Galatek

Synthetic Biology Automatic Solutions
AI for Life Science

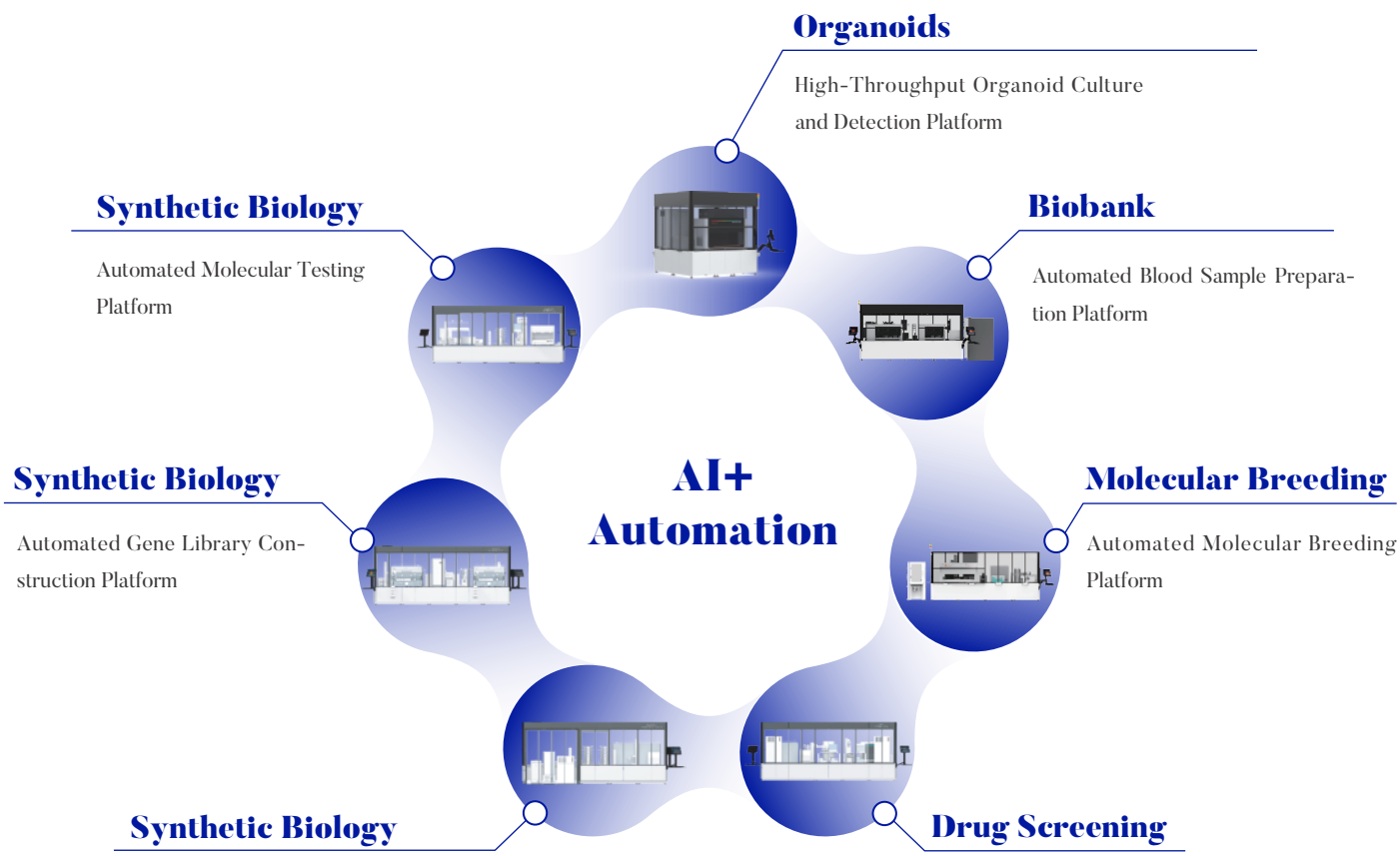
AI and Data-Driven Advanced Productivity Tools

- High-Quality Data
- AI-Assisted Design
- Multifunctional Platform

AI for Life Science - Building a Data Factory for Life Sciences

Empowering the life sciences with AI tech can accelerate scientific research innovation and industrial breakthroughs. In this process, high-quality data factory serves as the core infrastructure for generating the data required for AI, playing a crucial role. It provides a precise and reliable data foundation for scientific research, driving the transformation of scientific research paradigms. Galatek is committed to deeply integrating AI, automation, and life sciences to build an AI-powered smart laboratory and construct a high-quality data factory for life sciences that is oriented toward the future, providing a strong momentum to drive scientific research and industrial progress.

Solutions



Organoids

High-Throughput Organoid Culture and Detection Platform

Synthetic Biology

Automated Molecular Testing Platform

Biobank

Automated Blood Sample Preparation Platform

Synthetic Biology

Automated Gene Library Construction Platform

Molecular Breeding

Automated Molecular Breeding Platform

Synthetic Biology

Automated Protein-Directed Evolution Platform

Drug Screening

Automated Protein-Directed Evolution Platform

Digital Intelligence Platform Galatek Informatics

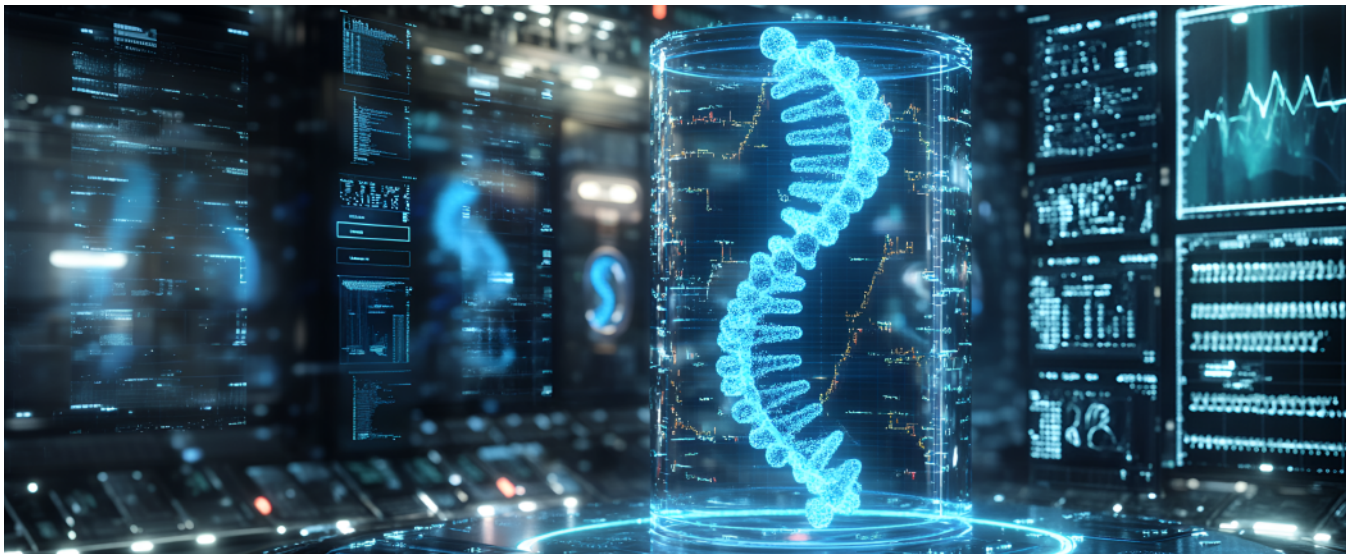
LABILLION™ Automation Scheduling Software	LABILLION™ Data Management Software	LibraX™ Data Intelligence Software	Laminar™ Digital Twin Software	CyberX™ Bioinformatics and Data Science Software

Overview of the Synthetic Biology Industry

Synthetic biology is an interdisciplinary field that integrates biology, engineering, and information science. It aims to achieve goals such as material synthesis, environmental remediation, and disease treatment by designing, modifying, or constructing biological systems from scratch. The industry focuses on biomanufacturing, healthcare, agriculture, and energy sectors, leveraging gene editing, DNA synthesis, and metabolic engineering technologies to develop engineered bacteria, artificial cells, and other biological tools. The global market size exceeds tens of billions of dollars, and technological breakthroughs such as CRISPR and AI design platforms are accelerating industrialization. Innovative achievements such as bio-based materials and cell therapies are emerging frequently. The industry currently faces challenges such as biosafety, system stability, and large-scale production, and is iterating toward intelligence and automation, with the potential to reshape traditional industrial production models.

Application Directions

- Engineered Bacteria Construction
- Phage Directed Evolution
- Molecular Vector Construction
- Protein Screening
- Drug Intermediate Development
- Metabolic Engineering



Challenges in Manual Synthetic Biology Experiments

Low Throughput, Time-Consuming and Labor-Intensive

In traditional methods, only a few dozen samples can typically be processed per day. Repetitive steps such as pipetting and plating rely on manual labor, resulting in low efficiency and wasted resources

Poor Standardization and Repeatability

Experiments are difficult to standardize and results vary greatly due to the reliance on human experience and operation

Complex and Error-Prone Technical Processes

Multi-step operations (such as enzyme digestion, ligation, transformation) are prone to cross-contamination or mutations, resulting in low experiment success rates

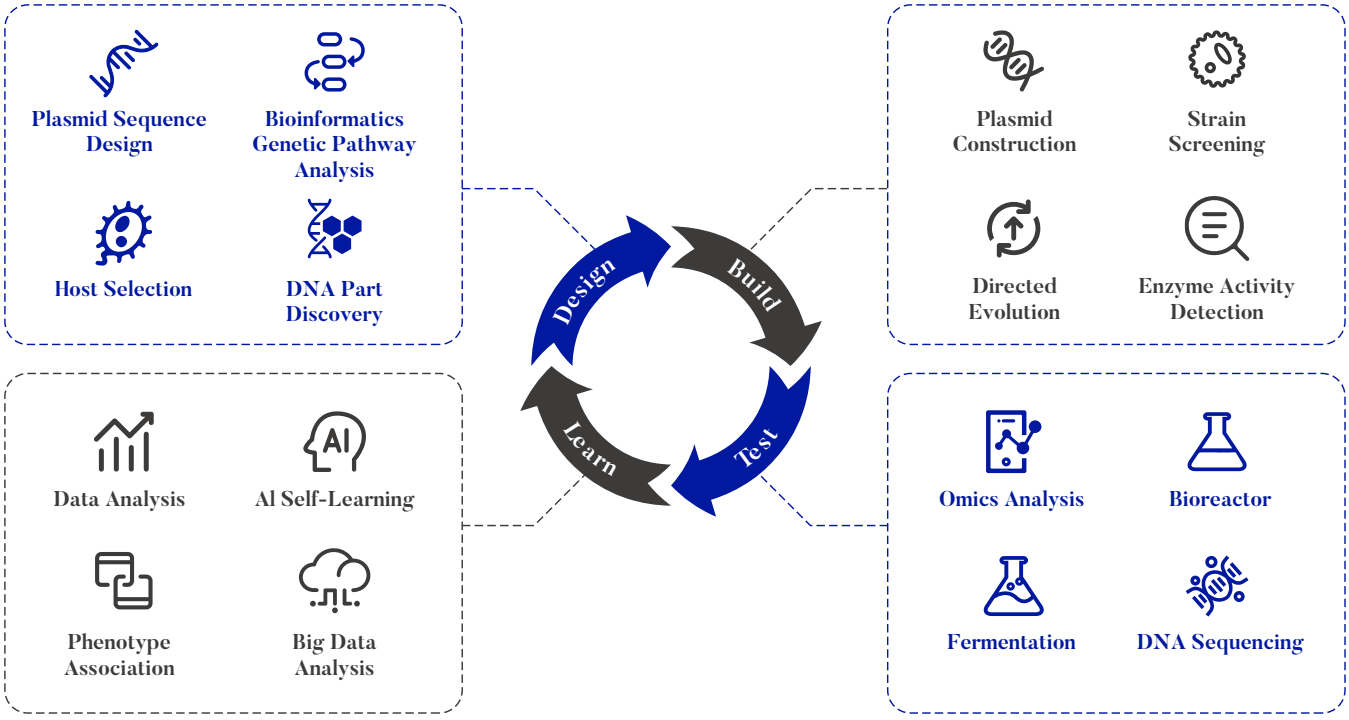
Difficulty in Tracing Results

It is challenging to trace back initial sample information from the final results and accumulate data to guide the next round of design, making it difficult to develop an ideal dry-wet closed-loop system

Digital Intelligence-Empowered Synthetic Biology Research

The main challenges facing synthetic biology include the complexity and unpredictability of biological systems, the difficulty of scaling up from small-scale experiments to large-scale production, and the low efficiency and high failure rate of traditional trial-and-error experimental methods. Digital intelligence and automation provide powerful support for addressing these challenges. Machine learning technologies offer powerful predictive capabilities, enabling the prediction of biological system behavior even without a full understanding of the underlying mechanisms, thereby aiding in the design of more stable synthetic biological systems. Automation technologies, through high-throughput, standardized experimental workflows, generate large volumes of high-quality data, providing the necessary training foundation for machine learning. The integration of these two technologies establishes an automated "Design-Build-Test-Learn" (DBTL) cycle, enabling whole-process automation from sample processing to product detection. This approach significantly improves research efficiency, reduces failure rates, and accelerates the transition from basic research to application development. The application of technologies such as automated liquid handling and microfluidics provides widely applicable solutions for synthetic biology research, driving rapid development in both basic research and industrial applications in this field.

DBTL Whole-Process Solutions



Advantages of Digital Intelligence in Synthetic Biology

Improves Throughput and Reduces Human Error

More than hundreds or even thousands of tasks are completed every day, including gene assembly, molecular cloning, strain screening, and expression detection

Uniform Standards, Easy to Reproduce Results

Strictly control and standardize experimental processes through standard data platforms and automated experimental platforms to ensure reproducible experimental results

Environmental Control to Prevent Contamination

Features negative pressure/dust cover environmental control and UV sterilization module to ensure a clean and contamination-free workbench

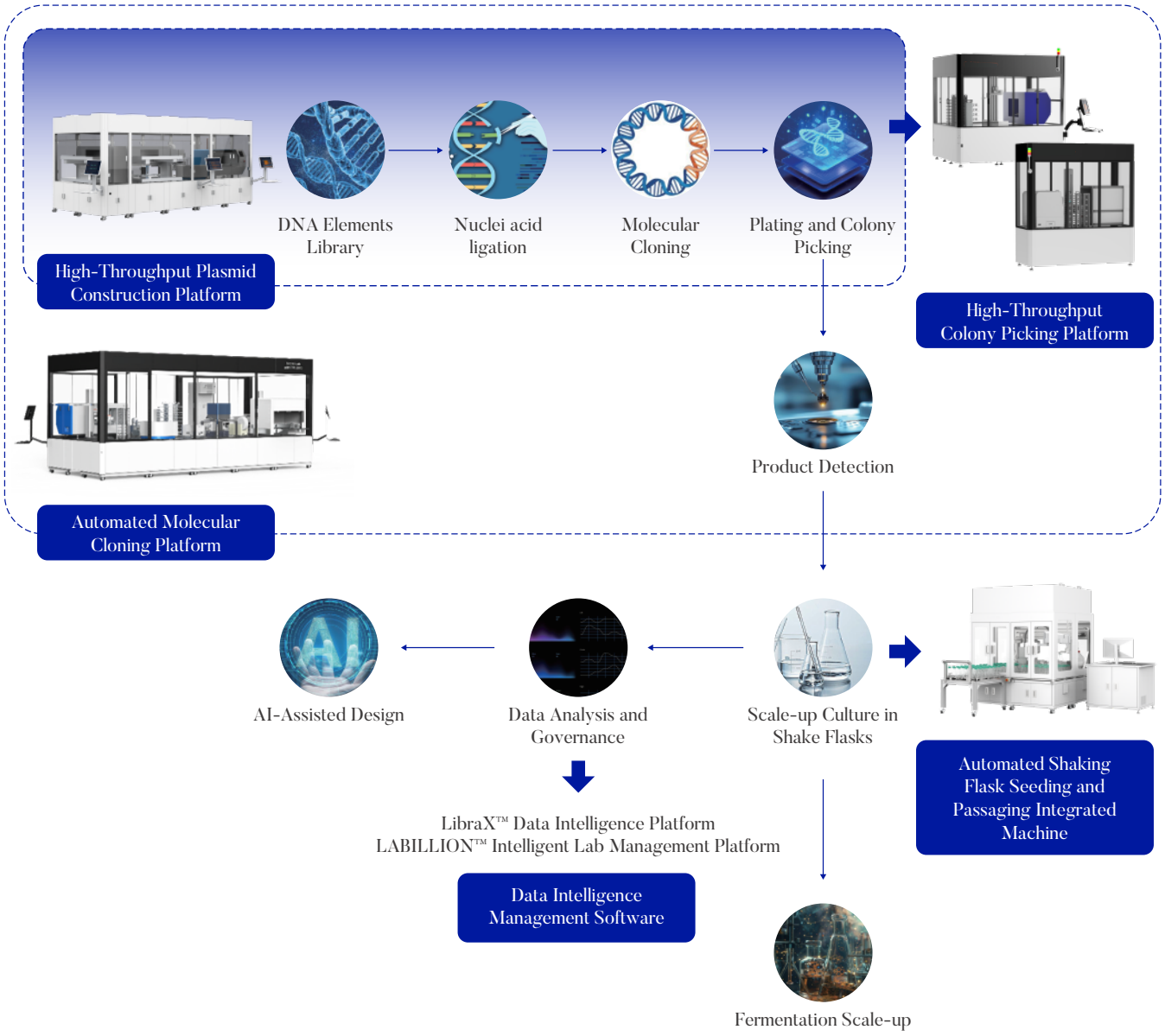
Accelerates the DBTL Iteration Cycle

Automated, informatized, and digital hardware and software platforms enable closed-loop dry and wet experiments

Synthetic Biology Automatic Solutions

Synthetic biology automatic solutions utilize automated and digital platforms to enable rational design and predictable synthesis of living organisms. These solutions assist non-specialists in quickly launching research projects, accelerating DBTL iteration cycles, shortening development times, reducing development costs, and improving titer, yield, and productivity. They provide efficient, standardized cell modification processes, deliver reliable data for local and national synthetic biology projects, and drive the development of the new economy.

Automated Molecular Testing Platform



Automated Molecular Testing Platform

The automated molecular testing platform is a multifunctional, efficient solution widely used in various experimental scenarios such as gene synthesis, plasmid preparation, strain screening, and microbial molecular identification. The platform integrates a complete set of automated processes, from DNA ligation, molecular cloning, monoclonal plating, product detection, to data analysis. The platform supports automated distributed high-throughput plating, enabling large-scale, precise colony culture. Utilizing automated colony imaging and identification technology, it provides efficient screening and data collection. Additionally, the platform supports parallel operation of multiple processes, significantly improving experimental efficiency, shortening experimental cycles, and ensuring high-quality experimental data output. This provides robust technical support for genetic engineering and biotechnology research.

Application Case: Screening of High-Yield Strains for Bioactive Molecules

AI-Assisted Strain Modification

Key Part Design | Mutant Sequence Library

Enzyme | Protein Binder | DNA

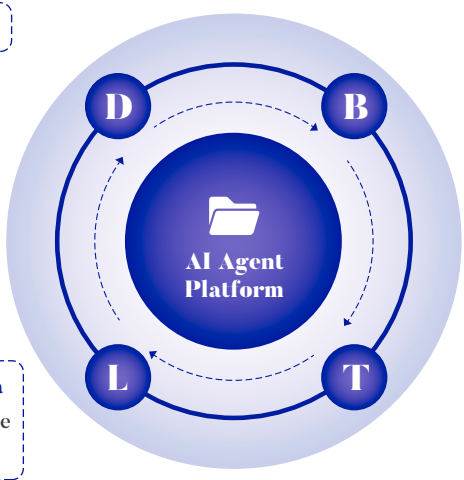
Multidimensional Data Analysis and Model Optimization

Library Data
Part/DNA Sequence
Fluorescence Intensity

Monoclonal Data
Part/DNA Sequence
Monoclonal Data

Environmental Parameters | Operating Parameters | Process Data

[Positive/negative process data] Knowledge base updates and reinforcement learning



Strain Construction

Rational Modification | Random Mutagenesis

Precise Diversity Scatter Mutation Library | ARTP Mutagenesis

High-Throughput Sequencing and Detection

Microfluidics/Flow Sorting
Fluorescence Assays

Microwell Plate Screening
Colorimetric Method

High Throughput Library Preparation and Sequencing

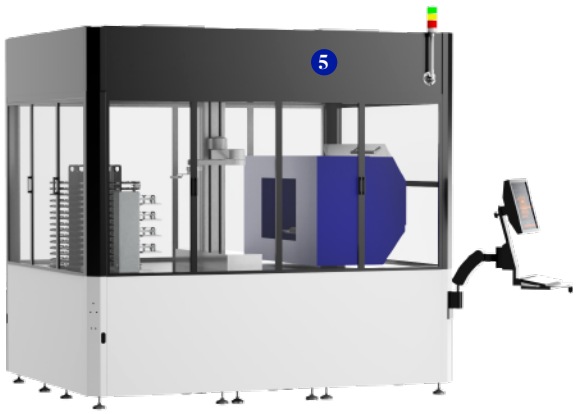
High-quality data generation and data governance AI data set generation

LibraX | LABILLION

Intelligent Lab Management Platform

High Throughput Colony Picking Platform (Basic Model)

The system integrates robotic arm, automated colony coating instrument, colony picking instrument, consumable stack, and other devices, supporting flexible configuration of plate stacks to enable automated experimental processes such as bacterial solution plating and monoclonal picking.



1 Colony picking instrument 2 Robotic arm and scanner 3 Consumable Stack 4 Automated plate delidder 5 Environment control module

AI-Assisted Strain Picking

Dynamic Consumable Transfer

Release More Deck Space

Less Consumable Waste

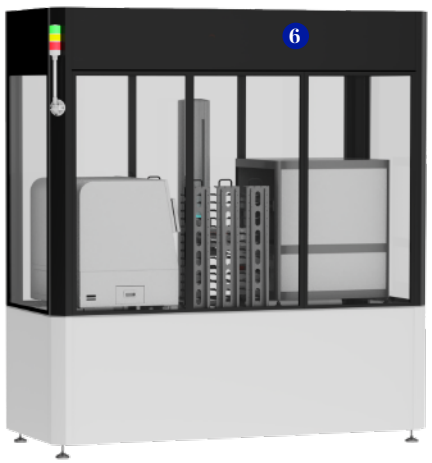
Simplified Process Editing

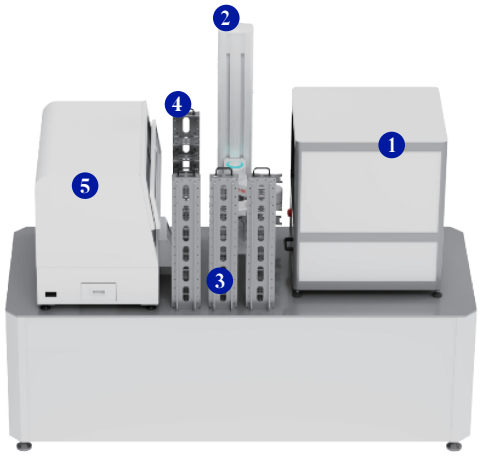
Parameters

Key Parameters	Description
Dimensions	2,500 * 1,900 * 2,400 mm
Designed Throughput	600 - 3,000 colonies per hour
Picking Pins	Disposable consumables or steel pins
Environment Control	Dust cover, FFU, positive pressure laminar flow hood, etc.

High Throughput Colony Picking Platform (Enhanced Model)

The system automates the whole process, including PCR amplification, ligation, transformation, plating, colony picking, and strain culture, facilitating a high-fidelity and robust automated DNA assembly process.





1 Colony picking instrument
2 Robotic arm and scanner
3 Consumable stack
4 Automated plate delidder
5 Colony coating instrument
6 Environment control module

Self-Developed Square-Well Culture Plate

Multiple Microorganism Plating Modes

Automatic Matching of ELISA Data to Sample Information

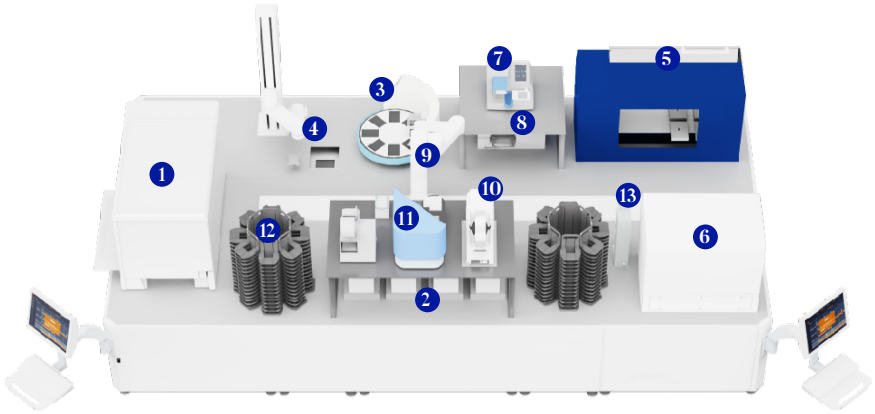
More Convenient Monoclonal Culture

Parameters

Key Parameters	Description
Dimensions	2,350 * 1,000 * 2,400 mm
Designed Throughput	600 - 3,000 colonies per hour; approximately 1 minute per plate for plating
Picking Pins	Disposable consumables or steel pins
Environment Control	Dust cover, FFU, positive pressure laminar flow hood, etc.

High-Throughput Plasmid Construction Platform

The system can integrate multiple gene seamless cloning technologies such as PCA assembly (polymerase cycle assembly) and Golden Gate assembly, and supports gene editing operations such as targeted mutation, etc. The automated platform enables the closed-loop control of the whole process, including target gene amplification, fragment-directed ligation, recombinant plasmid transformation, colony plating screening, monoclonal culture and plasmid validation. It significantly improves the fidelity of DNA assembly and operational robustness, meeting the needs of high-throughput synthetic biology research.

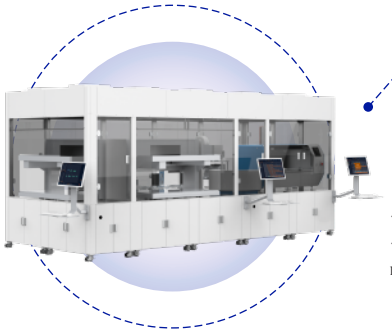


1 System construction workstation
2 PCR instrument * 4
3 Nucleic acid & plasmid purification system
4 Centrifuge
5 Colony picking module
6 Bacteria coating instrument
7 Microplate reader
8 Dispenser
9 Robotic arm and scanner
10 Film sealer
11 Film peeler
12 Consumable stack
13 Wellplate delidder

Independent R&D

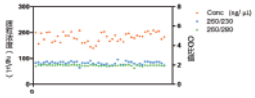
· Self-developed 8-well and 16-well culture consumables
· Reduces the consumable usage costs

· Self-developed matching reagent kits
· Eliminates the need for automation condition optimization



AI-Assisted Research

· AI-Assisted Identification
· Identifies colony size, color, morphology, and counting



· Experimental process and result data
· Visual management

Parameters

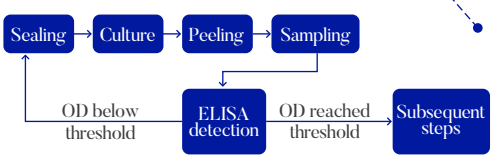
Key Parameters	Description
Dimensions	4,800 * 2,500 * 2,400 mm
Designed Throughput	Approx. 200 gene constructions and transformations per day; or 1,600 bacterial strain plating and screening processes
Sample Types	DNA elements
Environment Control	Dust cover, FFU, positive pressure laminar flow hood, etc.

Automated Molecular Cloning Platform

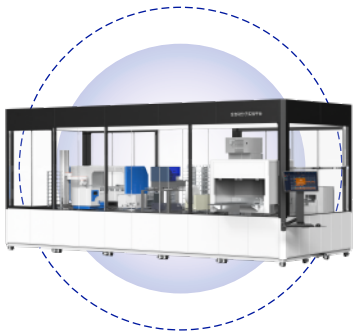
The system can automate the whole process of bacterial strain screening experiments, from colony picking and induction of expression to reaction detection. It is compatible with various screening methods and supports online vector construction, strain amplification and culture, density detection, and strain backup.

1. System construction workstation
2. PCR instrument
3. Nucleic acid & plasmid purification system
4. Colony picking instrument
5. Bacteria coating instrument
6. Film peeler
7. Film peeler
8. Fragment analyzer
9. Shaking incubator
10. Bacteria coating instrument
11. Film sealer
12. Freezer
13. Centrifuge
14. Wellplate delidder
15. Consumable stack
16. Robotic arm and scanner

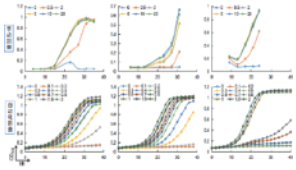
Automatic OD Detection



Decision/Loop judgment · Automatic detection of bacterial density thresholds · Overnight strain passaging



Features High-Quality Experimental Data



Higher detection frequency · More accurate growth curves · Increased data volume

Parameters

Key Parameters	Description
Dimensions	5,600 * 2,500 * 2,400 mm
Designed Throughput	384–576 plasmid constructions or 480–960 strain screenings per batch
Sample Types	Escherichia coli (E. coli), yeast, etc.
Environment Control	Dust cover, FFU, positive pressure laminar flow hood, HEPA filter, etc.

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Declaration