Benchling

A Foundational Platform to Accelerate Cultured Meat R&D

Despite significant advancements in cellular agriculture, tools for managing samples, process versions, and results have barely changed in the past decade. Scientists still use emails, spreadsheets, and standalone molecular biology tools to design and track hundreds of sequences, samples and experimental conditions. For cultured meat R&D, this means scientists and research managers often struggle to find the full experimental context of a sample, can't easily iterate on development processes, and have difficulty planning, managing, and monitoring research programs. Furthermore, key decisions early in R&D are made with incomplete and inadequate data, with consequences for efficiency and the quality of the desired product.

Benchling is a modern informatics platform that powers cultured meat R&D from early-stage research through downstream process development workflows. By centralizing and standardizing data throughout the R&D process, Benchling is a one-stop-shop for sequence design and analysis, sample tracking and registration, inventory management, instrument data acquisition, data-driven process optimization, and more. When transitioning from legacy point solutions to Benchling, life science R&D companies report productivity increases of 2-4x.

Key Challenges and Benchling's Solution

CELLULAR ENGINEERING

Tracking sequence libraries, plasmids, cell lines, tissues and other biological entities with spreadsheets and legacy systems creates unreliable data, sacrifices experimental context, and makes it challenging to handle multi-step processes.

BENCHLING'S SOLUTION

Benchling tracks DNA reagents, captures the diversity of edits in each experiment, associates edits with a full lineage, manages physical inventory, and links assay data back to cell lines and tissue samples in order to provide a single source of truth.

PROCESS DEVELOPMENT

Without a system that associates results data back to cell lines, culture conditions, and downstream process versions, it's difficult to identify relevant process parameters and optimize development processes.

BENCHLING'S SOLUTION

Structure complex development workflows into assignable, trackable steps. Track your inputs, outputs, process conditions and results against each version of your process. Create new process versions in a user interface to iterate quickly.

MANAGING AN EFFICIENT RESEARCH PROGRAM

Efficiency suffers due to complex upstream and downstream processes, the need to coordinate with analytical and core functions, and the use of highly fragmented, disparate software tools that do not mirror laboratory workflows.

BENCHLING'S SOLUTION

Benchling helps you orchestrate a seamless research program. Centralize your data and analytics on a single platform, and interlink samples with experimental results in a standardized format. This allows for easy handoffs within and between teams and creates a continuous feedback loop between all departments of the research organization.

How Benchling Accelerates Cultured Meat R&D

Unified, Biointelligent Platform

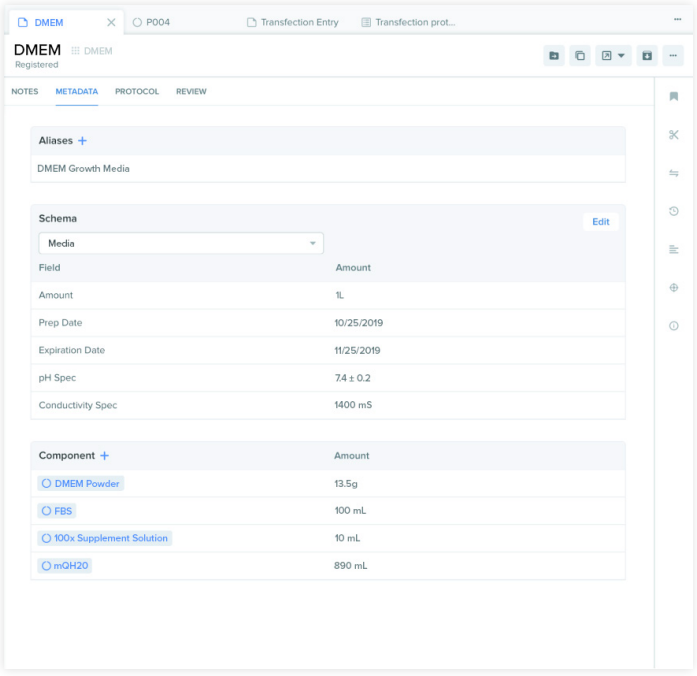
- **10+ sequence design and analysis** features including tools for alignment, bulk assembly, and CRISPR.
- **Automatic entity validation** to ensure completeness and accuracy of data entry.
- **Powerful collaboration features** including @ mentioning of individuals and teams.
- **Request submission and fulfillment** helps to eliminate knowledge loss during handoffs within and across teams.
- **360 degree view** of the entire R&D program for managers, directors and executives.

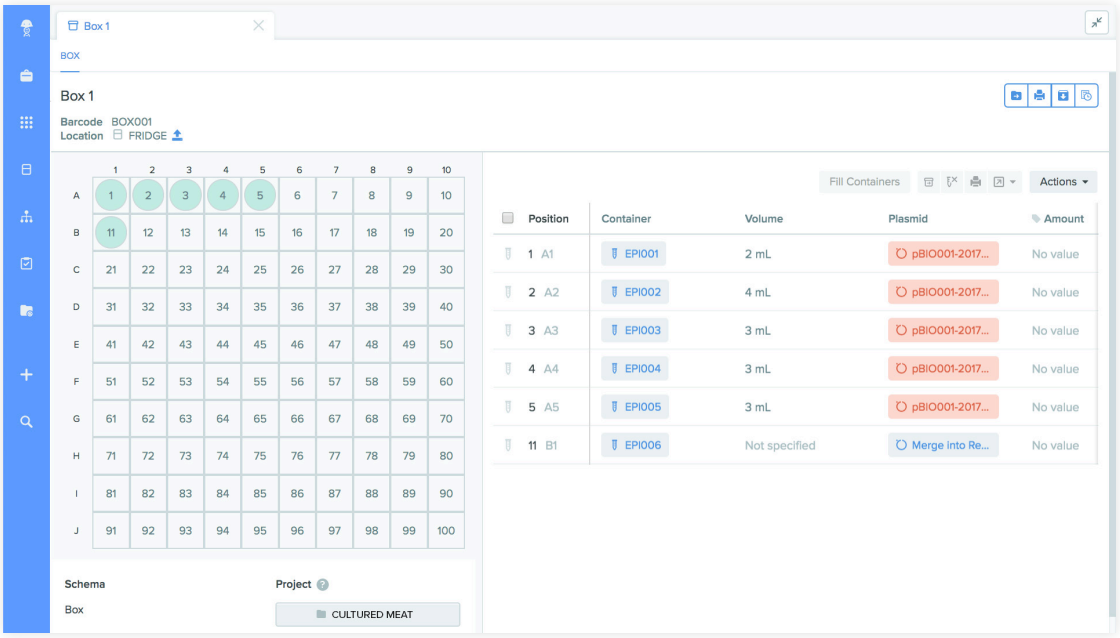
Flexible Workflow Engine for Process Development

- **Benchling's Workflows application** is unified with sample registration and tracking functionality.
- **Map novel, complex tissue culture processes** from seed train to large scale cultivation through rapidly configurable workflows that involve branching and pooling of runs.
- **Record and control workflow versions** to ensure reproducible results and monitor changes over time.
- **Automate end-to-end workflows** from experiment design and request submissions to sample analysis and results calculations.

Biopsy-To-Plate Sample Tracking

- **Manage a diverse set of entities and samples** ranging from cell lines, growth media/ supplements, tissues, and final product formulations.
- **Model complex biological relationships** across entities and automatically link the appropriate entities.
- **Track lineage**, "chain of custody," and physical location history of all samples.
- **Associate samples** with their full experimental history and results.
- **Media and buffer recipes** will soon be able to be registered as a default entity.





Structured Data Capture

- **Fully configurable data model** for cultured meat R&D, accessible through a point and click interface.
- **Standardize and templatize scale-up** processes through SOPs and structured results tables.
- **Centralize and aggregate data** for visualization, forecasting, and progress tracking.
- **Extract structured results** from experiments and sync to Data Warehouse.
- **Integrate with 3rd party instruments** to capture process and analytical data in a standard fashion.
- **Flexible storage system** allows creating locations like labs, freezers, shelves and boxes.

Key Outcomes

We have extensive in-house expertise at the intersection of life science and software and have successfully partnered with cellular agriculture companies to accelerate the pace of their R&D efforts.

- **Data is captured accurately** in real-time, as teams do their work.
- **Single source of truth** for the entire R&D organization.
- **Scientific teams base all decisions** on complete upstream data and explicit downstream needs.
- **R&D is faster** because Benchling adapts to the specific workflows that matter to each team.