



## A complete solution to meet synthetic biology research & industry needs

A COLLECTION OF THE MOST INNOVATIVE PRODUCTS FOR BREAKTHROUGH RESULTS

*life*  
technologies™

Invitrogen™

Applied Biosystems®

Gibco®

Molecular Probes®

Novex®

TaqMan®

Ambion®

Ion Torrent™

# Inquire, understand, break through to discover

At Life Technologies, we believe synthetic biology will change the way we create energy, produce food, optimize industrial processing, and detect, prevent, and cure diseases—improving the human condition and the world around us. We are committed to offering unparalleled technology and solutions to the research community.

Through design and engineering, this unique science enables researchers to study, alter, create, and re-create highly complex pathways, DNA sequences, genes, and natural biological systems in order to understand and answer some of life's most challenging questions.



# Breadth, depth & innovation: a complete solution

Expensive and time-intensive workflows and poor data quality with vague results are now problems of the past. Times have changed. And so have the possibilities for synthetic biology research and application.

At Life Technologies you'll find **a comprehensive selection** of products, technologies, and services that can be used in **a wide variety of workflows** and **at multiple stages of research**. Our products remain at the forefront of synthetic biology breakthroughs, providing cutting-edge solutions to meet the continuum of synthetic biology research and discovery.

- **Breadth and depth**—the only comprehensive offering of total parts, services, modeling software, hosts, and media for synthetic biology research
- **Innovation**—high-performing precision tools and services that enable new applications
- **Value**—qualified, highly effective, ready-to-employ solutions to streamline workflows
- **Customization**—select the kits, products, services, and options to meet your needs
- **Predictable outcomes**—software that gives reliable results in real time

## GeneArt® products and services for synthetic biology include:

- Algae Engineering Kits
- Cell Lines & Proteins Services
- Directed Evolution Services
- Gene Synthesis Service
- GeneOptimizer® Software
- High-Order Genetic Assembly System
- Plasmid Services
- Precision TALs
- Seamless Cloning and Assembly Kit
- Site-Directed Mutagenesis System

### Life Technologies brands:



- **Invitrogen™**  
DNA reagents, consumables, and kits



- **Applied Biosystems®**  
Integrated instrument systems, sequencing, and software



- **Gibco®**  
Cell culture reagents and consumables



- **Molecular Probes®**  
Labeling and detection solutions



- **Novex®**  
Protein reagents and consumables



- **TaqMan®**  
Real-time PCR



- **Ambion®**  
RNA reagents and consumables



- **Ion Torrent™**  
Semiconductor sequencing systems

# Rising to the challenge: research and applied markets

From investigating the behaviors of cancerous cells to minimizing carbon footprints, the potential of synthetic biology is both inspiring and very real. At Life Technologies, we strive to help meet the needs of life science research and key applied market areas, including biofuels, industrial enzymes, pharmaceuticals, vaccines, antibodies, bio-based chemicals, and agricultural biotechnology.



## Life science research

**Finding meaningful answers, actionable results.** Consistent, quality protocols are required to keep research moving in the right direction. From academia to government, research institutes to hospitals, life science researchers demand the best products and services to uncover, question, and explore hidden truths that will ultimately impact the human condition.

**Our solution.** Life Technologies offers researchers cost-effective, flexible solutions designed for convenience and quality, including gene synthesis services—that can help you get any desired DNA construct with 100% accuracy—and ready-to-use cloning and assembly kits.



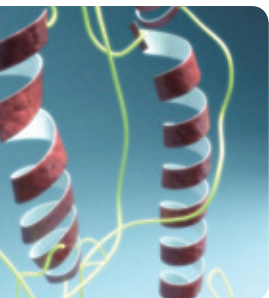
## Biofuels

**Engineering alternative fuel sources.** In today's climate, sustainable clean energy is more critical than ever. The biofuels industry is in need of efficient, secure, sustainable energy sources—and we're empowering researchers with a solution.

**Our solution.** Life Technologies provides researchers with the tools and services required to improve and expand feedstock options—and to optimize genes, microorganisms, and plants—for efficient conversion into desired biofuels.

## Innovation at work: unlocking alternative fuel sources

From medicinal use to biofuel, the seeds of *Jatropha curcas* carry huge impact. Resistant to drought and pests, these oil-packed seeds are a low-cost source for next-generation biofuel. Life Technologies and SG Biofuels, Inc. successfully sequenced the *Jatropha curcas* genome to 100x coverage using a SOLiD® System. The sequence will be used to create a high-quality reference genome and significantly accelerates the identification of key traits of the oilseed crop.



## Industrial enzymes

**Getting more with less.** The industrial enzyme industry is in search of sustainable processes that enable higher yields (more enzyme production) and higher activity (more efficient, effective, dynamic enzymes). From lactose-free dairy products to fast-acting laundry detergents, innovation is key in engineering improved, cost-effective end products for textiles, foods, detergents, animals, and more.

**Our solution.** Life Technologies equips researchers and industry leaders with the ability to optimize enzyme activity, yield, and quality for optimal product performance.

## Pharma, vaccines, and antibodies

**Going from drug research to application—faster.** When it comes to healthcare—disease detection, prevention, treatment—time is of the essence. The pharma, vaccines, and antibodies industries require more efficient, scalable ways to better streamline the drug research–development–application pipeline. With vaccines and other drug therapies, this industry has the potential to save and heal millions of lives.

**Our solution.** Life Technologies provides the tools industry leaders use to improve the therapeutic pipeline and success rate of experiments and trials. Our technology provides the tools and services necessary to sequence genetic information to formulate vaccines and other treatments.



### Discovery in motion: development toward an HIV vaccine

GeneArt® scientists developed the custom gene constructs that serve as the basis for HIV vaccine candidates. The gene sequences were custom-designed by scientists at GeneArt® and the University of Regensburg, and have been tested as HIV vaccine candidates on 40 test persons by the EuroVacc Foundation in a phase I clinical trial. The trial proved the prophylactic vaccine to be safe and well tolerated, triggering a strong and lasting immune response in 90% of the candidates.

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## Bio-based chemicals

**Decreasing dependency, increasing sustainability.** Bio-based chemicals represent a rapidly growing, high-demand industry. This emerging market delivers biodegradable plastics, plant-based cleaning supplies, and renewable energy sources, among several other uses, resulting in eco-friendly consumption alternatives. From ethanol to corn-based plastics, the bio-based chemical industry is fueled by inventive ways to replenish natural resources, decrease our dependency on foreign and limited-supply oil resources, and decrease greenhouse gas emissions.

**Our solution.** Life Technologies offers approaches to create chemicals, plastics, and textiles that have less impact on the environment.

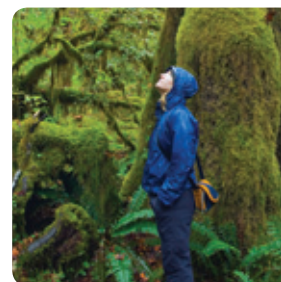


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## Agricultural biotechnology

**Growing a global food supply.** Fast, reliable methods for crop development are critical to feeding our growing world. The agricultural biotechnology industry looks to synthetic biology to increase crop yields—even in unfavorable conditions; to explore the next generation of plants designed for industrial (biofuel) and medicinal applications; and to sequester CO<sub>2</sub> emissions using photosynthetic microorganisms.

**Our solution.** Life Technologies offers integrated platforms and technologies to enable sequence-to-function plant analysis, and genetic tools to produce sequences *in silico* for specific phenotypes and traits.



## DISCIPLINE AREAS INCLUDE:

- Biochemistry
- Bioinformatics
- Cell biology
- Chemical engineering
- Computational biology
- Design engineering
- DNA sequencing
- Fermentation science
- Fluxomics
- Gene evolution
- Gene expression
- Gene optimization
- Gene synthesis
- Genetics
- Genomics
- Industrial microbiology
- Materials science
- Metabolomics
- Metagenomics
- Microbiology
- Molecular biology
- Proteomics
- Systems biology
- Transcriptomics
- Waste management

# Comprehensive tools to support deterministic design

At Life Technologies, we understand the challenges faced by scientists involved in synthetic biology discovery. You need robust tools and services that can reduce steps, time, error rates, cost, and complexity—and solutions that are scalable and are easy to access, order, and use.

The synthetic biology construction cycle from Life Technologies offers a truly integrated solution. From powerful sequencing solutions such as the Ion Torrent™ Personal Genome Machine™ (PGM™) System and intelligent *in silico* gene design tools to state-of-the-art GeneArt® gene cloning and synthesis technologies and Gibco® media and supplements, our product offering has the depth, breadth, and innovation to power every stage of the synthetic biology construction cycle.

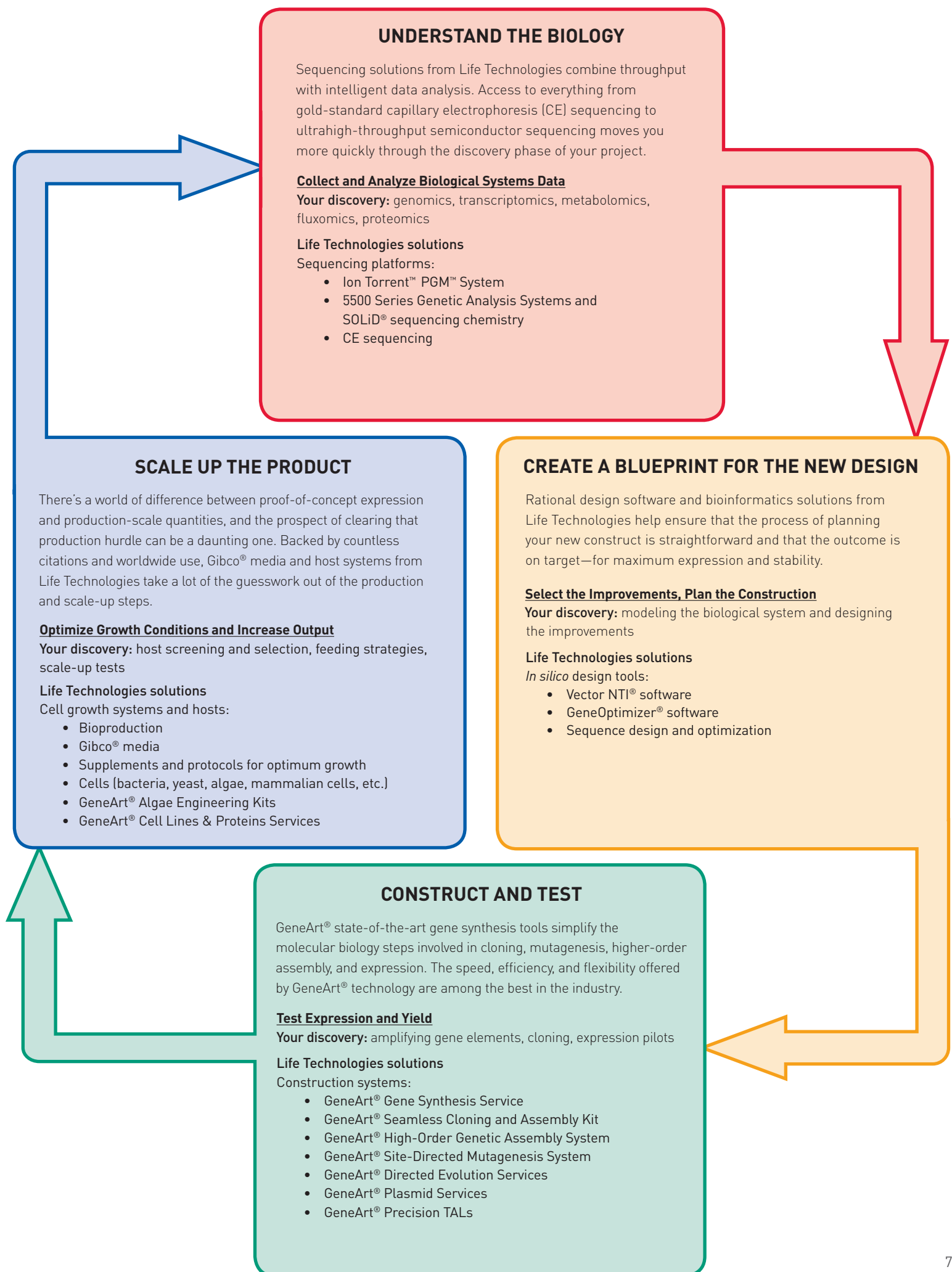
## Increasing your chances of success at every stage

No matter where you enter the synthetic biology construction cycle, products and services developed by Life Technologies are aimed at providing cost-effective, powerful, and flexible solutions to keep you moving forward.

Discover our collection of industry-leading research solutions at [lifetechnologies.com/syntheticbiology](http://lifetechnologies.com/syntheticbiology)



Here's how we're supporting synthetic biology research at every stage:





LIFE TECHNOLOGIES™  
**SYNTHETIC BIOLOGY**



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