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Neoantigen Targeted Therapies Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, 2018-2028 Segmented by Target Disease Indication (Bone Cancer, Colorectal Cancer, Gynecological Cancer, Non-Small Cell Lung Cancer, Renal Cell Carcinoma), By Neoantigens Type (Off-the-Shelf Neoantigens, Personalized Neoantigens), By Immunotherapy Type (Dendritic Cell Vaccines, DNA / RNA-Based Vaccines, Protein / Peptide-based Vaccines, TIL-Based Therapies), By Route of Administration (Intradermal, Intravenous, Subcutaneous), By Region, and Competition

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Abstracts

Global Neoantigen Targeted Therapies Market has valued at USD 1.88 billion in 2022 and is anticipated to witness an impressive growth in the forecast period with a CAGR of 8.34% through 2028. Neoantigen Targeted Therapies are a cutting-edge approach in cancer treatment that harnesses the power of the immune system to specifically recognize and attack cancer cells. These therapies are designed to target neoantigens, which are unique protein fragments found on the surface of cancer cells because of mutations in the tumor's DNA. Neoantigens are distinct from normal, healthy cell proteins, making them ideal targets for immune recognition and attack. Neoantigen therapies are highly personalized. Once neoantigens are identified, the patient's immune system is trained to recognize these specific neoantigens as foreign invaders. This often involves creating a customized vaccine or adoptive cell therapy tailored to the

patient's unique neoantigen profile. Neoantigen therapies can be used in combination with checkpoint inhibitors, another type of immunotherapy. Checkpoint inhibitors release the brakes on the immune system, allowing it to mount a stronger response against cancer cells, including those targeted by neoantigens.

The growing availability and affordability of genomic sequencing technologies have enabled the identification of neoantigens more accurately and quickly, facilitating the development of personalized therapies. Regulatory agencies like the FDA and EMA have shown willingness to support the development and approval of neoantigen therapies, streamlining the path to market for these treatments. Patients and healthcare providers are increasingly seeking precision therapies that specifically target cancer cells. Neoantigen therapies offer the potential for more effective and less toxic treatments. Researchers are exploring the synergistic effects of combining neoantigen therapies with other treatment modalities, such as chemotherapy and radiation therapy, to enhance treatment outcomes. The aging population is at higher risk of developing cancer. As the global population ages, the demand for innovative cancer treatments, including neoantigen therapies, is expected to rise.

Key Market Drivers

Advancements in Genomic Testing

Next-generation sequencing technologies have revolutionized the field of genomics. NGS allows for the rapid and cost-effective sequencing of large stretches of DNA. It has enabled the sequencing of entire genomes, transcriptomes, and epigenomes with unprecedented speed and affordability. High-throughput sequencing platforms can simultaneously process numerous DNA or RNA samples, allowing for large-scale studies and population-scale genomic research. This capability has accelerated the discovery of genetic variants associated with diseases and traits. Traditional short-read sequencing methods have limitations in resolving complex genomic regions. Long-read sequencing technologies, like Pacific Biosciences (PacBio) and Oxford Nanopore, can generate much longer sequencing reads, aiding in the assembly of complete genomes and the identification of structural variations. Single-cell sequencing technologies enable the analysis of individual cells within a tissue or organism. This approach provides insights into cellular heterogeneity, cell types, and gene expression at a single-cell resolution, advancing our understanding of complex biological systems. Genomic sequencing has been instrumental in cancer research and precision oncology. It allows for the identification of driver mutations, assessment of tumor heterogeneity, and the development of targeted therapies tailored to a patient's genetic profile.

Genome editing technologies, such as CRISPR-Cas9, combined with genomic sequencing, enable researchers to understand gene function by selectively modifying genes and observing their effects on cellular processes. Genomic sequencing has expanded beyond the study of individual organisms to the analysis of entire microbial communities (metagenomics). This has implications for microbiome research, ecology, and infectious disease studies. Genomic sequencing has been applied to epigenetic research, allowing for the mapping of DNA methylation patterns, histone modifications, and chromatin accessibility. This provides insights into gene regulation and cell identity. Genomic sequencing is increasingly used in clinical settings for diagnosing genetic disorders, identifying disease-causing mutations, and guiding treatment decisions. It has also enabled non-invasive prenatal testing (NIPT) and pharmacogenomics. Advances in genomic sequencing have made it more accessible to the public, leading to the rise of direct-to-consumer genetic testing services. Individuals can now obtain insights into their ancestry, traits, and health risks based on their genetic data. This factor will help in the development of the Global Neoantigen Targeted Therapies Market.

Increasing Patient Demand for Targeted Therapies

Patients increasingly seek personalized treatment options that specifically target the unique characteristics of their disease. Neoantigen-targeted therapies offer a highly personalized approach, as they are tailored to the genetic and immunological profile of each patient's cancer. Patients often prefer treatments that minimize side effects and improve their overall quality of life. Neoantigen therapies aim to spare healthy tissues while selectively targeting cancer cells, potentially reducing adverse effects associated with traditional treatments like chemotherapy. Patients and their families are becoming more informed about the latest advancements in cancer treatment, including targeted therapies like neoantigen-based treatments. This awareness drives discussions with healthcare providers and influences treatment decisions. Advances in genomic sequencing have empowered patients by providing insights into their own genetic makeup and the genetic drivers of their cancer. This information encourages patients to explore treatment options that align with their genomic profile.

Patient advocacy groups and organizations play a crucial role in raising awareness about the availability and benefits of targeted therapies. They provide support, information, and resources to patients and their families. Many patients are willing to participate in clinical trials, including those involving neoantigen-targeted therapies, as they see these trials as opportunities to access cutting-edge treatments not yet widely available. Positive outcomes and success stories from patients who have benefited from

targeted therapies, including neoantigen therapies, further fuel demand. Patients often share their experiences, inspiring others to explore similar treatment options. Neoantigen therapies, with their potential for reduced toxicity, are attractive to patients who wish to avoid the harsh side effects associated with traditional cancer treatments. Patients facing advanced or hard-to-treat cancers may view neoantigen therapies as a source of hope and a potential lifeline. This hope can drive their interest in exploring these innovative treatment options. Oncologists and healthcare providers who are knowledgeable about neoantigen therapies and their potential benefits are more likely to discuss these options with patients, increasing patient awareness and demand. This factor will pace up the demand of the Global Neoantigen Targeted Therapies Market.

Rising Aging Population

As individuals age, their risk of developing cancer typically increases. Cancer is more prevalent among older adults, and many cancers are diagnosed in individuals over the age of 65. This demographic trend creates a larger patient pool for cancer therapies, including Neoantigen Targeted Therapies. Cancers that affect older individuals can be more complex and challenging to treat. Aging-related changes in the immune system and a higher likelihood of comorbidities can make standard treatments less effective. Neoantigen therapies offer innovative approaches that may be more tailored to the unique characteristics of these cancers. Older adults may have lower tolerance for the side effects of traditional cancer treatments like chemotherapy. Neoantigen therapies, with their potential for reduced toxicity, are often more appealing to this patient group. Advances in healthcare have led to longer life expectancy, and older individuals are more likely to pursue treatments that offer the potential for extended survival and improved quality of life. Neoantigen therapies are designed to target cancer cells while sparing healthy tissues, potentially providing these benefits. The concept of precision medicine, which includes tailoring treatments to individual patients, aligns with the healthcare needs and preferences of older adults. Neoantigen therapies are a prime example of personalized medicine, as they are customized to a patient's unique cancer profile.

Older patients and their families are increasingly proactive in seeking information about cancer treatment options. Patient advocacy groups and educational resources play a role in raising awareness about the availability and benefits of Neoantigen Targeted Therapies. Older adults are willing to participate in clinical trials, including those involving Neoantigen therapies, to access cutting-edge treatments. Their involvement in research contributes to the development and validation of these therapies. Many countries are grappling with the economic impact of an aging population's healthcare

needs. Neoantigen therapies, by potentially offering more effective and cost-efficient treatments, may be viewed favorably by healthcare systems and payers. Aging is associated with an increased prevalence of chronic conditions. Neoantigen therapies, by targeting the root cause of cancer, offer the potential to address the underlying condition and its complications. As the aging population continues to grow, it expands the overall market for cancer therapies, creating opportunities for pharmaceutical companies and researchers to develop and market Neoantigen Targeted Therapies. This factor will accelerate the demand of the Global Neoantigen Targeted Therapies Market.

Key Market Challenges

Identification of Relevant Neoantigens

Tumors are often genetically heterogeneous, meaning they contain a mix of different cell types with various mutations. Identifying the specific neoantigens that are present across all tumor cells can be challenging. Neoantigen prediction relies on computational algorithms to predict potential neoantigens based on DNA sequencing data. These algorithms are continually improving, but false positives and false negatives are still common, leading to uncertainty in selecting the most relevant neoantigens. Predicted neoantigens must be experimentally validated to confirm their presentation on cancer cells and their immunogenicity. This validation process can be time-consuming and resource intensive. Each patient's tumor has a unique set of neoantigens, and these can vary greatly from one patient to another. Identifying relevant neoantigens requires a personalized approach for each patient, which can be logistically challenging. Some neoantigens may be present at very low frequencies within a tumor, making them difficult to detect and target effectively. Tumors can evolve over time, leading to changes in their neoantigen landscape. This requires ongoing monitoring and adaptation of neoantigen-targeted therapies. Cancer cells may develop mechanisms to evade the immune system, including downregulating the presentation of neoantigens. This immune evasion can hinder the effectiveness of neoantigen-targeted therapies.

Clinical Trial Complexity

Identifying patients with the appropriate neoantigen profiles for specific therapies is a key challenge. Neoantigen therapies are highly personalized, and patient selection is critical for treatment efficacy. Each patient's neoantigen profile is unique, requiring the customization of treatment for individual participants. This necessitates specialized manufacturing processes for each patient. Designing clinical trials for neoantigen

therapies often involves complex protocols that include genomic sequencing, neoantigen prediction, and personalized vaccine or T-cell therapy production. These processes must be seamlessly integrated into the trial design. Managing the logistics of personalized neoantigen therapies, including sample collection, sequencing, manufacturing, and administration, can be challenging and resource intensive. Accurate prediction of neoantigens relies on sophisticated bioinformatics tools. Ensuring the reliability and consistency of these tools across multiple trial sites is essential. Validating the predicted neoantigens and ensuring the quality and consistency of vaccine or T-cell production are critical aspects of trial conduct. Quality control measures must be rigorous. Regulatory agencies often require substantial data on the safety and efficacy of neoantigen therapies, making the regulatory pathway complex and time-consuming. Obtaining informed consent from patients for the various stages of neoantigen-based trials, including genomic sequencing and treatment, requires careful communication and adherence to ethical standards.

Key Market Trends

Immunotherapy Dominance

Immunotherapy has gained prominence as a leading approach in cancer treatment. It harnesses the body's immune system to target and destroy cancer cells. Neoantigen-targeted therapies are a subset of immunotherapy that focuses on training the immune system to recognize and attack cancer-specific neoantigens. Immunotherapy, including neoantigen-targeted therapies, aligns with the principles of precision medicine. These therapies are tailored to the individual genetic and immunological profiles of each patient, aiming to maximize treatment efficacy while minimizing side effects. Neoantigen-targeted therapies often complement the use of checkpoint inhibitors, another class of immunotherapies. Checkpoint inhibitors release the brakes on the immune system, allowing it to attack cancer cells more effectively. Neoantigens can serve as specific targets for the immune system to recognize in combination with checkpoint inhibitors. Neoantigen-targeted therapies aim to enhance the immune system's response against cancer cells by targeting neoantigens, which are unique to the tumor. This can lead to a more focused and potent immune response compared to traditional treatments. Positive outcomes and clinical successes in immunotherapy trials, including neoantigen therapies, have fueled interest and investment in this field. Patients who have experienced durable responses are advocating for and raising awareness of these treatments. The pharmaceutical and biotechnology industries have invested heavily in the research and development of immunotherapies, including neoantigen-based approaches. This investment has led to a growing pipeline of potential therapies.

Segmental Insights

Target Disease Indication Insights

In 2022, the Global Neoantigen Targeted Therapies Market was dominated by the Colorectal Cancer segment and is predicted to continue expanding over the coming years. Colorectal cancer is one of the most common types of cancer globally. Its high incidence rates result in a substantial patient population, making it an attractive target for therapeutic interventions, including neoantigen-based therapies. Colorectal cancer can be aggressive and challenging to treat, particularly in advanced stages. Patients with advanced colorectal cancer often have limited treatment options, which creates a strong demand for innovative therapies like neoantigen-targeted treatments. It is known for having an immunogenic tumour microenvironment. This means that it tends to elicit immune responses, making it a promising candidate for immunotherapies like neoantigen-targeted therapies.

Neoantigens Type Insights

In 2022, the Global Neoantigen Targeted Therapies Market largest share was held by Off-the-Shelf Neoantigens segment and is predicted to continue expanding over the coming years. Off-the-shelf neoantigen therapies are pre-manufactured and readily available for use, eliminating the need for the time-consuming and expensive process of personalized neoantigen identification and production. This accessibility and convenience make them a practical choice for a broader patient population. Personalized neoantigen therapies require the identification of specific neoantigens for each patient, limiting their application to a subset of patients. In contrast, off-the-shelf neoantigens can be used in a more extensive range of patients, including those who may not have identified neoantigens suitable for personalized therapies. Developing personalized neoantigen therapies can be costly and time-intensive due to the need for individualized manufacturing processes. Off-the-shelf therapies are often more cost-effective because they can be produced in larger batches, reducing production costs.

Immunotherapy Type Insights

In 2022, the Global Neoantigen Targeted Therapies Market largest share was held by Protein / Peptide-based Vaccines segment with a revenue of around and is predicted to continue expanding over the coming years. Protein and peptide-based vaccines are designed to target specific neoantigens present on cancer cells while minimizing off-

target effects. They are known for their safety profile and high specificity, making them attractive options for cancer immunotherapy. Protein and peptide-based vaccines can be tailored to each patient's unique neoantigen profile. This personalized approach can potentially enhance their effectiveness in treating a wide range of cancer types. Many protein and peptide-based vaccines are designed to be highly immunogenic, stimulating a robust immune response against cancer cells. This immunogenicity is critical for the therapeutic success of neoantigen vaccines.

Route of Administration Insights

In 2022, the Global Neoantigen Targeted Therapies Market largest share was held by Intravenous segment and is predicted to continue expanding over the coming years. Intravenous administration allows for precise and consistent dosing of neoantigen therapies. This route ensures that the therapy is directly delivered into the bloodstream, which can lead to more predictable and controlled systemic effects. Neoantigen therapies administered intravenously quickly distribute throughout the body, reaching target cells and tissues efficiently. This is particularly important for systemic diseases like cancer, where cancer cells may be present at multiple sites. Many neoantigen therapies, such as monoclonal antibodies and adoptive T-cell therapies, are large molecules that may not be effectively absorbed through other routes, like oral administration. Intravenous administration bypasses issues related to absorption and bioavailability.

Regional Insights

The North America region has established itself as the leader in the Global Neoantigen Targeted Therapies Market in 2022. North America, particularly the United States, boasts a highly advanced and well-developed healthcare infrastructure. This includes world-renowned research institutions, top-tier medical centers, and a robust biotechnology and pharmaceutical industry, all of which contribute to the development and adoption of cutting-edge therapies like neoantigen targeted therapies. The region is a global hub for biomedical research and innovation. North American researchers and institutions are at the forefront of scientific discoveries related to cancer biology, immunology, and genomics, which are critical fields for the development of neoantigen therapies. North America attracts significant investment in the biotechnology and pharmaceutical sectors. The availability of venture capital, private equity, and public funding sources provides the financial support needed for research and development efforts.

Key Market Players

BioNtech SE

Gritstone Bio, Inc.

Genocea Biosciences Inc.

Moderna Inc

Agenus Inc.

Immatics NV

Advaxis Inc

Precision Biologics

Gilead Sciences, Inc.

Cellular Biomedicine Group Inc.

Achillies Therapeutics Plc.

Merck & Co Inc

Report Scope:

In this report, the Global Neoantigen Targeted Therapies Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Neoantigen Targeted Therapies Market, By Target Disease Indication:

Bone Cancer

Colorectal Cancer

Gynecological Cancer

Non-Small Cell Lung Cancer

Renal Cell Carcinoma

Neoantigen Targeted Therapies Market, By Neoantigens Type:

Off-the-Shelf Neoantigens

Personalized Neoantigens

Neoantigen Targeted Therapies Market, By Immunotherapy Type:

Dendritic Cell Vaccines

DNA / RNA-Based Vaccines

Protein / Peptide-based Vaccines

TIL-Based Therapies

Neoantigen Targeted Therapies Market, By Route of Administration:

Intradermal

Intravenous

Subcutaneous

Global Neoantigen Targeted Therapies Market, By region:

North America

United States

Canada

Mexico

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Asia-Pacific

China

India

South Korea

Australia

Japan

Europe

Germany

France

United Kingdom

Spain

Italy

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

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Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Neoantigen Targeted Therapies Market.

Available Customizations:

Global Neoantigen Targeted Therapies Market report with the given market data, Tech Sci 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).

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