

Synthetic Biology Market to Hit USD 84.7 Billion by 2035, Fueled by Advances in Gene Editing and Bio-Manufacturing

The global synthetic biology market will grow at 14.1% CAGR to \$84.7B by 2035, driven by gene editing advances and sustainable bio-manufacturing.

WILMINGTON, DE, UNITED STATES, August 13, 2025 /EINPresswire.com/ -- The [synthetic biology market](#) is entering a phase of accelerated expansion, driven by technological breakthroughs, surging investment, and the urgent need for sustainable solutions to global challenges. In 2024, the market was valued at US\$ 18.9 billion, reflecting steady adoption of engineered biological systems across healthcare, agriculture, and industrial sectors. Looking ahead, the market is projected to grow at an impressive compound annual growth rate (CAGR) of 14.1% between 2025 and 2035,

ultimately reaching US\$ 84.7 billion by the end of the forecast period. This trajectory signals not just a quantitative leap in market size, but also a qualitative shift in the role synthetic biology will play in everyday life and industrial supply chains. With applications ranging from precision fermentation and bio-based materials to advanced gene therapies, synthetic biology stands at the intersection of science, business, and sustainability — and its momentum is unlikely to slow anytime soon.

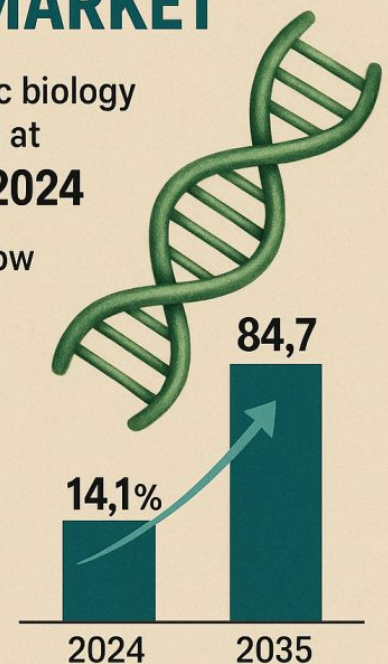
Market Size and Growth

The growth prospects for synthetic biology are underpinned by the convergence of several powerful trends: advances in gene synthesis, a drop in sequencing costs, and the scaling up of bio-manufacturing infrastructure. Between 2025 and 2035, the market is expected to add nearly US\$ 65.8 billion in value, a transformation largely fueled by both the diversification of applications and the maturation of enabling technologies. In healthcare, synthetic biology is

GLOBAL SYNTHETIC BIOLOGY MARKET

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Synthetic Biology Market



Synthetic Biology Market Set for \$84.7B by 2035, Powered by Gene Editing Progress and Bioeconomy Growth”

By Transparency Market Research

making possible the development of complex biologics, personalized vaccines, and gene therapies that were once considered too costly or technically unfeasible. In food and agriculture, the technology is enabling the creation of animal-free dairy proteins, engineered crops with enhanced nutritional profiles, and microbial solutions that reduce chemical fertilizer use. On the industrial front, companies are using synthetic biology to produce biofuels, bioplastics, and specialty chemicals with far smaller

environmental footprints than their petrochemical counterparts. This combination of innovation, cost efficiency, and sustainability is setting the stage for exponential growth over the next decade.

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Market Segmentation

By Product Type

The synthetic biology market encompasses a wide array of products, each serving as a critical building block for bioengineering applications. Synthetic DNA and genes are at the heart of the sector, enabling precise control over genetic functions. Synthetic cells and chassis organisms serve as engineered platforms for producing proteins, enzymes, and metabolites at scale. Oligonucleotides have become indispensable for diagnostics and research applications, while advanced bioinformatics tools are making it possible to design and simulate biological systems in silico before they are built in the lab. The diversity of these product categories reflects the multi-disciplinary nature of synthetic biology and its ability to serve multiple industries simultaneously.

By Application

In healthcare and pharmaceuticals, synthetic biology is revolutionizing drug discovery, vaccine development, and regenerative medicine. Techniques such as CRISPR-Cas9 gene editing and synthetic virology are paving the way for treatments that directly address genetic causes of disease. In agriculture and food, the focus is on boosting yield, resilience, and sustainability through engineered crops, microbial soil enhancers, and cultured proteins. The industrial biotechnology segment is leveraging engineered microbes for the production of renewable fuels, biodegradable plastics, and specialty chemicals, reducing reliance on fossil fuels. Environmental applications — while smaller in current market share — hold immense potential, with innovations aimed at bioremediation, waste-to-value processes, and carbon capture through engineered organisms.

By End-User Industry

The end-user base for synthetic biology is expanding rapidly. Biotechnology and pharmaceutical companies remain the largest consumers, integrating synthetic biology into R&D pipelines. Food and beverage manufacturers are increasingly adopting bioengineered ingredients to meet demand for sustainable, ethical, and allergen-free products. Chemical and energy companies are partnering with synthetic biology firms to produce green chemicals and renewable fuels at industrial scale. Academic and research institutions also represent a significant segment, as they drive much of the foundational work and training that sustains industry innovation.

Regional Analysis

North America leads the synthetic biology market, bolstered by world-class research institutions, substantial venture capital flows, and a supportive regulatory landscape for biotech innovation. The United States, in particular, has nurtured a thriving startup ecosystem with companies like Ginkgo Bioworks and Twist Bioscience at the forefront. Europe is the second-largest market, driven by strong government initiatives aimed at building a circular bioeconomy and a regulatory focus on sustainability and consumer safety. Countries such as the UK, Germany, and the Netherlands have emerged as hubs for synthetic biology research and commercialization. Asia-Pacific is expected to record the fastest growth rate over the forecast period, as nations like China, Japan, and Singapore invest heavily in biotechnology infrastructure, education, and public-private partnerships. Meanwhile, the Rest of the World — including Latin America, the Middle East, and Africa — is beginning to explore synthetic biology primarily in agriculture and renewable energy, with potential for rapid adoption as infrastructure and investment grow.

Market Drivers and Challenges

The momentum behind synthetic biology is powered by several interconnected drivers. Technological advancements — especially in DNA sequencing, gene synthesis, and computational biology — have significantly lowered costs and reduced time-to-market for bioengineered products. Environmental pressures, from climate change to resource scarcity, are pushing industries to find sustainable alternatives, and synthetic biology offers solutions with lower carbon footprints and reduced waste. In healthcare, the rising prevalence of chronic and genetic diseases is creating demand for therapies that go beyond the capabilities of conventional pharmaceuticals.

Market Trends

One of the most transformative trends in synthetic biology is the rise of precision fermentation, which uses genetically engineered microorganisms to produce specific proteins, fats, or enzymes with exact molecular profiles. Companies like Perfect Day and Motif FoodWorks are using this technology to replicate dairy and meat products without the need for animal farming,

addressing ethical concerns and reducing environmental impact. Carbon recycling is another emerging area, exemplified by LanzaTech's process of converting industrial CO₂ emissions into ethanol and other useful chemicals. CRISPR-based diagnostics are gaining traction, with firms like Mammoth Biosciences developing rapid, affordable testing tools for infectious diseases and genetic conditions. Additionally, the development of biodegradable materials — such as Bolt Threads' biofabricated spider silk and Apeel's plant-based produce coatings — reflects the growing consumer demand for sustainable products in both food and fashion.

Competitive Landscape

The synthetic biology market is characterized by a dynamic mix of established players and nimble startups, each bringing unique capabilities to the table. Ginkgo Bioworks operates a powerful organism engineering platform serving industries from pharmaceuticals to fragrances. Bolt Threads is revolutionizing textiles with biofabricated materials. Mammoth Biosciences is at the forefront of CRISPR-powered diagnostics, while LanzaTech is redefining carbon utilization. Motif FoodWorks and Perfect Day are leaders in sustainable food innovation, offering products that closely mimic traditional animal-based foods without the environmental burden. Joyn Bio focuses on agricultural microbiome solutions to reduce chemical inputs, while Kiverdi transforms CO₂ into protein and other valuable compounds. Viridos specializes in algae-based biofuels, Upside Foods is pioneering cultivated meat, and Asimov offers biodesign automation tools to accelerate synthetic biology workflows. Apeel and Twist Bioscience round out the list with innovations in food preservation and synthetic DNA production, respectively.

Future Outlook

By 2035, synthetic biology is expected to be deeply integrated into industrial supply chains, consumer products, and healthcare solutions. The technology's role in mitigating climate change, improving food security, and enabling personalized medicine will become increasingly apparent. The most successful companies will likely be those that forge strong partnerships across industries, enabling them to scale production and commercialize innovations quickly. Emerging areas such as programmable living therapeutics, synthetic virology, and bio-computing could open entirely new markets, further expanding the industry's potential. As the sector grows, the balance between innovation and ethical responsibility will be critical, with clear regulatory pathways and transparent stakeholder engagement serving as cornerstones for public trust.

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Contact:

Transparency Market Research Inc.
CORPORATE HEADQUARTER DOWNTOWN,
1000 N. West Street,
Suite 1200, Wilmington, Delaware 19801 USA
Tel: +1-518-618-1030
USA – Canada Toll Free: 866-552-3453
Website: <https://www.transparencymarketresearch.com>
Email: sales@transparencymarketresearch.com

Atil Chaudhari
Transparency Market Research Inc.
+1 518-618-1030
[email us here](#)

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