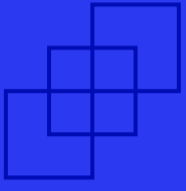


# Why bioprocessing needs a digital fix

Bioprocessing is a critical part of development and manufacturing that helps create valuable products using living organisms, cells, or cell components. Bioprocessing practices have been established over decades to create foods, materials, pharmaceuticals, chemicals, and proteins. A new wave of innovations is rapidly transforming the biotech industry, and at the same time, creating new pressures on bioprocess teams to increase their output.

## Newer, Complex Modalities

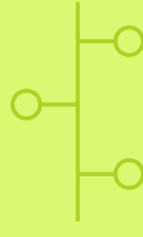


# 21%

of biopharma pipeline are complex, next-generation therapies<sup>1</sup>

New modalities such as cell therapies, gene therapies, bispecifics, antibody-drug conjugates, mRNAs, and RNA therapeutics are forcing bioprocessing practices to evolve.

## Compressed Timelines



# 65%

of drugs approved in 2022 used one or more expedited programs<sup>2</sup>

Regulatory pathways such as fast track, breakthrough therapy, priority review, accelerated approval, and orphan drugs are shortening development timelines.

## Bioprocess Intensification



# 1 to 10

fold average boost in bioprocessing productivity due to process intensification<sup>3</sup>

Innovations in equipment, processes, and materials are leading to novel bioprocess intensification practices with increased productivity and savings in time, volume, and cost.

## Bioprocessing 4.0 Technologies

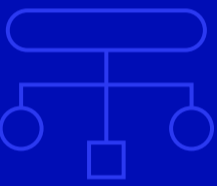


# 18.4%

CAGR projected for the global bioprocessing automation market by 2030<sup>4</sup>

Smart technologies such as automation, internet of things, artificial intelligence, machine learning, robotics, and digital twins are causing unprecedented digitization of bioprocessing.

## Process Analytical Technology (PAT)



# 3X

projected growth in PAT market size over the next 10 years<sup>5</sup>

Adoption of PAT to ensure high quality products with real-time monitoring and control is creating new in-line, on-line, at-line, and off-line data sets for process optimization.

## Sustainability Initiatives



# 15-52%

lower environmental impact of single-use bioreactors relative to conventional bioreactors<sup>6</sup>

More companies are setting up green goals for biomanufacturing, which means bioprocessing practices have to adapt to reduce resource consumption and environmental impact.

As the bioprocessing industry evolves to take advantage of these new innovations, it is creating new pressures to modernize data management practices. Companies have realized that spreadsheets and legacy ELN and LIMS applications struggle to keep up with the increase in data volume, formats, and complexity. R&D organizations must modernize their informatics to stay at the cutting edge of bioprocess efficiency.



### More data types and formats



### Greater number of data sources



### Higher data volume

### Key considerations across data lifecycle:

	Collection	Access	Analysis	Storage	Reporting
Legacy State	Process data capture varies by user and project	Historical process performance results are hard to track down	Process optimization decisions require manual aggregation of data	Raw and processed data are stored across on-premise databases and computers	Results are communicated via written docs, presentations and in-person meetings
Modern State	Process parameters and data are captured consistently across team	Historical process context and results are easily searchable and findable	Multiple process runs can be compared directly by querying a central database	All experimental, process, and sample data are centralized on the cloud	Results are readily searchable and traceable to create reports

To learn more about how Benchling R&D cloud can modernize your bioprocess development:

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