

Cell Expansion Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Product (Consumables, Culture Flasks and Accessories, Instruments), By Cell Type (Mammalian, Human, Microbial, Others), By Application (Biopharmaceuticals, Tissue Culture & Engineering, Vaccine Production, Drug Development, Gene Therapy, Cancer Research, Stem Cell Research, Others), By End-use (Biopharmaceutical & Biotechnology Companies, Research Institutes, Cell Banks, Others), By Region and Competition, 2019-2029F

<https://marketpublishers.com/r/CF4E14F59942EN.html>

Date: May 2024

Pages: 182

Price: US\$ 4,500.00 (Single User License)

ID: CF4E14F59942EN

Abstracts

Global Cell Expansion Market was valued at USD 15.28 Billion in 2023 and is anticipated to project steady growth in the forecast period with a CAGR of 10.48% through 2029. The Global Cell Expansion Market is a dynamic and rapidly growing sector within the field of biotechnology and regenerative medicine. This market encompasses a wide range of technologies, products, and services that are designed to facilitate the expansion of various cell types for research, therapeutic, and bioprocessing applications. Cell expansion is a critical step in the development of cell-based therapies, drug discovery, and tissue engineering, making it a pivotal component in the advancement of modern medicine. One of the primary drivers of the global cell expansion market is the increasing demand for cell-based therapies, including stem cell therapies and immunotherapies, for the treatment of various diseases and conditions.

This demand is fueled by the potential of these therapies to provide more effective and personalized treatment options, especially in the fields of oncology, neurodegenerative diseases, and cardiovascular disorders.

In addition to therapeutic applications, the market for cell expansion also caters to the needs of the pharmaceutical and biotechnology industries. Cell expansion technologies and equipment are essential for drug screening, bioprocessing, and the production of biologics. The pharmaceutical industry's growing focus on biologics and personalized medicine further drives the expansion of this market. Key technologies and products in the global cell expansion market include bioreactors, cell culture systems, consumables, and reagents. Innovations in these areas, such as the development of single-use bioreactors and automated cell culture systems, are enhancing efficiency and scalability in cell expansion processes.

Key Market Drivers

Growing Demand for Cell-Based Therapies

The global cell expansion market is experiencing robust growth, primarily attributed to the growing demand for cell-based therapies across a wide spectrum of medical conditions. Cell-based therapies, which harness the potential of stem cells, immune cells, and other specialized cell types, offer innovative and promising solutions for the treatment of various diseases, ranging from cancer and autoimmune disorders to degenerative conditions. As these therapies continue to demonstrate their efficacy and potential for personalized treatment, the demand for cell expansion technologies and services is on the rise, driving the expansion of the global cell expansion market.

Cell-based therapies often require a substantial number of therapeutic cells to be produced, and this necessitates the process of cell expansion. Stem cell treatments, immunotherapies, and regenerative medicine approaches are increasingly being integrated into clinical practice, and they all rely on the ability to expand specific cell populations *ex vivo* before administration to patients. This has led to a surge in demand for reliable and scalable cell expansion technologies that can efficiently generate the required quantity of therapeutic cells.

Cancer treatments, in particular, have witnessed a significant shift towards cell-based therapies, such as CAR-T cell therapy and adoptive cell transfer, which have shown remarkable success in targeting and eradicating cancer cells. The growing prevalence

of cancer, coupled with the increasing recognition of the potential of these therapies, is fueling the expansion market. In addition to oncology, cell-based therapies are being explored for a range of other disorders, including cardiovascular diseases, neurodegenerative conditions, and autoimmune disorders, further diversifying the applications of cell expansion technologies.

Regenerative medicine and tissue engineering are also strong drivers of the cell expansion market. These fields seek to repair or replace damaged or degenerated tissues using patient-derived or engineered cells. These therapeutic approaches hold immense promise for treating conditions such as spinal cord injuries, osteoarthritis, and diabetes, and they rely on efficient cell expansion to provide sufficient quantities of functional cells for transplantation. Regulatory agencies have been actively supporting the development and approval of cell-based therapies, providing clear guidelines and pathways for their clinical use. This regulatory backing instills confidence in healthcare providers, researchers, and investors, reducing barriers to entry and facilitating the growth of the cell expansion market.

Advancements in Biotechnology and Bioprocessing

The global cell expansion market is experiencing remarkable growth, primarily attributed to the significant advancements in biotechnology and bioprocessing. These advancements are transforming the landscape of cell expansion, making it more efficient, cost-effective, and accessible for a wide range of applications in regenerative medicine, biopharmaceuticals, and research.

Biotechnology has played a pivotal role in the development of innovative cell expansion technologies. The field has witnessed substantial progress in recent years, resulting in the design of advanced bioreactors, culture systems, and bioprocessing equipment. These cutting-edge technologies facilitate the controlled growth and expansion of various cell types, providing more precise and efficient methods for generating therapeutic and research-grade cells. The emergence of single-use bioreactors has particularly revolutionized the field, offered scalability and flexibility while reducing contamination risks and production costs.

The application of automation and advanced software systems in bioprocessing has further boosted the efficiency of cell expansion processes. Automated culture systems can monitor and adjust critical parameters in real-time, ensuring optimal conditions for cell growth. This automation minimizes human error, increases reproducibility, and allows for high-throughput production, all of which are critical for large-scale cell

expansion.

These biotechnology advancements are not only streamlining cell expansion but also making it more economically viable. The cost-effectiveness of cell expansion technologies is a significant factor driving the growth of the global market. As biopharmaceutical companies and research institutions seek to optimize production processes and reduce the cost of manufacturing, the adoption of advanced bioprocessing technologies is becoming increasingly attractive.

The demand for biologics, including monoclonal antibodies, gene therapies, and cell-based products, is on the rise. These biologics require efficient cell expansion for their production, and the bioprocessing industry is evolving to meet these demands. As a result, the global cell expansion market is becoming an essential component of the broader biopharmaceutical sector.

Increasing Prevalence of Chronic Diseases

The global cell expansion market is experiencing a significant boost driven by the increasing prevalence of chronic diseases. Chronic diseases, such as cancer, diabetes, cardiovascular disorders, and neurodegenerative conditions, have become a global health epidemic, and the demand for effective treatments is on the rise. Cell-based therapies, which hold great promise in addressing these complex and often debilitating conditions, are emerging as key players in the fight against chronic diseases, thereby contributing to the growth of the global cell expansion market. One of the primary drivers of this trend is the potential of cell-based therapies to offer personalized and targeted treatments for chronic diseases. These therapies often involve the expansion of specific cell types, such as stem cells or immune cells, which can be customized to match an individual's unique genetic and health profile. This personalization is especially valuable in the treatment of conditions like cancer, where precision and efficacy are paramount.

Cancer, in particular, has witnessed a paradigm shift in treatment with the advent of cell-based therapies such as CAR-T cell therapy. This innovative approach involves the expansion of a patient's own immune cells, genetically modifying them to target cancer cells specifically. The increasing incidence of cancer worldwide, along with the growing recognition of the potential of cell-based therapies, is driving the demand for cell expansion technologies that can produce the required quantity of therapeutic cells. The aging population and lifestyle factors are contributing to the surge in chronic diseases. As individuals live longer and face a range of risk factors such as sedentary

lifestyles and poor dietary habits, the incidence of diabetes, cardiovascular diseases, and neurodegenerative disorders is on the rise. Cell-based therapies are becoming increasingly attractive for addressing these health challenges by offering regenerative and reparative treatments.

Regulatory agencies have also shown strong support for the development and approval of cell-based therapies for chronic diseases. This regulatory backing provides confidence to healthcare providers and researchers, facilitating the integration of cell-based treatments into clinical practice. As more clinical trials and real-world applications demonstrate the safety and efficacy of these therapies, their adoption in the management of chronic diseases is expected to increase.

Key Market Challenges

Quality and Safety Concerns

The global cell expansion market has witnessed remarkable growth in recent years, primarily driven by the increasing demand for cell-based therapies and biologics. However, despite the positive strides, this burgeoning market faces critical quality and safety concerns that pose significant challenges to its continued expansion. Quality control is paramount in the development and production of cell-based therapies. Ensuring the consistent quality and safety of cell-based products is essential for their success and widespread adoption.

Contamination of cell cultures is a persistent and pervasive challenge. Microbial contamination, such as bacterial, viral, or fungal contamination, can jeopardize the viability and safety of therapeutic cells. Even trace contamination can have adverse consequences. Implementing rigorous protocols and maintaining sterile conditions throughout the cell expansion process is essential to mitigate this risk.

Ensuring the genetic stability of expanded cells is crucial to maintain their therapeutic potential and safety. Genetic mutations or alterations in cell lines can compromise the efficacy and safety of cell-based therapies. Quality control measures to monitor and maintain the genetic integrity of cells are imperative.

Variability in cell culture conditions, including factors such as temperature, pH, and nutrient supply, can result in inconsistent cell growth and behavior. Addressing this variability is critical to achieving reproducibility and reliability in cell expansion processes, as it ensures that therapeutic cells maintain their intended characteristics

from one batch to another.

Cost Concerns

The global cell expansion market has shown tremendous promise in revolutionizing the field of regenerative medicine and biopharmaceuticals, but it faces significant cost concerns that act as a barrier to its widespread growth. Developing and optimizing cell expansion technologies and protocols can be a costly and time-consuming endeavor. Research institutions, biotechnology companies, and pharmaceutical giants invest substantial resources in advancing these technologies, which, in turn, may limit the pace of innovation. This research and development investment can also raise the cost of cell expansion products and services, making them less affordable.

The production of cell-based therapies and biologics at a commercial scale requires specialized facilities, equipment, and skilled personnel. Maintaining these resources can be expensive, contributing to the high cost of goods (COGs). The complexity of bioprocessing and the need for stringent quality control measures further drive up manufacturing costs. Ensuring the safety, quality, and consistency of cell-based products involves significant quality assurance efforts and adherence to strict regulatory standards. Compliance with regulatory guidelines can entail additional expenses in terms of documentation, validation, and quality control procedures. Scaling up cell expansion processes from small laboratory settings to industrial production is often accompanied by considerable costs. The transition to large-scale manufacturing while maintaining consistent product quality can be both technically and financially challenging. Addressing scalability issues and optimizing production methods can require substantial investments.

Key Market Trends

Proliferation of CAR-T Cell Therapies

The global cell expansion market has experienced a significant boost, driven in large part by the proliferation of Chimeric Antigen Receptor T-cell (CAR-T) therapies. CAR-T cell therapy represents a revolutionary approach to cancer treatment, where a patient's own T-cells are genetically modified to target and destroy cancer cells. The remarkable success and clinical efficacy of CAR-T therapies in various blood cancers have catapulted them into the mainstream of cancer treatment, and this has had a profound impact on the global cell expansion market.

The unique and personalized nature of CAR-T therapies relies heavily on the expansion of a patient's own T-cells. The process involves extracting a patient's T-cells, modifying them to express chimeric antigen receptors specific to cancer cells, and then expanding these engineered T-cells ex vivo to create a large population. This population is then reintroduced into the patient, where it specifically targets and eliminates cancer cells. This entire process emphasizes the critical role of cell expansion technologies in the production of therapeutic T-cells. The success stories of CAR-T therapies, such as Kymriah and Yescarta, have not only provided patients with potentially life-saving treatments but have also ignited tremendous interest and investment in the cell expansion market.

This surge in demand for efficient and scalable cell expansion technologies is attributed to the commercialization and adoption of CAR-T therapies, leading to an expansion of production capabilities and the development of advanced cell expansion equipment. The proliferation of CAR-T cell therapies has not only benefited patients but has also driven innovation and investments in the cell expansion market. Companies and research institutions are actively exploring ways to enhance the efficiency, scalability, and cost-effectiveness of cell expansion processes to meet the increasing demand. These developments are not limited to the cancer field but are also extending to other cell-based therapies, further expanding the cell expansion market's reach.

Growing Focus on Rare Diseases

The global cell expansion market is experiencing significant growth due to the growing focus on rare diseases within the medical community. Rare diseases, also known as orphan diseases, affect a limited number of individuals, often making them overlooked and underfunded in traditional pharmaceutical research. However, advancements in the understanding of the genetic basis of rare diseases and the potential for cell-based therapies have shifted the spotlight onto this niche but crucial area of medicine, significantly boosting the demand for cell expansion technologies.

The rarity of these diseases, which collectively impact millions of people worldwide, has created a compelling need for innovative treatment options. Cell-based therapies, including gene therapies and regenerative medicine, have emerged as promising approaches to address the underlying causes of many rare diseases. These therapies often involve the expansion of specialized cells or stem cells to correct genetic defects or regenerate damaged tissues. As a result, the cell expansion market is becoming a pivotal player in the development of treatments for these underserved

patient populations.

The pharmaceutical industry's growing interest in rare diseases has led to increased investment and research efforts, creating a surge in the demand for cell expansion technologies. Many biotechnology and pharmaceutical companies are actively exploring the potential of cell-based therapies to address these conditions. Rare diseases encompass a wide range of disorders, including genetic, metabolic, and degenerative conditions, making the versatility of cell expansion technologies a crucial asset in the development of tailored and effective therapies. Regulatory agencies have introduced incentives to accelerate the development and approval of treatments for rare diseases, such as orphan drug designation and fast-track approvals. This support from regulatory bodies has reduced the barriers to entry for cell-based therapies in this market segment, encouraging innovation and investment. The combination of financial incentives, patient advocacy, and the potential to make a significant impact on the lives of individuals with rare diseases has led to an upsurge in research, clinical trials, and commercialization efforts, all of which rely on efficient and scalable cell expansion processes.

Segmental Insights

Product Insights

Based on product, consumables emerged as the dominant segment in the Global Cell Expansion Market in 2023. Consumables, such as cell culture media, reagents, and growth factors, are fundamental components of cell expansion processes. They are indispensable for the maintenance and expansion of cells in culture. These products provide the necessary nutrients, pH balance, and environment for cell growth and proliferation. Without consumables, the entire cell expansion process would be unfeasible, making them essential for any cell-based research, bioprocessing, or therapy. Consumables are used at multiple stages of cell expansion, from the initial cell isolation and culture initiation to subsequent passages and scale-up. This ongoing and recurrent need for consumables in cell expansion processes leads to a high demand for these products. Researchers and manufacturers require a steady supply of consumables for their day-to-day operations.

Cell Type Insights

Based on Cell Type, Mammalian emerged as the dominant segment in the Global Cell Expansion Market in 2023. Mammalian cells, particularly Chinese hamster ovary (CHO)

cells and human embryonic kidney (HEK) cells, are the preferred choice for producing biopharmaceuticals, including monoclonal antibodies, recombinant proteins, and viral vectors. Their ability to correctly fold and post-translationally modify complex proteins, such as antibodies, is crucial in the biopharmaceutical industry. The demand for these biologics has led to a high demand for mammalian cell expansion technologies. Mammalian cells, especially human cell lines, are central to the development of advanced cell-based therapies, including stem cell therapies, gene therapies, and CAR-T cell therapies. Human cells are used in both research and clinical applications for their potential in personalized medicine and regenerative treatments, significantly boosting the demand for cell expansion technologies.

Regional Insights

Based on region, North America emerged as the dominant region in the Global Cell Expansion Market in 2023, holding the largest market share. North America boasts a robust and well-established biopharmaceutical industry, with numerous biotechnology and pharmaceutical companies at the forefront of biologics and cell-based therapies. The region's leadership in the development and commercialization of innovative cell therapies, monoclonal antibodies, and other biologics has propelled the demand for cell expansion technologies. North American research institutions, academic centers, and biopharmaceutical companies conduct extensive research and development in the field of cell expansion. These entities are engaged in cutting-edge projects involving gene therapies, regenerative medicine, and immunotherapies, driving the need for efficient cell expansion processes.

Key Market Players

ThermoFisher Scientific, Inc.

Corning Incorporated

Merck KGaA

Miltenyi Biotec B.V. & Co. KG

Becton, Dickinson and Company (BD)

Terumo BCT, Inc.

Sartorius AG

Takara BioUSA, Inc.

TRINOVA BIOCHEM GmbH

Upcyte Technologies GmbH

Report Scope:

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

Cell Expansion Market, By Product:

Consumables

Culture Flasks and Accessories

Instruments

Cell Expansion Market, By Cell Type:

Mammalian

Human

Microbial

Others

Cell Expansion Market, By Application:

Biopharmaceuticals

Tissue Culture & Engineering

Vaccine Production

Drug Development

Gene Therapy

Cancer Research

Stem Cell Research

Others

Cell Expansion Market, By End-use:

Biopharmaceutical & Biotechnology Companies

Research Institutes

Cell Banks

Others

Cell Expansion 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

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Cell Expansion Market.

Available Customizations:

Global Cell Expansion 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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