tetrascience

Data and AI in Bioprocess Development: Trends and Prospects

New modalities are on the rise

Therapies derived from living cells are more costly and difficult to manufacture than small molecules.

17 New drug modalities in the last 20 years[1]

- Antibody-drug conjugates
- Bispecific proteins
- Cell and gene therapies (CGTs)

60% of the preclinical drug pipeline is now made up of advanced, complex therapies[3]

Bioprocess development is on the critical path to approval

Process development extends timelines by up to

2.5 years for biologics

7 years for vaccines

Reducing them by just **3 months** can increase a drug's NPV by

5%

Bioprocess development and clinical manufacturing accounts for up to

of total R&D costs[5]

Data-driven approaches can transform bioprocessing

Bioprocess intensification can boost productivity by

50%

driving innovations like continuous bioprocessing and advanced enzyme engineering to overcome downstream challenges[6]

AI in process development could slash timelines by up to

75%

by enabling parallel optimization and rapid exploration of multiple variable and conditions[4]

But roadblocks stand in the way

High costs from excessive complexity

Traditional methods for developing and optimizing bioprocesses using classical DoE are time-and resource-intensive, driving up costs.

Low scientific productivity

Scientists and data scientists spend 50% of their time on manual data tasks because the data isn't FAIR, leaving less time for value-added work.[7]

Limited data-driven insights

Raw scientific data can't be used for advanced analytics or AI, limiting the ability to extract valuable insights.

11% clinical success for biologics, vaccines, and CGTs[8]

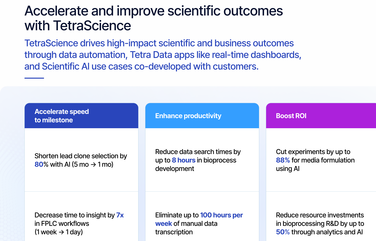
$2.3B average R&D costs per drug[9]

10+ years typically required for drug development[9]

Unlock the value of scientific data for analytics and AI in development and CMC

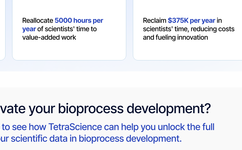
To take advantage of AI and significantly enhance process development, a strong data foundation is needed.

Raw scientific data must undergo an immutable series of operations to achieve analytics- and AI-ready data.



With TetraScience, build a state-of-the-art data foundation that supports bioprocess development and CMC workflows end to end.

Centralize, contextualize, and harmonize all your scientific data to prepare it for advanced analytics and AI.



Data sources in bioprocess development and CMC

TetraScience generates AI-native datasets with a purpose-built tech stack and science-led approach.

AI-native data (Tetra Data)

Accelerate and improve scientific outcomes with TetraScience

TetraScience drives high-impact scientific and business outcomes through data automation, Tetra Data apps like real-time dashboards, and Scientific AI use cases co-developed with customers.

Accelerate speed to milestone	Enhance productivity	Boost ROI
Shorten lead clone selection by **80%** with AI (5 mo → 1 mo)	Reduce data search times by up to **8 hours** in bioprocess development	Cut experiments by up to **88%** for media formulation using AI
Decrease time to insight by **7x** in FPLC workflows (1 week → 1 day)	Eliminate up to **100 hours per week** of manual data transcription	Reduce resource investments in bioprocessing R&D by up to **50%** through analytics and AI
Process chromatograms **96x faster** (1 day → 5 min)	Reallocate **5000 hours per year** of scientists' time to value-added work	Reclaim **$375K per year** in scientists' time, reducing costs and fueling innovation

Ready to elevate your bioprocess development?

Read our playbook to see how TetraScience can help you unlock the full value of your scientific data in bioprocess development.

Download Playbook

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