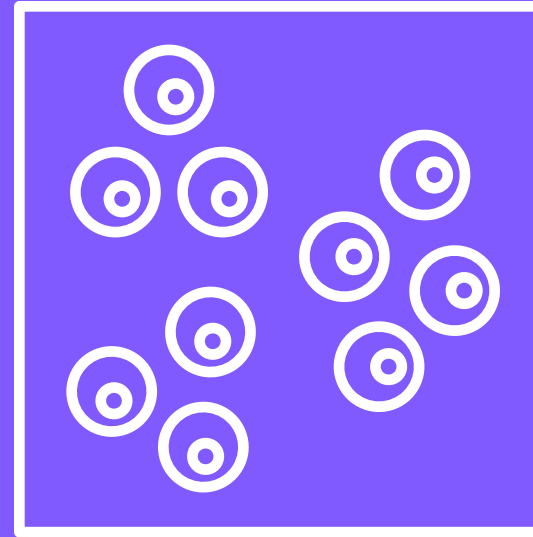
Stämm streamlines the entire **cell bioengineering** process. Our solutions are designed to be modular, aligning with our clients' objectives and fostering iterative processes.

Applications

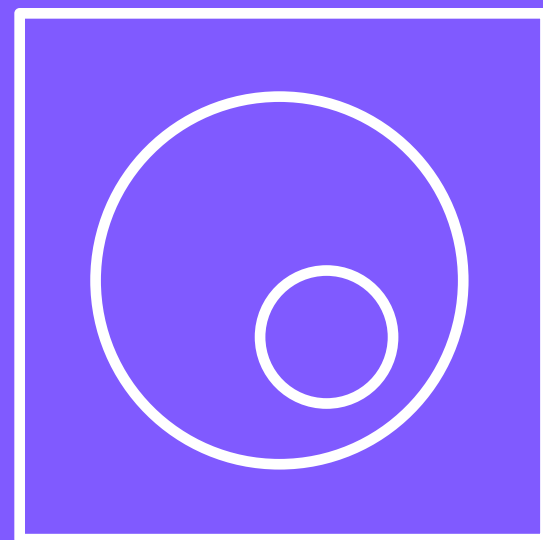
- + Cell Line Development
- + Cell Therapy
- + R&D



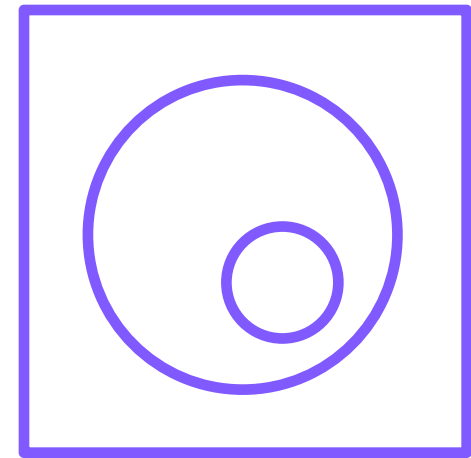
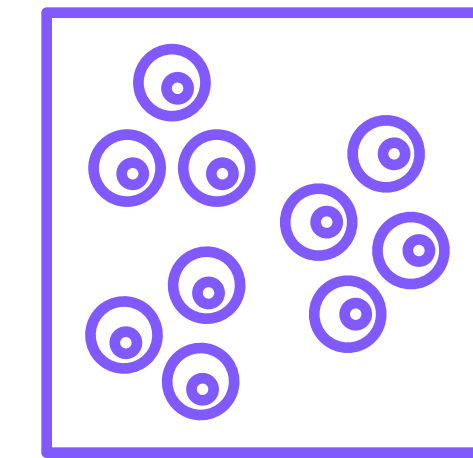
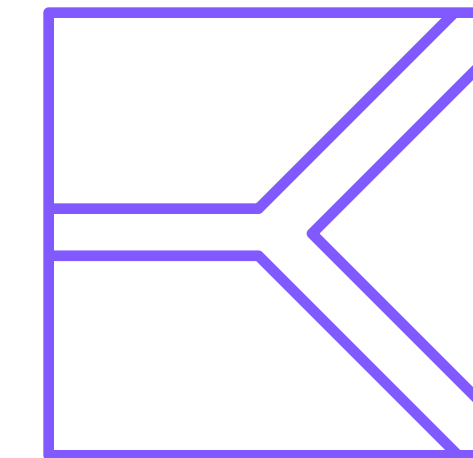
Transfection
& cell sorting



Clone
selection



Optimized
cell line



Interface

Continuous
Inoculation
Module

Minimum
inoculum

Bioengineering
Platform

Transfected
Single Cells

Stable pool of
trasfected cells

Bioprocessor

Cloud
MicroBioreactor

Cell bank

Clone Selection
Platform

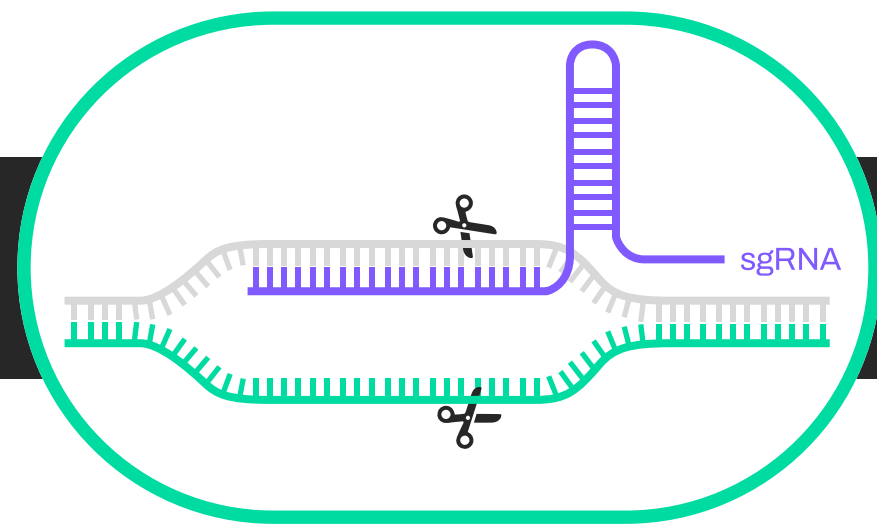
Bioengineering Platform.

What is Stämm's Bioengineering Platform?

A microfluidic platform that enables single-cell genetic modifications for continuous transfection, storage and sorting stages with a high throughput automated system.

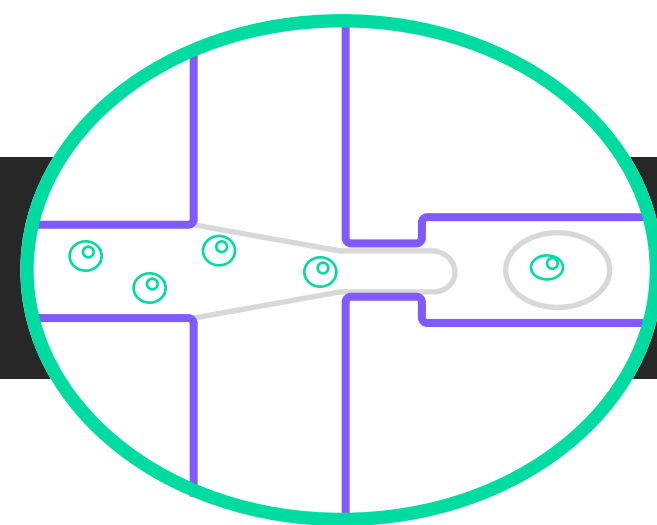
- + High-performance gene editing.
- + Reduced manual dependency and human error.
- + Less reagents use compared to traditional methods.

Trasfected cells stable pool go to **Clone Selection Platform**



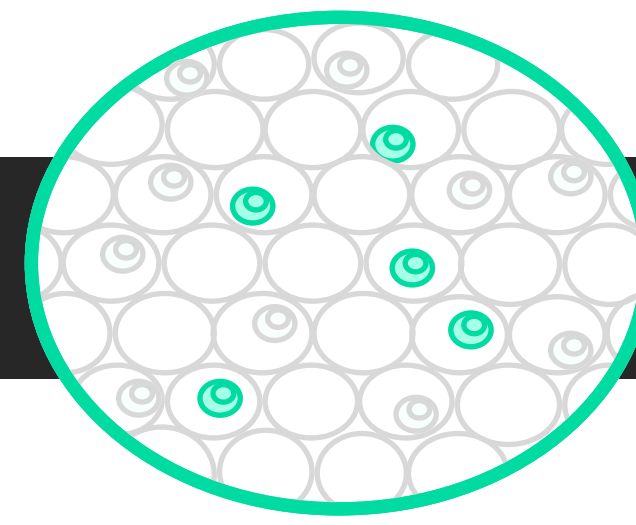
mRNA Guide Design WebApp

- + Automated guide design.
- + No need for specialists.



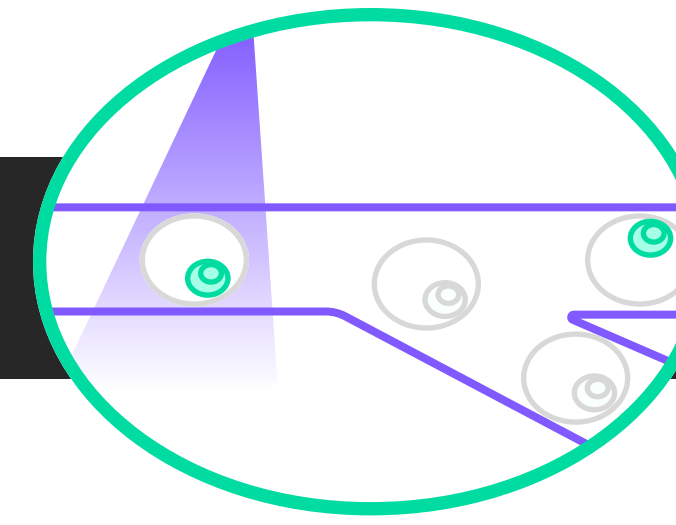
Continuous cell encapsulation

- + Microdroplets high throughput generation.
- + Single cell encapsulation in biocompatible oil.



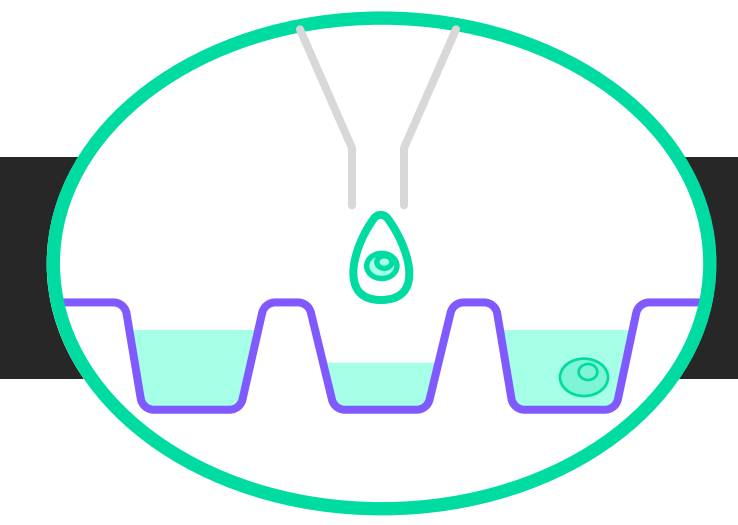
Transfection & Storage modules

- + Stable microdroplets.
- + In line monitoring of transfected cells.



GFP-positive cell sorting

- + Automated Sorting.
- + Visualizer & Transfection Checkpoint.



Cell dispensing

- + Positive single cell isolation.

Clone Selection Platform.

What is Stämm's Clone Selection Platform?

A platform that automates clone outgrowth and screening in a Cell Line Development pipeline from single-cell cloning of transfected cells to selecting high-producing clones for scale up.

- + Traceability, documentation and performance comparison for each clone.
- + Increased single-cells yield and ensured out-growth clone productivity measurements.
- + Real-time data access and remote process monitoring software.



Monoclonality

- + Single cell isolation.
- + Monoclonality assurance.

Growth

- + Evaluate cell viability.
- + Cell growth monitoring.
- + Doubling time estimation.
- + Cell morphology detection.

Clone by product characterization

- + Protein measurement.

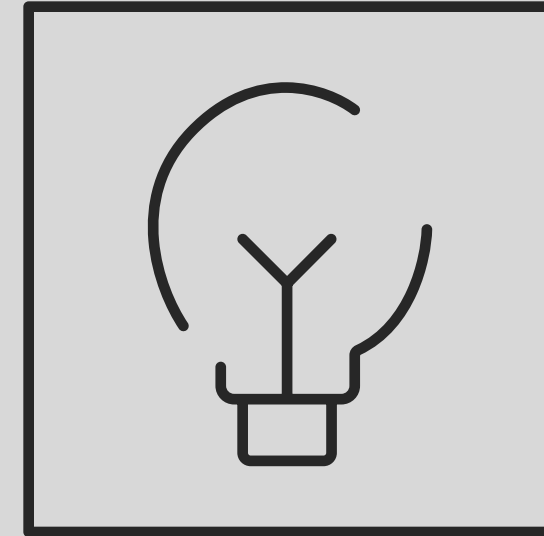
Selection and recovery

- + Clone selection.
- + Clone recovery.

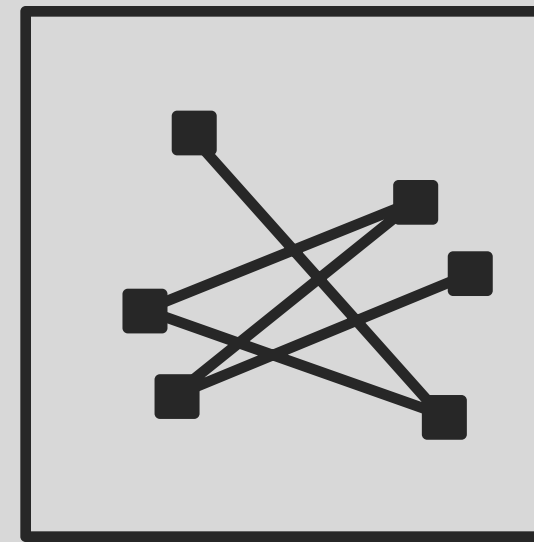
Amplification

- + Selected clone amplification.
- + Cell bank.

AI & Bioinformatics.



R&D



AI Computational
Biology



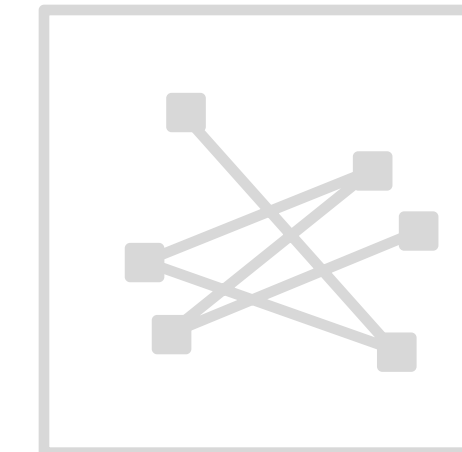
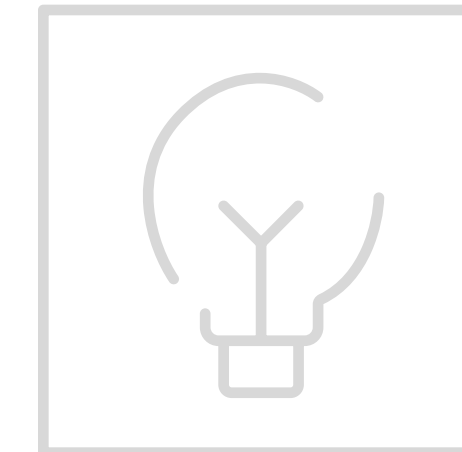
Biodata-informed
design brief

Stämm wants to give biologists the opportunity to analyze and process cell line's biological data with **multiple omics** without needing to code.

Deeper knowledge will enable them to have specific information about cell behavior, thus making **better and faster decisions** for in-vitro and in-vivo trials thanks to in-silico simulations.

Applications

- + In-silico predictions
- + In-vitro trials
- + R&D



Transomics.

What is Stämm's Transomics?

A **no-code AI Platform** capable of performing analytics and cell modelling from multi-omic data and physicochemical conditions.

Simplifies data interpretation

Eliminates the need for a specialist or programming to understand biological data.

Simulates and forecasts un-observed cells

Transomics AI discriminates cells and builds a network model using biomarkers and cell sub-types.

Analyses cell environment

Provides cell environment similarities, differences and relationships providing them before lab assays.

Facilitates biological discovery

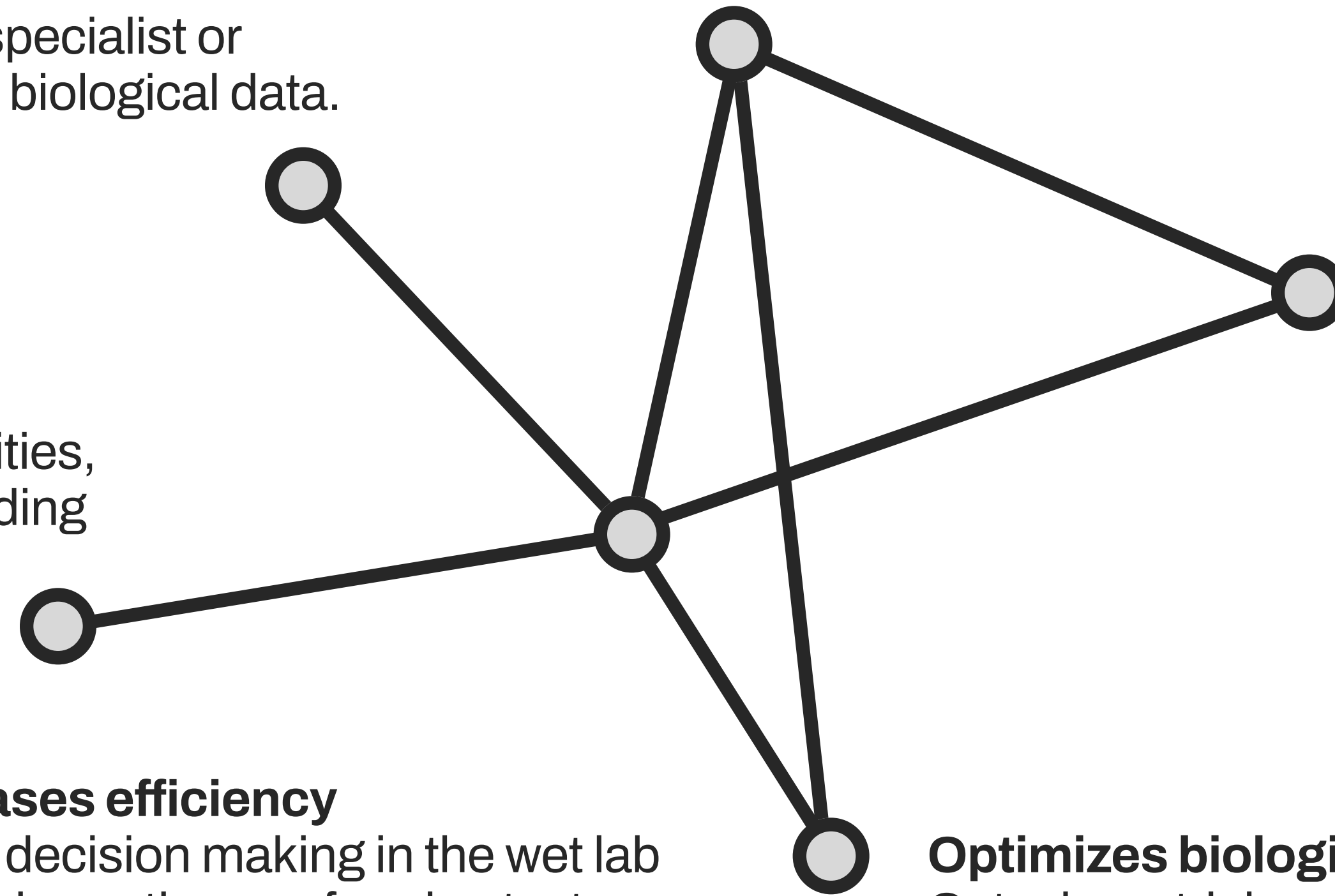
Processes and analyses of multi-omic biological data.

Increases efficiency

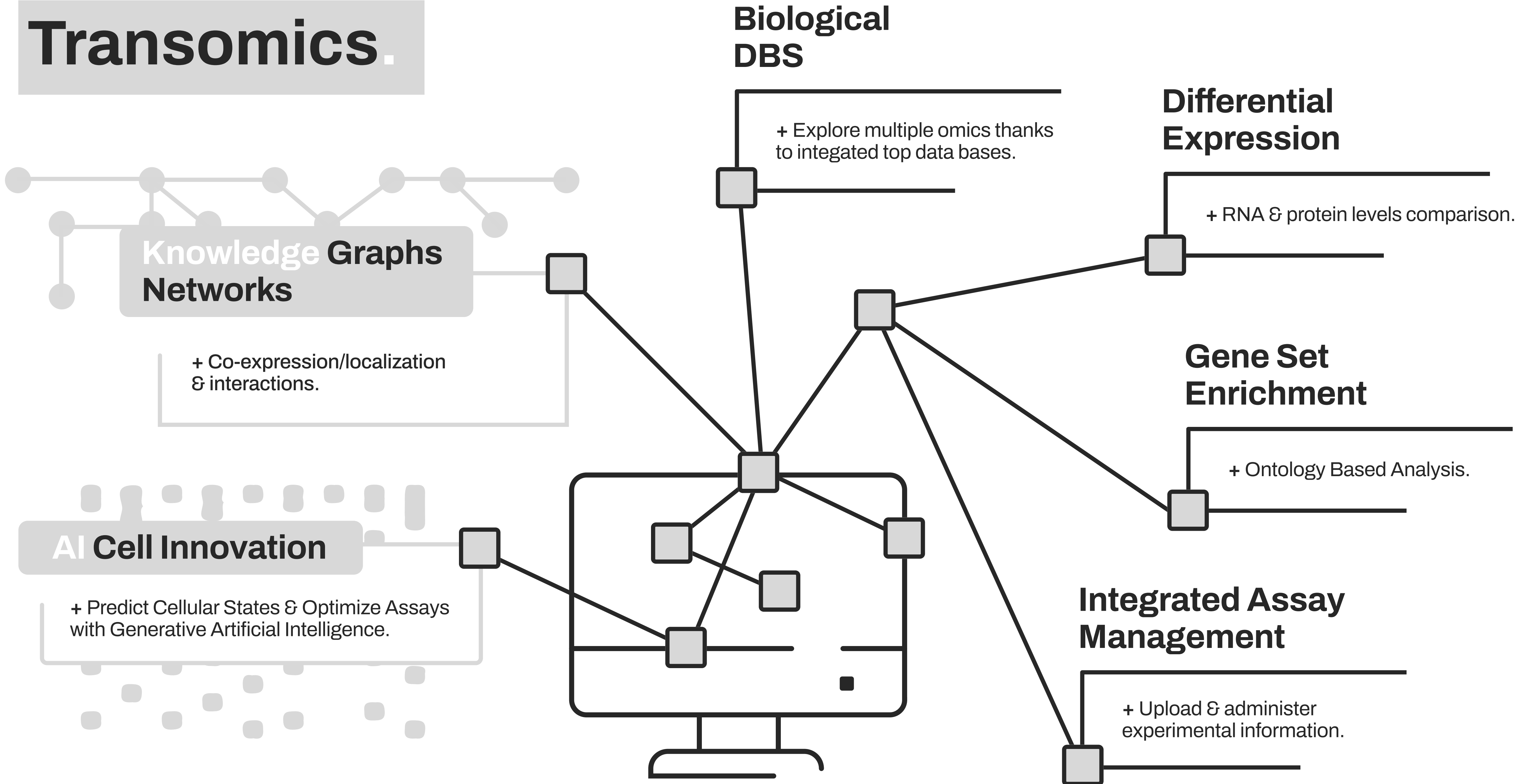
Better decision making in the wet lab and reduces time performing tests.

Optimizes biological processes

Cuts down trials, saving time and costs.



Transomics.



Co-Development Partnership Goal.

Plan overview

Partnership Goal

- + Stämm could negotiate a long-term licensing contract with their partners through an innovative and flexible technology with easy implementation, scalability and repeatability.

During the Co-Development

- + A Stämm bioprocessor is used to produce and scale-up biologics or cell culture:
 - + At a partner site.
 - + By Stämm staff.
 - + With the partner's cell-line.
 - + In concert with the partner's production line.

Product Development

- + Product development can be shaped by partner needs. From cell line development to industrial scale up.

After Co-Development

- + Partner company could agree to special deals with Stämm technology for use in their agreed upon target area (ex: for a particular antibody) for an agreed upon length of time.

Partner with Stämm

- + **3D Printed Bioreactors**
- + **Specific Productivity vs Batch**
- + **Continuous Biologics Biomanufacturing**

Contact Information

Dr. Alejandro R. Picardi,
Business Development
alejandro.picardi@stamm.bio