

Protein Expression Market - A Global and Regional Analysis: Focus on Application, End User, Product, Expression System, and Region - Analysis and Forecast, 2023-2033

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Abstracts

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Introduction of Protein Expression

The global protein expression market was valued at \$2,393.0 million in 2023 and is expected to reach \$6,963.6 million by 2033, growing at a CAGR of 11.27% between 2023 and 2033. Protein expression involves the generation or production of proteins within living cells or organisms. The synthesis, modification, and regulation of proteins are guided by the genetic information encoded in DNA. These proteins possess intricate and varied structures and functions, which are vital for sustaining life and facilitating various biological activities.

Market Introduction

Various methodologies are employed by researchers to regulate protein expression for experimental, biotechnological, and medical purposes. To observe proteins in a living environment, they are often marked with fluorescent proteins, enabling the study of their distribution.

Unlike DNA, which can be synthesized with relative ease, protein production necessitates the use of complex mixtures derived from cells or the utilization of living cells themselves. To facilitate protein production, a variety of expression systems are employed, including those based on mammalian, insect, bacterial, plant, yeast, and cell-

free environments.

Industrial Impact

The global protein expression market is a dynamic and rapidly evolving sector and is witnessing double-digit growth, driven by increased demand for protein biologics coupled with growing biopharmaceutical R&D in the field of protein expression. The utilization of expression systems in various research and development endeavors is further contributing to the market growth.

Market Segmentation:

Segmentation 1: by Application

Biopharmaceutical Manufacturing

Research and Development

Industrial Usage

Biopharmaceutical Manufacturing Segment to Dominate the Protein Expression Market

Based on application, the global protein expression market was led by the biopharmaceutical manufacturing segment, with a 48.61% share in 2022. Protein expression plays a pivotal role in the manufacturing of biopharmaceuticals, involving the generation of therapeutic proteins using living cells, such as bacteria, yeast, or mammalian cells. The selection of a protein expression system hinges on the specific protein product and its intended application.

Segmentation 2: by End User

Biopharmaceutical and Biotech Companies

CRO and CDMO

Academia

Other End Users

Biopharmaceutical and Biotech Companies Segment to Witness the Highest Growth in the Market between 2023 and 2033

The primary end-use consumers of protein expression products and services are biopharmaceutical and biotechnology firms. They employ protein expression techniques to create and produce recombinant proteins for various purposes, including drug development, vaccine production, antibody synthesis, and hormone production. Prominent examples of such companies engaged in protein expression include Pfizer Inc., Merck KGaA, F. Hoffmann-La Roche Ltd, and Amgen Inc.

Segmentation 3: by Product

Kits and Reagents

Expression Vectors

Competent Cells

Plastic Consumables and Accessories

Based on products, the kits and reagents segment holds a larger share of the global protein expression market. Mature industry participants, including Merck KGaA, Agilent Technologies, Inc., and Thermo Fisher Scientific, dominate the market by providing an extensive array of kits and reagents to meet the demands of protein expression.

Segmentation 4: by Expression System

Mammalian Cell Expression System

Bacterial Cell Expression System

Insect Cell Expression System

Yeast Cell Expression System

Others

Mammalian Cell Expression System to Witness the Highest Growth in the Market between 2023 and 2033

Based on various expression systems, mammalian cell-based expression systems hold a predominant position in the realm of biopharmaceutical production. These systems are employed for the transient or stable production of proteins, with the expression construct either temporarily introduced or integrated into the host genome. The preference for mammalian expression arises from its ability to create a highly physiologically relevant environment for studying protein function, thereby facilitating the utmost level of post-translational processing and functional activity of the produced protein.

Segmentation 5: by Region

North America

U.S.

Canada

Europe

Germany

U.K.

France

Italy

Spain

Rest-of-Europe

Asia-Pacific

Japan

India

China

South Korea

Australia

Rest-of-Asia-Pacific

Latin America

Brazil

Mexico

Rest-of-Latin America

Middle East and Africa

South Africa

Israel

Saudi Arabia

Rest-of-Middle East and Africa

Recent Developments in the Protein Expression Market

In January 2024, Evosep, a leader in sample preparation for mass spectrometry-based proteomics, partnered with Thermo Fisher Scientific Inc., a global scientific leader, to advance clinical proteomics research. This collaboration would combine Evosep's sample separation technology with Thermo Fisher Scientific Inc.'s mass spectrometry instruments, enhancing proteomics research capabilities.

In July 2023, Lonza Bioscience introduced the TheraPRO CHO Media System, a novel cell culture platform designed to streamline processes and enhance productivity and protein quality, particularly when used in conjunction with GS-CHO cell lines. This release would support pharmaceutical and biotechnology companies engaged in the manufacturing of therapeutic proteins, with the goal of improving product quality and expediting time-to-market.

In October 2023, Thermo Fisher Scientific Inc. announced a \$3.1 billion acquisition deal with Sweden's Olink Holding to bolster its presence in the proteomics market. This agreement was jointly disclosed by the two companies.

In December 2023, Medical equipment supplier Danaher Corporation (Abcam plc.) announced the successful completion of its \$5.7 billion acquisition of Danaher Corporation (Abcam plc.) despite initial resistance from the founder of the protein consumables manufacturer.

Demand – Drivers, Challenges, and Opportunities

Market Demand Drivers:

Increasing Demand for Protein Biologics Creating the Need for Protein Expression: Biologics represent a category of pharmaceutical drugs derived from biological sources. They can be produced from, extracted from, or semi-synthesized from biological materials. These drugs consist of proteins, sugars, nucleic acids, or intricate combinations of these components and can even include living cells or tissues. Biologics find application in both human and animal healthcare and are employed to treat a range of medical conditions when no alternative treatments are accessible.

Market Challenges:

Long and Complicated Regulatory Timelines and Approvals of Recombinant Proteins and Biologics: Recombinant proteins, generated through genetic engineering methods, belong to a category of proteins employed in the development of biopharmaceuticals, which are pharmaceutical drugs derived from biological sources. The production of these recombinant proteins falls under the oversight of regulatory authorities worldwide.

Market Opportunities:

Advancements in Microfluidics Requiring the Use of Protein Expression: Microfluidics is a scientific discipline that focuses on studying, manipulating, and controlling fluids at the microscale level. It has brought about a significant transformation in our approach to studying and examining biological systems. One particularly exciting application of microfluidics is within the realm of protein expression. Innovative microfluidic devices have been created to simplify the process of loading and cultivating cells, allowing for efficient parallel transfection, culturing, and analysis of mammalian cells.

How Can This Report Add Value to an Organization?

Product/Innovation Strategy: The global protein expression market has been segmented on the basis of various categories, such as application, end user, offering, expression system, and region. Segments such as by offering have been further sub-segmented to ensure the comprehensiveness and thoroughness of the report.

Growth/Marketing Strategy: Product launches and synergistic activities together accounted for the maximum number of key developments, at nearly 67% of the total developments in the protein expression market between January 2021 and December 2023.

Competitive Strategy: The global protein expression market is a highly fragmented one, with many smaller and private companies constantly entering it. Key players in the protein expression market analyzed and profiled in the study involve established players that offer various kinds of products and services.

Methodology

Key Considerations and Assumptions in Market Engineering and Validation

The base year considered for the calculation of the market size is 2022. A historical year analysis has been done for the period FY2019-FY2021. The market size has been estimated for FY2022 and projected for the period FY2023-FY2033.

The scope of this report has been carefully derived based on interactions with experts in different companies across the world. This report provides a market study of protein expression.

The market contribution of protein expression anticipated to be launched in the

future has been calculated based on the historical analysis of the solutions.

Revenues of the companies have been referenced from their annual reports for FY2022 and FY2023. For private companies, revenues have been estimated based on factors such as inputs obtained from primary research, funding history, market collaborations, and operational history.

The market has been mapped based on the available protein expression solutions. All the key companies with significant offerings in this field have been considered and profiled in this report.

Primary Research:

The primary sources involve industry experts in protein expression, including the market players offering products and services. Resources such as CEOs, vice presidents, marketing directors, and technology and innovation directors have been interviewed to obtain and verify both qualitative and quantitative aspects of this research study.

The key data points taken from the primary sources include:

- validation and triangulation of all the numbers and graphs

- validation of the report's segmentation and key qualitative findings

- understanding the competitive landscape and business model

- current and proposed production values of a product by market players

- validation of the numbers of the different segments of the market in focus

- percentage split of individual markets for regional analysis

Secondary Research

Open Sources

Certified publications, articles from recognized authors, white papers,

directories, and major databases, among others

Annual reports, SEC filings, and investor presentations of the leading market players

Company websites and detailed study of their product portfolio

Gold standard magazines, journals, white papers, press releases, and news articles

Paid databases

The key data points taken from the secondary sources include:

segmentations and percentage shares

data for market value

key industry trends of the top players of the market

qualitative insights into various aspects of the market, key trends, and emerging areas of innovation

quantitative data for mathematical and statistical calculations

Key Market Players and Competition Synopsis

The companies that are profiled have been selected based on inputs gathered from primary experts and analyzing company coverage, product portfolio, and market penetration.

Some prominent names established in this market are:

Agilent Technologies, Inc.

Bio-Rad Laboratories, Inc.

Charles River Laboratories International, Inc.

Danaher Corporation (Abcam plc.)

GenCefe Co., Ltd.

Genscript Biotech Corporation

Jena Bioscience

Lonza Bioscience

Merck KGaA

New England Biolabs

Oxford Expression Technologies Ltd

Promega Corporation

QIAGEN N.V.

Takara Bio Inc.

Thermo Fisher Scientific, Inc.

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