Galatek

Case Study | May 2026

Automated Antibody Discovery and Production Increases Yield and Shortens Delivery Timelines



Top Antibody Drug Discovery CRO | Galatek Customized High-throughput Antibody Discovery & Production Platform

BACKGROUND

The global market for therapeutic antibody drugs has grown consistently in recent decades and is estimated to approach $700 billion over the next ten years. Yet the core therapeutic antibody discovery workflow including plasmid construction, cell culture, transfection, and purification, remains laborious, variable, and difficult to scale.

THE CHALLENGE

A leading antibody discovery Contract Research Organization (CRO) faced compounding pressures across competitiveness, capacity, and quality.

Operational challenges defined the gap between where they were and where they needed to be:

- **Delivery cycle pressure:** Fluctuating demand made consistent, competitive turnaround difficult to sustain.
- **Throughput Limits:** A single technician can process only a limited number of samples, forcing extended timelines or turned down projects
- **Batch Variability**: manual pipetting, incubation timing, and column handling introduced inconsistencies unacceptable for functional screening or *in vivo* studies
- **Limited automation scalability:** Legacy automation solutions lack the throughput and labware flexibility needed for complex, adaptable workflows

THE SOLUTION

Bringing the Whole Workflow Together

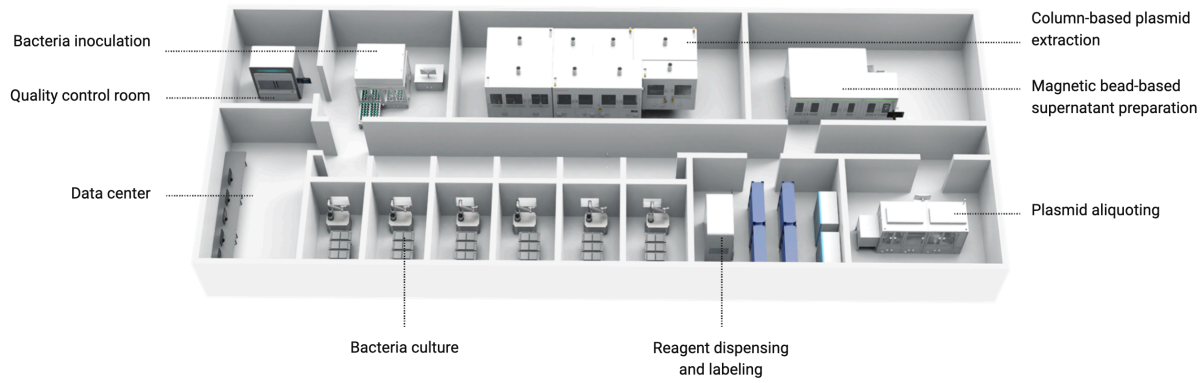
Galatek designed a fully integrated, modular automation platform to unify every step of the workflow of the therapeutic antibody discovery:

- Individual modular unit operations were custom-engineered for each workflow step
- Automated Guided Vehicle (AGV) transfers samples between unit operations
- Orchestration software connects all unit operations into a single managed workflow — real-time scheduling, instrument control, and end-to-end process visibility

Unit operations were set up as depicted below:

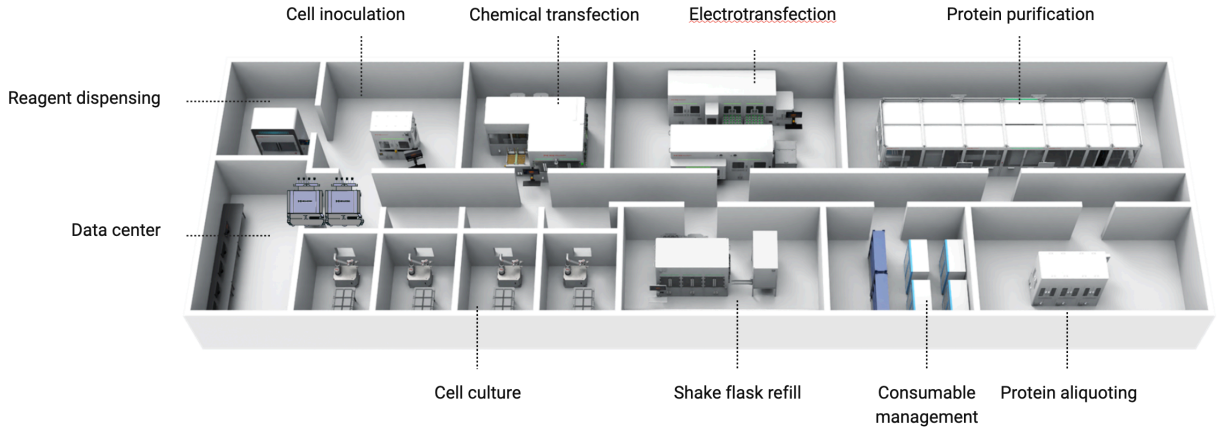
Bacterial Plasmid Production

Bacterial Inoculation — Culture — Harvest — Resuspension & Lysis — Lysate Clarification — Plasmid Extraction — Aliquot & Distribution



Mammalian Expression and Monoclonal Antibody Production

Reagent Preparation — Transfection Mix Preparation — Cell Transfection — Cell Seeding — Cell Expansion — Harvest — Protein Purification — Final Sample Preparation & QC



Managing Biological Process Risk Through Automation

Process Risk	Why It Matters	Automation Control
Variable cell density at transfection	Directly impacts transfection efficiency, expression levels, and antibody yield	Scheduled culture monitoring and standardized transfection timing
Inconsistent DNA/reagent complex preparation	Reduces transfection efficiency and produces variable protein expression across batches	Controlled reagent addition, mixing, and incubation timing
Harvest timing variability	Off-schedule harvest degrades cell viability, protein titer, and overall recovery	Software-driven scheduling and automated sample tracking
Manual purification variability	Inconsistent column handling, bead processing, or wash timing reduces antibody recovery and reproducibility	Standardized purification protocols and automated liquid handling
Sample identity risk	Mislabeling compromises traceability, data integrity, and customer confidence	Barcode-based sample tracking with LIMS integration
Cross-contamination risk	High-throughput scale amplifies carryover and contamination events across runs	Validated liquid handling procedures, disposable consumables, and workflow segregation

Software-Driven Process Integration:

An integrated software layer captures process parameters, equipment status, and sample identifiers at every stage — automatically. When variables shift (reagent availability, incubation timing, expression yield), the system flags deviations and adapts scheduling in real time.

The result: fewer failed batches, more consistent output across expression formats, and a complete traceable data record at every step.

Design
AI and computational modeling drive virtual screening, sequence analysis, and antibody candidate optimization *in silico*

Learn
Experimental data feeds back into ML models to refine candidates and inform toxicology and clinical translation



Build
Integrated ELN/LIMS and workflow orchestration translate digital designs into expressed antibody candidates

Test
24/7 automated assays screen antibody binding, specificity, and functional activity at scale

THE IMPACT

The deployment of Galatek's customized automation platform delivered measurable gains across every dimension of the operation, from turnaround time and batch capacity to data quality and workflow coverage.

Metric	Result	Impact
Delivery Time	2 weeks → 1 week	Halved customer turnaround timeline
Batch Capacity	2,000 expressions/batch	Single-batch antibody protein expressions
Productivity	2× increase	Reduced costs, expanded profit margins
Data Scale	100× capacity	Consistent, structured, high-quality data assets
Automation Coverage	90% of workflow	30+ proprietary systems across 5 expression formats

Moving Forward: The Value of Automation

With 90% of the antibody discovery and production workflow now automated across five expression formats, this initiative represents a structural shift in what this CRO can reliably deliver.

The platform's scalable architecture enables expansion into adjacent biologics programs without rebuilding underlying infrastructure, freeing scientific teams to focus on biology rather than managing process variability.

For Galatek, it's a blueprint for what fully customized automation can deliver when designed from the ground up around the demands of a high-throughput discovery environment.



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