Gene Editing Market Assessment, By Products and Services [Reagents and Consumables, Software and Systems, Services], By Technique [Knock-in, Knock-out, Gene Silencing, Others], By Method [Ex-vivo, In-vivo], By Technology [CRISPR, TALENs, ZFN, Antisense, Others], By Application [Genetic Engineering, Clinical Applications], By End-user [Biotechnology and Pharmaceutical Companies, Academic and Government Research Institutes, CROs and CDMOs], By Region, Opportunities and Forecast, 2018-2032F

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Report description:

Global gene editing market is projected to witness a CAGR of 17.87% during the forecast period 2025-2032, growing from USD 9.01 billion in 2024 to USD 33.57 billion in 2032. The market's growth is supported by the rising applications of gene editing in various industries, the increasing prevalence of chronic disorders, the growing requirement for personalized medicines, and rising research and development activities.

Additionally, the rising adoption of gene editing by the agriculture sector also provides lucrative growth opportunities to the market. Companies across the globe are increasingly deploying gene editing to enhance the nutritional value and taste of fruits and vegetables. For instance, Pairwise, one of the leading agriculture and health-focused food companies, is working on mustard green without tang in its laboratory. The company is doing so by locating the gene that is responsible for showcasing the trait and making the edits. The scientists use a specially designed bacterium to introduce the new trait in the plant cells, after which the plants are placed in a grow chamber and greenhouse. The researchers then check the progress of the gene edits by carefully monitoring the plants during the different phases of their growth.

The increasing burden of cancer, infectious diseases, and genetic disorders has propelled the requirement for gene editing-based therapies. As per the estimates of the American Cancer Society, approximately 2,001,140 new cases of cancer are expected to occur in the United States alone in 2024. Such diseases and disorders are usually caused by complex genetic mutations, increasing the requirement for gene-editing technologies, including Transcription Activator-Like Effector Nucleases (TALENs) and CRISPR. Genetic disorders, including sickle cell anemia, Huntington's disease, and cystic fibrosis, are caused by gene mutations. Gene editing technologies offer an effective approach for correcting these mutations as opposed to the traditional treatment options.

Technological Advancements Support Market Expansion

Technological advancements in gene editing technology are enhancing the efficiency, safety, and precision of various gene editing processes and increasing the possible applications of the technique in a wide range of industries, such as biotechnology, agriculture, and healthcare. Additionally, various governments are also recognizing leading regional players actively involved in gene editing, encouraging them to continue to invest in research and development activities and ensure the accessibility of novel technologies. For instance, in December 2024, Jincore Co., Ltd., one of the leading domestic gene-editing specialist corporations, was recognized by the government of South Korea as a corporation that holds national strategic technology. The Ministry of Science noted

that the company's ultra-small gene editing technology is positioned under the national strategic technology of next-generation gene editing.

Moreover, machine learning and artificial intelligence (AI) are allowing the optimization of gene editing technologies by enabling automation and predictive modeling. The AI algorithms are aiding in the prediction of targets and are increasingly being deployed to design guide RNAs and identify optimal gene targets. Such advancements are further expected to improve the efficacy of gene editing technologies and provide lucrative growth opportunities for the market.

Increasing Focus on the Development of Gene Therapies Boosts Market Demand

The growing focus on developing gene therapies is one of the major factors supporting the growth of the gene editing market. Gene therapies deploy gene editing technologies for correcting, removing, and introducing genetic material for preventing and treating various diseases. Thus, the growing efforts of leading pharmaceutical companies to bolster the development of novel therapies with the help of gene editing technologies are providing lucrative growth opportunities to the market. For instance, in December 2024, Precision BioSciences, Inc. announced receiving Clinical Trial Application (CTA) approval in Hong Kong for studying PBGENE-HBV in the ongoing ELIMINATE-B Phase I trial. The company's in vivo gene editing program, PBGENE-HBV, is designed to eliminate covalently closed circular DNA (cccDNA) and cure chronic hepatitis B.

Additionally, rapid advancements in gene editing tools are enhancing the efficacy and safety of gene therapies, and innovative delivery systems are allowing researchers to address various challenges associated with the delivery of gene therapies.

Biotechnology and Pharmaceutical Companies Account for a Significant Share of the Market

The rise in investments in the biotechnology and pharmaceutical sectors is one of the major factors propelling the global gene editing market demand. The leading pharmaceutical and biotechnology companies are actively working on research and development activities to develop novel therapeutic solutions to combat the growing threat of various diseases that currently do not have any suitable therapies available. Various leading pharmaceutical companies are also engaging in partnerships and collaborations to bolster the development of advanced treatments, further supporting the market's expansion. For instance, in October 2024, AaviGen GmbH and SK Pharmteco Inc. announced that they have entered into a multi-year manufacturing agreement under which the latter is going to manufacture AaviGen's leading gene therapy product called AVG-101 for treating heart failure. The company's heart-specific adeno-associated viral vector technology allows the development of therapies that aid in targeting and reversing the molecular cause of heart muscle dysfunction.

North America Holds Dominant share in Global Gene Editing Market

The growth of the North America gene editing market can be attributed to the strong presence of key players, increasing investments in research and development activities, a well-established healthcare sector, and the easy availability of novel technologies and therapies. Meanwhile, the rising number of patent approvals in the region is also accelerating the adoption of various gene editing tools. Increasing investments in gene editing technologies by the leading research institutions in the region are also positively influencing the market's expansion. For instance, in July 2023, the National Institute of Health announced

funding of more than USD 140 million to support the accelerated development of genome editing approaches.
Meanwhile, the Asia-Pacific region is expected to observe significant growth over the forecast period due to the rising deployment of gene editing in agriculture and increasing investments in the biotechnology industry. Countries such as Japan, India, and China are committed to leveraging gene editing tools for industrial, agricultural, and medical applications. The rising incidences of genetic diseases and disorders are also expected to augment the requirement for gene editing tools in the region. The leading gene editing companies in the region are significantly investing in producing technologies that cater to regional requirements.
Future Market Scenario (2025-2032F)
As per the global gene editing market analysis, the market is expected to observe significant growth in the coming years due to the rising prevalence of chronic diseases, technological advancements, increasing applications of gene editing in agriculture, and rising applications in precision medicine. Due to the growing adoption of sustainable solutions, the utilization of gene editing in agriculture practices is expected to increase significantly. Additionally, joint efforts of regulatory bodies and key market players across the globe to address the various regulatory hurdles associated with gene editing are also expected to provide lucrative growth opportunities for the market.
Moreover, rising research activities in gene editing are also expected to provide lucrative growth opportunities to the market. For instance, the St. Jude Children's Research Hospital is starting an interventional study in January 2025 to test the safety of gene editing in sickle cell disease and see if a single dose of genetically modified cellular product aids in reducing the symptoms associated with sickle cell disease and increase the amount of fetal hemoglobin. The study is estimated to be completed in December 2029. The secondary objective of the study is to assess the efficacy of autologous infusion of CRISPR/Cas9 genome-edited CD34+ HSPCs in patients suffering from severe sickle cell disease.
Key Players Landscape and Outlook
The key players in the market are actively engaging in partnerships with research organizations, investing in collaborative activities, launching new devices and technologies, and strengthening their global presence. For instance, in January 2024, the Innovative Genomics Institute (IGI) and Danaher Corporation launched a collaborative center for developing gene-editing therapies to combat the threat of various chronic diseases and support the development of a range of genomic medicines. The Danaher-IGI Beacon for CRISPR Cures aims to deploy CRISPR-based gene editing to permanently address several diseases with a unified regulatory, research, and development approach.
Similarly, in May 2024, Merck & Co., Inc. signed a definitive agreement for acquiring Mirus Bio LLC for USD 600 million. Mirus Bio is known for developing and commercializing various transfection reagents. The acquisition aims to accelerate the growth of novel technologies and significantly impact potential gene and cell therapies. By combining Merck's bioprocessing expertise and Mirus Bio's advanced technology, the companies aim to provide solutions for all the steps involved in viral vector manufacturing and development. This acquisition is also expected to improve Merck's global presence and allow it to serve its customers better.

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