MiRNA Sequencing and Assay Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Technology (Sequencing by Synthesis, Sequencing by Oligonucleotide Ligation and Detection (SOLiD), Nanopore Sequencing, Sanger Sequencing, Single Molecule Real-time (SMRT) Sequencing), By Application (Cancer, Polyglutamine Diseases, Autoimmune Disease, Schizophrenia, Others), By End-use (Pharmaceutical & Biotechnology Industry, Research and Academic Institutes, Others), By Workflow (Library Preparation, Sequencing, Data Analysis & Storage), By Region and Competition, 2020-2030F

Market Report | 2025-01-10 | 185 pages | TechSci Research

AVAILABLE LICENSES:

- Single User License $4500.00
- Multi-User License $5500.00
- Custom Research License $8000.00

Report description:

Global MiRNA Sequencing and Assay Market was valued at USD 22.76 Billion in 2024 and is anticipated to reach USD 33.23 Billion in the forecast period with a CAGR of 6.58% through 2030. The Global MiRNA Sequencing and Assay Market is at the forefront of genomics and molecular biology, representing a dynamic and rapidly evolving sector. MicroRNAs (miRNAs) are small RNA molecules that play a pivotal role in regulating gene expression across various biological processes. This market has experienced substantial growth in recent years, fueled by the increasing recognition of miRNAs' significance in understanding disease mechanisms and identifying potential therapeutic targets. With their involvement in crucial cellular pathways related to development, immunity, and disease, miRNAs have become key targets for research and diagnostic applications.
A primary driver of the global miRNA sequencing and assay market is the growing demand for personalized medicine and

precision diagnostics. Researchers and clinicians are leveraging miRNA profiling to develop targeted therapies and identify biomarkers for early disease detection. By understanding the unique miRNA expression patterns associated with different diseases, healthcare professionals can tailor treatment strategies to individual patients, maximizing efficacy and minimizing side effects. This emphasis on personalized approaches to healthcare has propelled the adoption of miRNA sequencing and assay technologies across diverse clinical specialties.

The Global MiRNA Sequencing and Assay Market represents a vital component of the genomics and molecular biology landscape, driven by the growing recognition of miRNAs' role in health and disease. With increasing demand for personalized medicine, technological advancements, and a deeper understanding of miRNA biology, this market is poised for continued growth and innovation. As researchers and clinicians harness the power of miRNA sequencing and assay technologies to unlock new insights into disease mechanisms and develop targeted therapies, the potential for transformative advancements in healthcare is immense.

Key Market Drivers

Rising Prevalence of Chronic Diseases

The Global MiRNA Sequencing and Assay Market is witnessing a significant boost due to the rising prevalence of chronic diseases worldwide. Chronic diseases, which include conditions such as cancer, cardiovascular diseases, diabetes, and neurodegenerative disorders, have become a global health concern, contributing to a substantial portion of morbidity and mortality. According to data from the World Health Organization (WHO) in 2024, non-communicable diseases (NCDs) were responsible for at least 43 million deaths in 2021, representing 75% of all non-pandemic-related deaths globally. In the same year, 18 million individuals died from NCDs before reaching the age of 70, with 82% of these premature deaths occurring in low- and middle-income countries. Cardiovascular diseases were the leading cause of NCD-related fatalities, accounting for at least 19 million deaths in 2021, followed by cancers (10 million), chronic respiratory diseases (4 million), and diabetes (over 2 million, including kidney disease deaths caused by diabetes). MiRNA sequencing and assay technologies are playing a pivotal role in addressing the challenges posed by these chronic diseases. Chronic diseases are often characterized by complex and multifactorial genetic underpinnings, making their diagnosis, prognosis, and treatment a daunting task. MiRNAs, as small regulatory RNA molecules, are intricately involved in the regulation of gene expression and have been found to play a crucial role in the development and progression of many chronic diseases. Their unique ability to modulate the expression of multiple genes simultaneously makes them attractive candidates for understanding the underlying molecular mechanisms of these conditions.

Researchers and clinicians are increasingly turning to miRNA profiling to unravel the intricate web of molecular events associated with chronic diseases. By identifying specific miRNA signatures or dysregulations, they can gain insights into disease mechanisms and develop innovative diagnostic and therapeutic strategies. MiRNA sequencing and assays provide the tools necessary to comprehensively analyze these small but influential RNA molecules. One of the most significant advantages of using miRNA sequencing and assays in the context of chronic diseases is the potential for early diagnosis and personalized treatment. MiRNA profiles can serve as biomarkers for disease risk assessment, allowing for the detection of diseases at an earlier, more manageable stage. Furthermore, by understanding the unique miRNA expression patterns in individual patients, personalized treatment plans can be developed, targeting the specific molecular pathways involved in their condition.

Advancements in Sequencing Technologies

Advancements in sequencing technologies have played a pivotal role in propelling the Global MiRNA Sequencing and Assay Market to new heights. MiRNA sequencing and assay technologies have undergone remarkable improvements, leading to increased efficiency, accuracy, and affordability, which have in turn stimulated their adoption and utilization across various research and clinical applications. The introduction of advanced next-generation sequencing (NGS) platforms, including Illumina, Pacific Biosciences, and Oxford Nanopore, has revolutionized genomics by enabling the simultaneous sequencing of millions to billions of DNA fragments. This advancement has created new opportunities for exploring genetic variation, gene expression, epigenetic changes, and microbial diversity. One of the primary drivers of this market growth is the evolution of next-generation sequencing (NGS) technologies. NGS has revolutionized the field of genomics by enabling high-throughput and massively parallel sequencing of nucleic acids, including miRNAs. These platforms have become more cost-effective and accessible, allowing researchers to profile miRNAs with unprecedented precision. The ability to simultaneously analyze multiple miRNAs in a single experiment, along with the rapid turnaround time, has made NGS a go-to technology for miRNA research.

In addition to NGS, microarray-based techniques have also advanced, further diversifying the tools available for miRNA profiling. Microarrays provide a complementary approach to miRNA analysis, allowing researchers to simultaneously examine the expression levels of numerous miRNAs on a single chip. The development of highly sensitive and specific microarray platforms has extended the reach of miRNA sequencing and assays, offering options that cater to different research needs and budgets. Advancements in sequencing technologies have also led to improved data analysis pipelines and bioinformatics tools, which are critical for extracting meaningful insights from complex miRNA datasets. These tools assist researchers in identifying differentially expressed miRNAs, predicting miRNA targets, and uncovering potential regulatory networks. The integration of bioinformatics resources has made miRNA research more accessible and user-friendly, encouraging researchers to harness the power of miRNA sequencing and assays.

Microarray-Based Techniques

Microarray-based techniques have emerged as a significant driver behind the growth of the Global MiRNA Sequencing and Assay Market. These techniques have played a crucial role in expanding the range of available tools for miRNA analysis, complementing the dominant next-generation sequencing (NGS) technologies. MMchip enables the comprehensive analysis of cross-platform and inter-laboratory data, focusing on the interactions between DNA and proteins. It utilizes two techniques: ChIP-chip (Chromatin Immunoprecipitation followed by array hybridization) and ChIP-seq (Chromatin Immunoprecipitation followed by massively parallel sequencing). Microarrays offer unique advantages that contribute to their popularity in miRNA research and diagnostics, thereby boosting the market. One of the key benefits of microarray-based miRNA profiling is the ability to simultaneously analyze the expression levels of multiple miRNAs in a single experiment. This high-throughput capability allows researchers to examine a broader spectrum of miRNA data, making it particularly suitable for large-scale studies and miRNA signature profiling. As chronic diseases and personalized medicine gain prominence, the need to explore complex miRNA networks and signatures has intensified, and microarrays are well-suited to meet these demands.

Microarray platforms have evolved significantly, offering improved sensitivity and specificity. These enhancements have increased the accuracy and reliability of miRNA data generated through microarray-based techniques, making them a viable option for various research and clinical applications. With the ability to detect subtle changes in miRNA expression, microarrays have become indispensable in identifying miRNA dysregulations associated with diseases. The cost-effectiveness of microarray-based miRNA profiling is another factor contributing to its market growth. While NGS technologies are powerful, they can be relatively costly and resource intensive. Microarrays provide a more budget-friendly alternative, particularly for laboratories with limited financial resources. Researchers and clinicians can achieve comprehensive miRNA profiling without the significant financial burden associated with NGS, making microarrays an accessible and attractive option for a wide range of users.

Key Market Challenges

Data Analysis Complexities

Data analysis complexities represent a significant hindrance to the growth of the Global MiRNA Sequencing and Assay Market. MiRNA sequencing generates vast amounts of data, making it a powerful tool for researchers seeking insights into gene regulation and disease mechanisms. However, the intricate nature of miRNA data, coupled with the need for specialized bioinformatics expertise, poses a considerable challenge for the market. One of the key issues surrounding data analysis in miRNA sequencing is the complexity of the data itself. Unlike other sequencing data, miRNA data is characterized by its relatively short read length, which can make alignment and mapping to reference genomes or miRNA databases more challenging. Additionally, miRNAs can have multiple isoforms and variants, further complicating data analysis.

The identification and quantification of miRNAs require the use of bioinformatics tools that are specifically designed for small RNA sequencing data. Researchers must employ algorithms that can accurately distinguish miRNAs from other small RNAs, such as tRNAs and rRNAs, while also dealing with issues like sequencing errors and variations in miRNA expression levels. miRNA data analysis often involves the detection of differential miRNA expression between experimental conditions, such as healthy and disease states. This process requires statistical approaches to identify significant changes in miRNA expression, adding another layer of complexity. Researchers must account for factors like biological replicates, data normalization, and the multiple testing problem to obtain reliable results.

High Costs

The Global MiRNA Sequencing and Assay Market is a burgeoning sector in genomics and molecular biology, offering profound

insights into gene regulation and its implications for various diseases. However, the market faces a substantial challenge in the form of high costs associated with miRNA sequencing and assay technologies. While these techniques hold immense promise, the financial burden they place on research laboratories, clinics, and diagnostic facilities can hinder their widespread adoption. The primary cost factors in miRNA sequencing and assays is the expense of the equipment and technology required for these procedures. Next-generation sequencing (NGS) platforms, which are commonly used for miRNA sequencing, come with a substantial initial investment. The cost of purchasing and maintaining NGS equipment, as well as staying up to date with technological advancements, can strain the budgets of research institutions and clinical facilities.

The reagents and consumables used in miRNA sequencing and assays contribute significantly to the overall cost. These specialized chemicals and kits are often more expensive than those used in conventional molecular biology techniques. The cost of reagents can become a major concern, particularly in high-throughput experiments that require large quantities of materials. Bioinformatics resources and data analysis tools add another layer of expenses. To make sense of the vast amount of data generated by miRNA sequencing, researchers often rely on sophisticated software and computational infrastructure. The licensing, maintenance, and training costs associated with these tools can be substantial.

Key Market Trends

Integration of Bioinformatics Tools

The integration of bioinformatics tools has emerged as a significant driver in boosting the Global MiRNA Sequencing and Assay Market. MiRNA sequencing and assays generate copious amounts of data, making it essential to harness sophisticated computational techniques for data analysis and interpretation. Bioinformatics tools have filled this crucial role, enhancing the efficiency and accessibility of miRNA research and applications. The process begins with Evercode's split-pool combinatorial barcoding, a proprietary technology that assigns cell-specific barcode combinations to molecules. Initially, cells are fixed and permeabilized, effectively transforming them into their own reaction vessels and eliminating the need for capturing individual cells in droplets or microwells. The split-pool barcoding system then assigns an exponentially vast array of barcode combinations to the cells, enabling scalability far beyond other technologies. This approach allows for the parallel processing of up to 1 million cells, even if collected on different days. One of the key advantages of integrating bioinformatics tools into miRNA sequencing and assay workflows is their ability to manage and analyze complex miRNA data. MiRNA sequences are relatively short, and they can have multiple isoforms, making their analysis intricate. Bioinformatics software and algorithms have been specifically designed to handle these intricacies, allowing researchers to accurately identify and quantify miRNAs, distinguish them from other small RNAs, and perform quality control on sequencing data.

Bioinformatics tools play a pivotal role in identifying differentially expressed miRNAs. These tools apply statistical methods to discern significant changes in miRNA expression levels between experimental conditions, such as healthy and disease states. This capability is critical for biomarker discovery and understanding the regulatory roles of miRNAs in various biological processes. The integration of bioinformatics tools is also pivotal in uncovering miRNA-target interactions and regulatory networks. These tools predict potential mRNA targets of miRNAs, shedding light on the downstream effects of miRNA dysregulation. This information is invaluable for understanding disease mechanisms and developing targeted therapies. Bioinformatics resources assist in the integration of miRNA data with other omics data, such as mRNA and proteomic profiles. The combined analysis of multiple data types is essential for elucidating complex regulatory networks and molecular interactions, particularly in personalized medicine and disease research.

Segmental Insights

Technology Insights

Based on Technology, Sequencing by Synthesis have emerged as the fastest growing segment in the Global MiRNA Sequencing and Assay Market in 2024. Sequencing by Synthesis has a well-established and proven track record in the genomics field. It has been widely adopted for various sequencing applications, including miRNA profiling. Researchers and clinicians often prefer technologies with a history of success and reliability, which Sequencing by Synthesis offers. SBS platforms are renowned for their high-throughput capabilities. They can process a large number of samples simultaneously, making them well-suited for large-scale miRNA profiling studies. The ability to handle multiple samples efficiently and cost-effectively aligns with the demands of miRNA research, where extensive datasets are often required to uncover meaningful insights.

Application Insights

Based on Application, Cancer have emerged as the dominant segment in the Global MiRNA Sequencing and Assay Market in 2024. Cancer is a leading cause of morbidity and mortality worldwide, contributing to a substantial global disease burden. The need for effective cancer diagnosis, prognosis, and treatment strategies is paramount, which has driven extensive research into miRNA profiling. MiRNAs have been identified as critical regulators of gene expression in cancer, making them attractive targets for understanding cancer biology and developing novel therapies. MiRNA profiling offers significant diagnostic and prognostic value in cancer. Specific miRNA signatures or dysregulations have been associated with different cancer types, stages, and patient outcomes. By analyzing miRNA expression patterns, clinicians can identify cancer subtypes, predict disease progression, and assess patient prognosis. This diagnostic potential has led to the integration of miRNA profiling into clinical oncology.

Regional Insights

Based on Region, North America have emerged as the dominant region in the Global MiRNA Sequencing and Assay Market in 2024, holding the largest market share. The United States and Canada, in particular, have highly advanced healthcare systems with a strong emphasis on research and innovation. The integration of miRNA profiling into clinical practice, precision medicine initiatives, and the development of targeted therapies has significantly contributed to the adoption of miRNA sequencing and assays. North America hosts a significant portion of the global pharmaceutical and biotechnology industry. These companies play a pivotal role in drug discovery and development, where miRNA profiling is extensively used for target identification, companion diagnostics, and biomarker discovery. The close collaboration between academia and the industry further fuels the demand for miRNA technologies.

Key Market Players

- Thermo Fisher Scientific, Inc.
- Illumina, Inc.
- QIAGEN N.V.
- PerkinElmer, Inc.
- Abcam plc
- New England Biolabs, Inc.
- Takara Bio USA Inc.
- Lexogen GmbH
- Norgen Biotek Corp.
- Maravai LifeSciences Holdings, Inc.

Report Scope:

In this report, the Global MiRNA Sequencing and Assay Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

- MiRNA Sequencing and Assay Market, By Technology:
  - Sequencing By Synthesis
  - Sequencing By Oligonucleotide Ligation and Detection (SOLiD)
  - Nanopore Sequencing
  - Sanger Sequencing
  - Single Molecule Real-time (SMRT) Sequencing
- MiRNA Sequencing and Assay Market, By Application:
  - Cancer
  - Polyglutamine Diseases
  - Autoimmune Disease
  - Schizophrenia
  - Others
- MiRNA Sequencing and Assay Market, By Workflow:
  - Library Preparation
  - Sequencing
  - Data Analysis & Storage

MiRNA Sequencing and Assay Market, By End-use:
- Pharmaceutical & Biotechnology Industry
- Research and Academic Institutes
- Others

MiRNA Sequencing and Assay Market, By Region:
- North America
  - United States
  - Canada
  - Mexico
- Europe
  - France
  - United Kingdom
  - Italy
  - Germany
  - Spain
- Asia Pacific
  - China
  - India
  - Japan
  - Australia
  - South Korea
- South America
  - Brazil
  - Argentina
  - Colombia
- Middle East & Africa
  - South Africa
  - Saudi Arabia
  - UAE
  - Egypt

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global MiRNA Sequencing and Assay Market.

Available Customizations:

Global MiRNA Sequencing and Assay Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

Table of Contents:

MiRNA Sequencing and Assay Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Technology (Sequencing by Synthesis, Sequencing by Oligonucleotide Ligation and Detection (SOLiD), Nanopore Sequencing, Sanger Sequencing, Single Molecule Real-time (SMRT) Sequencing), By Application (Cancer, Polyglutamine Diseases, Autoimmune Disease, Schizophrenia, Others), By End-use (Pharmaceutical & Biotechnology Industry, Research and Academic Institutes, Others), By Workflow (Library Preparation, Sequencing, Data Analysis & Storage), By Region and Competition, 2020-2030F

Market Report | 2025-01-10 | 185 pages | TechSci Research

To place an Order with Scotts International:

- - Print this form
- - Complete the relevant blank fields and sign
- - Send as a scanned email to support@scotts-international.com

ORDER FORM:

Select license	License	Price
	Single User License	$4500.00
	Multi-User License	$5500.00
	Custom Research License	$8000.00
	VAT	
	Total	

*Please circle the relevant license option. For any questions please contact support@scotts-international.com or 0048 603 394 346.

** VAT will be added at 23% for Polish based companies, individuals and EU based companies who are unable to provide a valid EU Vat Numbers.

Email*		Phone*	
First Name*		Last Name*	
Job title*			
Company Name*		EU Vat / Tax ID / NIP number*	
Address*		City*	
Zip Code*		Country*	
		Date	2026-03-05
		Signature	