

DNA Manufacturing Market Size, Share & Trends Analysis Report By Type (Plasmid, Synthetic), By Grade (GMP, R&D), By Application (Cell & Gene Therapy, Vaccines), By End Use, By Region, And Segment Forecasts, 2026 - 2033

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Abstracts

The global DNA manufacturing market size was estimated at USD 6.4 billion in 2025 and is anticipated to reach USD 23.1 billion by 2033, growing at a CAGR of 17.8% from 2026 to 2033. This growth is driven by increasing demand for gene therapies, personalized medicine, and advancements in synthetic biology.

Expanding applications in pharmaceutical research and vaccine development also contribute to market expansion. For instance, in July 2024, GenScript Biotech announced the launch of an advanced DNA synthesis platform that reduces production time, enabling faster development of gene therapies and synthetic vaccines.

Growth of Gene Therapy

Gene therapies are transforming the treatment landscape for genetic disorders, rare diseases, and common chronic conditions. Gene therapies directly modify or replace faulty genes within a patient's cells, offering the potential for long-lasting or curative effects. For instance, in September 2022, GenScript USA Inc. introduced the GenWand Double-Stranded DNA (dsDNA) service, designed to enhance CRISPR-based gene editing in T-cell engineering. This service offers covalently closed, linear DNA templates that are more stable and less prone to endonuclease degradation, thereby improving homology-directed repair (HDR) efficiency and reducing off-target effects compared to traditional PCR-based methods. This innovative approach requires large-scale production of highly precise, pure DNA sequences to develop therapeutic vectors, such

as viral carriers or plasmids, that deliver corrective genes into patient cells.

For instance, in November 2024, NewBiologix launched its Xcell rAAV Production and Analytics Platform. It enables simultaneous screening of multiple rAAV candidates and provides comprehensive data reports that support preclinical and clinical development. Key features include detailed characterization of encapsulated DNA, including full and empty capsid ratios and gene sequence integrity, to accelerate gene therapy development. As more gene therapies progress through clinical trials and receive regulatory approvals, the demand for DNA manufacturing grows exponentially. The complexity and customization required for each treatment drive the need for advanced DNA synthesis technologies capable of producing high-quality DNA at scale and speed. Diseases like spinal muscular atrophy, certain types of inherited blindness, and blood disorders such as beta-thalassemia have experienced successful gene therapy treatments, fueling the market expansion of DNA manufacturing.

Automation and Grade Improvements

Technological advancements and automation are revolutionizing the DNA manufacturing industry by improving accuracy and significantly reducing costs. Innovations such as silicon-based DNA synthesis, microfluidics, and AI-powered design tools enable high-throughput production with enhanced precision and reproducibility. For instance, in November 2023, Twist Bioscience launched Express Genes, a rapid gene synthesis service delivering NGS-verified clonal genes within five to seven days, leveraging its silicon-based platform and expanded manufacturing capacity.

Improvements in sequencing technologies and bioinformatics have further streamlined quality control processes, ensuring that synthetic DNA products consistently meet the stringent standards required for clinical and research use. For instance, in March 2025, WuXi Biologics introduced the EffiX platform, an E. coli-based system designed to enhance recombinant proteins and plasmid DNA production, delivering high yield, stability, scalability, and cost-efficient manufacturing. This platform supports the efficient development and manufacturing of diverse biologics modalities. The continued adoption of automation and advanced technologies is transforming the market landscape by enabling rapid, high-quality production of complex DNA sequences at scale.

Global DNA Manufacturing Market Report Segmentation

This report forecasts revenue growth and provides an analysis of the latest trends in each of the sub-segments from 2021 to 2033. For this report, Grand View Research has

segmented the global DNA manufacturing market based on type, grade, application, end use, and region:

Type Outlook (Revenue, USD Million, 2021 - 2033)

Plasmid DNA

Synthetic DNA

Gene Synthesis

Oligonucleotide Synthesis

Grade Outlook (Revenue, USD Million, 2021 - 2033)

GMP Grade

R&D Grade

Application Outlook (Revenue, USD Million, 2021 - 2033)

Cell & Gene Therapy

Vaccines

Oligonucleotide-based Drugs

Others

End Use Outlook (Revenue, USD Million, 2021 - 2033)

Pharmaceutical and Biotechnology Companies

Academic & Research Institutes

Contract Research Organizations

Regional Outlook (Revenue, USD Million, 2021 - 2033)

North America

U.S.

Canada

Mexico

Europe

UK

Germany

France

Italy

Spain

Denmark

Sweden

Norway

Asia Pacific

Japan

China

India

South Korea

Australia

Thailand

Latin America

Brazil

Argentina

Middle East & Africa

South Africa

Saudi Arabia

UAE

Kuwait

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