

# **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.

## Contents

Executive Summary  
Scope and Definition

### 1 MARKETS

1.1 Trends: Current and Future Impact Assessment

1.1.1 Protein Expression Market Trend Analysis

1.1.2 Continuous Innovations in Fields such as Automation of Protein Expression Processes

1.1.3 Advancements in Protein Engineering and Design

1.2 Supply Chain Overview

1.2.1 Value Chain Analysis

1.2.2 Market Map

1.3 Research and Development Review

1.3.1 Patent Filing Trend (by Country, Year)

1.4 Regulatory Landscape

1.5 Impact Analysis for Key Global Events - COVID-19

1.6 Market Entry Barriers and Opportunities

1.6.1 Pain Points for Manufacturers

1.6.2 Opportunities for Manufacturers

1.7 Market Dynamics Overview

1.7.1 Market Drivers

1.7.1.1 Increasing Demand for Protein Biologics Creating the Need for Protein Expression

1.7.1.2 Increasing Biopharmaceutical R&D Influencing the Use of Protein Expression

1.7.1.3 Increasing Protein Synthesis Funding

1.7.2 Market Restraints

1.7.2.1 Long and Complicated Regulatory Timelines and Approvals of Recombinant Proteins and Biologics

1.7.2.2 Intricate and Fluctuating Nature of Protein Expression Necessitating a Demand for Highly Trained Personnel

1.7.3 Market Opportunities

1.7.3.1 Advancements in Microfluidics Requiring the Use of Protein Expression

1.7.3.2 Rising Awareness of Proteomics in Emerging Countries

### 2 APPLICATION

- 2.1 Application Segmentation
- 2.2 Application Summary
- 2.3 Global Protein Expression Market (by Application)
  - 2.3.1 Biopharmaceutical Manufacturing
  - 2.3.2 Research and Development
  - 2.3.3 Industrial Usage
- 2.4 Global Protein Expression Market (by End User)
  - 2.4.1 Biopharmaceutical and Biotech Companies
  - 2.4.2 CRO and CDMO
  - 2.4.3 Academia
  - 2.4.4 Others

### **3 PRODUCT**

- 3.1 Product Segmentation
- 3.2 Product Summary
  - 3.2.1 Product Summary
  - 3.2.2 Expression System Summary
- 3.3 Global Protein Expression Market (by Product)
  - 3.3.1 Kits and Reagents
  - 3.3.2 Expression Vectors
  - 3.3.3 Competent Cells
  - 3.3.4 Plastic Consumables and Accessories
- 3.4 Global Protein Expression Market (by Expression System)
  - 3.4.1 Mammalian Cell Expression System
  - 3.4.2 Yeast Cell Expression System
  - 3.4.3 Bacterial Cell Expression System
  - 3.4.4 Insect Cell Expression System
  - 3.4.5 Other Expression System

### **4 REGION**

- 4.1 Regional Summary
- 4.2 Drivers and Restraints
- 4.3 North America
  - 4.3.1 Regional Overview
  - 4.3.2 Driving Factors for Market Growth
  - 4.3.3 Factors Challenging the Market
  - 4.3.4 Application

#### 4.3.5 Products

#### 4.3.6 U.S.

##### 4.3.6.1 Application

##### 4.3.6.2 Product

#### 4.3.7 Canada

##### 4.3.7.1 Application

##### 4.3.7.2 Product

### 4.4 Europe

#### 4.4.1 Regional Overview

#### 4.4.2 Driving Factors for Market Growth

#### 4.4.3 Factors Challenging the Market

#### 4.4.4 Application

#### 4.4.5 Product

#### 4.4.6 France

##### 4.4.6.1 Application

##### 4.4.6.2 Product

#### 4.4.7 Germany

##### 4.4.7.1 Application

##### 4.4.7.2 Product

#### 4.4.8 U.K.

##### 4.4.8.1 Application

##### 4.4.8.2 Product

#### 4.4.9 Spain

##### 4.4.9.1 Application

##### 4.4.9.2 Product

#### 4.4.10 Italy

##### 4.4.10.1 Application

##### 4.4.10.2 Product

#### 4.4.11 Rest-of-Europe

##### 4.4.11.1 Application

##### 4.4.11.2 Product

### 4.5 Asia-Pacific

#### 4.5.1 Regional Overview

#### 4.5.2 Driving Factors for Market Growth

#### 4.5.3 Factors Challenging the Market

#### 4.5.4 Application

#### 4.5.5 Product

#### 4.5.6 China

##### 4.5.6.1 Application

- 4.5.6.2 Product
- 4.5.7 India
  - 4.5.7.1 Application
  - 4.5.7.2 Product
- 4.5.8 Australia
  - 4.5.8.1 Application
  - 4.5.8.2 Product
- 4.5.9 Japan
  - 4.5.9.1 Application
  - 4.5.9.2 Product
- 4.5.10 South Korea
  - 4.5.10.1 Application
  - 4.5.10.2 Product
- 4.5.11 Rest-of-Asia-Pacific
  - 4.5.11.1 Application
  - 4.5.11.2 Product
- 4.6 Latin America
  - 4.6.1 Regional Overview
  - 4.6.2 Driving Factors for Market Growth
  - 4.6.3 Factors Challenging the Market
  - 4.6.4 Application
  - 4.6.5 Product
  - 4.6.6 Brazil
    - 4.6.6.1 Application
    - 4.6.6.2 Product
  - 4.6.7 Mexico
    - 4.6.7.1 Application
    - 4.6.7.2 Product
  - 4.6.8 Rest-of-Latin America
    - 4.6.8.1 Application
    - 4.6.8.2 Product
- 4.7 Middle East and Africa
  - 4.7.1 Regional Overview
  - 4.7.2 Driving Factors for Market Growth
  - 4.7.3 Factors Challenging the Market
  - 4.7.4 Application
  - 4.7.5 Product
  - 4.7.6 Israel
    - 4.7.6.1 Application

- 4.7.6.2 Product
- 4.7.7 Saudi Arabia
  - 4.7.7.1 Application
  - 4.7.7.2 Product
- 4.7.8 South Africa
  - 4.7.8.1 Application
  - 4.7.8.2 Product
- 4.7.9 Rest-of-Middle East and Africa
  - 4.7.9.1 Application
  - 4.7.9.2 Product

## **5 MARKETS - COMPETITIVE BENCHMARKING & COMPANY PROFILES**

- 5.1 Next Frontiers.....
- 5.2 Company Assessment
- 5.3 Market Ecosystem and Key Players
  - 5.3.1 Agilent Technologies, Inc.
    - 5.3.1.1 Overview
    - 5.3.1.2 Top Products/Product Portfolio
    - 5.3.1.3 Top Competitors
    - 5.3.1.4 Key Personnel
    - 5.3.1.5 Analyst View
  - 5.3.2 Bio-Rad Laboratories, Inc.
    - 5.3.2.1 Overview
    - 5.3.2.2 Top Products/Product Portfolio
    - 5.3.2.3 Top Competitors
    - 5.3.2.4 Key Personnel
    - 5.3.2.5 Analyst View
  - 5.3.3 Charles River Laboratories International, Inc.
    - 5.3.3.1 Overview
    - 5.3.3.2 Top Services/Service Portfolio
    - 5.3.3.3 Top Competitors
    - 5.3.3.4 Key Personnel
    - 5.3.3.5 Analyst View
  - 5.3.4 Danaher Corporation (Abcam plc.)
    - 5.3.4.1 Overview
    - 5.3.4.2 Top Products/Product Portfolio
    - 5.3.4.3 Top Competitors
    - 5.3.4.4 Key Personnel

- 5.3.4.5 Analyst View
- 5.3.5 GenCefe Co., Ltd.
  - 5.3.5.1 Overview
  - 5.3.5.2 Top Services/Service Portfolio
  - 5.3.5.3 Top Competitors
  - 5.3.5.4 Key Personnel
  - 5.3.5.5 Analyst View
- 5.3.6 Genscript Biotech Corporation
  - 5.3.6.1 Overview
  - 5.3.6.2 Top Services/Service Portfolio
  - 5.3.6.3 Top Competitors
  - 5.3.6.4 Key Personnel
  - 5.3.6.5 Analyst View
- 5.3.7 Jena Bioscience
  - 5.3.7.1 Overview
  - 5.3.7.2 Top Products/Product Portfolio
  - 5.3.7.3 Top Competitors
  - 5.3.7.4 Key Personnel
  - 5.3.7.5 Analyst View
- 5.3.8 Lonza Bioscience
  - 5.3.8.1 Overview
  - 5.3.8.2 Top Services/Service Portfolio
  - 5.3.8.3 Top Competitors
  - 5.3.8.4 Key Personnel
  - 5.3.8.5 Analyst View
- 5.3.9 Merck KGaA
  - 5.3.9.1 Overview
  - 5.3.9.2 Top Products/Product/Service Portfolio
  - 5.3.9.3 Top Competitors
  - 5.3.9.4 Key Personnel
  - 5.3.9.5 Analyst View
- 5.3.10 New England Biolabs
  - 5.3.10.1 Overview
  - 5.3.10.2 Top Products/Product Portfolio
  - 5.3.10.3 Top Competitors
  - 5.3.10.4 Key Personnel
  - 5.3.10.5 Analyst View
- 5.3.11 Oxford Expression Technologies Ltd
  - 5.3.11.1 Overview



- 5.3.11.2 Top Products/Product Portfolio
- 5.3.11.3 Top Competitors
- 5.3.11.4 Key Personnel
- 5.3.11.5 Analyst View
- 5.3.12 Promega Corporation
  - 5.3.12.1 Overview
  - 5.3.12.2 Top Products/Product Portfolio
  - 5.3.12.3 Top Competitors
  - 5.3.12.4 Target Customers
  - 5.3.12.5 Key Personnel
  - 5.3.12.6 Analyst View
- 5.3.13 QIAGEN N.V.
  - 5.3.13.1 Overview
  - 5.3.13.2 Top Products/Product Portfolio
  - 5.3.13.3 Top Competitors
  - 5.3.13.4 Key Personnel
  - 5.3.13.5 Analyst View
- 5.3.14 Takara Bio Inc.
  - 5.3.14.1 Overview
  - 5.3.14.2 Top Products/Product Portfolio
  - 5.3.14.3 Top Competitors
  - 5.3.14.4 Key Personnel
  - 5.3.14.5 Analyst View
- 5.3.15 Thermo Fisher Scientific, Inc.
  - 5.3.15.1 Overview
  - 5.3.15.2 Top Products/Product Portfolio
  - 5.3.15.3 Top Competitors
  - 5.3.15.4 Key Personnel
  - 5.3.15.5 Analyst View

## **6 RESEARCH METHODOLOGY**

- 6.1 Data Sources
  - 6.1.1 Primary Data Sources
  - 6.1.2 Secondary Data Sources
  - 6.1.3 Data Triangulation
- 6.2 Market Estimation and Forecast

## List Of Figures

### LIST OF FIGURES

Figure 1: Region with the Largest Share of Market, 2023, 2027, and 2033

Figure 2: Global Protein Expression Market (by Application), \$Million, 2023, 2027, and 2033

Figure 3: Global Protein Expression Market (by End User), \$Million, 2023, 2027, and 2033

Figure 4: Global Protein Expression Market (by Product), \$Million, 2023 and 2033

Figure 5: Global Protein Expression Market (by Expression System), \$Million, 2023 and 2033

Figure 6: Key Events to Keep Track of within the Protein Expression Market

Figure 7: Advantages of Using Automation for Protein Expression

Figure 8: Supply Chain and Risks within the Supply Chain

Figure 9: Protein Expression Market (by Country), January 2021-December 2023

Figure 10: Patents Filed in Protein Expression Market (by Year), January 2021-December 2023

Figure 11: Impact of COVID-19 on Protein Expression Market

Figure 12: Impact Analysis of Market Navigating Factors, 2023-2033

Figure 13: Recently Launched Protein Biologics, their Indications, and Manufacturers

Figure 14: Total Pharmaceutical Research and Development Pipeline Size (by Year), 2010-2023

Figure 15: All Protein Synthesis Funding between 2022 and 2023

Figure 16: Timeline of Biologics Clinical Trials

Figure 17: Challenges at each of the Protein Expression Steps

Figure 18: Timeline of Microfluidics over the Years

Figure 19: Examples of Increasing Awareness with Respect to Proteomics in India and China

Figure 20: Number of Authorized Biologics in China Compared to the U.S. (2016-2020)

Figure 21: U.S. Protein Expression Market, \$Million, 2022-2033

Figure 22: Canada Protein Expression Market, \$Million, 2022-2033

Figure 23: France Protein Expression Market, \$Million, 2022-2033

Figure 24: Germany Protein Expression Market, \$Million, 2022-2033

Figure 25: U.K. Protein Expression Market, \$Million, 2022-2033

Figure 26: Spain Protein Expression Market, \$Million, 2022-2033

Figure 27: Italy Protein Expression Market, \$Million, 2022-2033

Figure 28: Rest-of-Europe Protein Expression Market, \$Million, 2022-2033

Figure 29: China Protein Expression Market, \$Million, 2022-2033

- Figure 30: India Protein Expression Market, \$Million, 2022-2033
- Figure 31: Australia Protein Expression Market, \$Million, 2022-2033
- Figure 32: Japan Protein Expression Market, \$Million, 2022-2033
- Figure 33: South Korea Protein Expression Market, \$Million, 2022-2033
- Figure 34: Rest-of-Asia-Pacific Protein Expression Market, \$Million, 2022-2033
- Figure 35: Brazil Protein Expression Market, \$Million, 2022-2033
- Figure 36: Mexico Protein Expression Market, \$Million, 2022-2033
- Figure 37: Rest-of-Latin America Protein Expression Market, \$Million, 2022-2033
- Figure 38: Israel Protein Expression Market, \$Million, 2022-2033
- Figure 39: Saudi Arabia Protein Expression Market, \$Million, 2022-2033
- Figure 40: South Africa Protein Expression Market, \$Million, 2022-2033
- Figure 41: Rest-of-Middle East and Africa Protein Expression Market, \$Million, 2022-2033
- Figure 42: Strategic Initiatives, 2021-2023
- Figure 43: Share of Strategic Initiatives, 2021-2023
- Figure 44: Data Triangulation
- Figure 45: Top-Down and Bottom-Up Approach
- Figure 46: Assumptions and Limitations

## List Of Tables

### LIST OF TABLES

Table 1: Global Protein Expression Market Snapshot

Table 2: Opportunities across Regions

Table 3: Recent Advancements in Protein Engineering

Table 4: Global Protein Expression Market, Product Benchmarking by Expression System

Table 5: Examples of Five Regulatory Bodies and Recombinant Protein

Table 6: Protein Expression (by Region), \$Million, 2022-2033

Table 7: North America Protein Expression Market (by Application), \$Million, 2022-2033

Table 8: North America Protein Expression Market (by End User), \$Million, 2022-2033

Table 9: North America Protein Expression Market (by Products), \$Million, 2022-2033

Table 10: North America Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 11: U.S. Protein Expression Market (by Application), \$Million, 2022-2033

Table 12: U.S. Protein Expression Market (by End User), \$Million, 2022-2033

Table 13: U.S. Protein Expression Market (by Product), \$Million, 2022-2033

Table 14: U.S. Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 15: Canada Protein Expression Market (by Application), \$Million, 2022-2033

Table 16: Canada Protein Expression Market (by End User), \$Million, 2022-2033

Table 17: Canada Protein Expression Market (by Product), \$Million, 2022-2033

Table 18: Canada Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 19: Europe Protein Expression Market (by Application), \$Million, 2022-2033

Table 20: Europe Protein Expression Market (by End User), \$Million, 2022-2033

Table 21: Europe Protein Expression Market (by Product), \$Million, 2022-2033

Table 22: Europe Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 23: France Protein Expression Market (by Application), \$Million, 2022-2033

Table 24: France Protein Expression Market (by End User), \$Million, 2022-2033

Table 25: France Protein Expression Market (by Product), \$Million, 2022-2033

Table 26: France Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 27: Germany Protein Expression Market (by Application), \$Million, 2022-2033

Table 28: Germany Protein Expression Market (by End User), \$Million, 2022-2033

Table 29: Germany Protein Expression Market (by Product), \$Million, 2022-2033

Table 30: Germany Protein Expression Market (by Expression System), \$Million,

## 2022-2033

Table 31: U.K. Protein Expression Market (by Application), \$Million, 2022-2033

Table 32: U.K. Protein Expression Market (by End User), \$Million, 2022-2033

Table 33: U.K. Protein Expression Market (by Product), \$Million, 2022-2033

Table 34: U.K. Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 35: Spain Protein Expression Market (by Application), \$Million, 2022-2033

Table 36: Spain Protein Expression Market (by End User), \$Million, 2022-2033

Table 37: Spain Protein Expression Market (by Product), \$Million, 2022-2033

Table 38: Spain Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 39: Italy Protein Expression Market (by Application), \$Million, 2022-2033

Table 40: Italy Protein Expression Market (by End User), \$Million, 2022-2033

Table 41: Italy Protein Expression Market (by Product), \$Million, 2022-2033

Table 42: Italy Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 43: Rest-of-Europe Protein Expression Market (by Application), \$Million, 2022-2033

Table 44: Rest-of-Europe Protein Expression Market (by End User), \$Million, 2022-2033

Table 45: Rest-of-Europe Protein Expression Market (by Product), \$Million, 2022-2033

Table 46: Rest-of-Europe Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 47: Asia-Pacific Protein Expression Market (by Application), \$Million, 2022-2033

Table 48: Asia-Pacific Protein Expression Market (by End User), \$Million, 2022-2033

Table 49: Asia-Pacific Protein Expression Market (by Product), \$Million, 2022-2033

Table 50: Asia-Pacific Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 51: China Protein Expression Market (by Application), \$Million, 2022-2033

Table 52: China Protein Expression Market (by End User), \$Million, 2022-2033

Table 53: China Protein Expression Market (by Product), \$Million, 2022-2033

Table 54: China Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 55: India Protein Expression Market (by Application), \$Million, 2022-2033

Table 56: India Protein Expression Market (by End User), \$Million, 2022-2033

Table 57: India Protein Expression Market (by Product), \$Million, 2022-2033

Table 58: India Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 59: Australia Protein Expression Market (by Application), \$Million, 2022-2033

Table 60: Australia Protein Expression Market (by End User), \$Million, 2022-2033

Table 61: Australia Protein Expression Market (by Product), \$Million, 2022-2033

Table 62: Australia Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 63: Japan Protein Expression Market (by Application), \$Million, 2022-2033

Table 64: Japan Protein Expression Market (by End User), \$Million, 2022-2033

Table 65: Japan Protein Expression Market (by Product), \$Million, 2022-2033

Table 66: Japan Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 67: South Korea Protein Expression Market (by Application), \$Million, 2022-2033

Table 68: South Korea Protein Expression Market (by End User), \$Million, 2022-2033

Table 69: South Korea Protein Expression Market (by Product), \$Million, 2022-2033

Table 70: South Korea Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 71: Rest-of-Asia-Pacific Protein Expression Market (by Application), \$Million, 2022-2033

Table 72: Rest-of-Asia-Pacific Protein Expression Market (by End User), \$Million, 2022-2033

Table 73: Rest-of-Asia-Pacific Protein Expression Market (by Product), \$Million, 2022-2033

Table 74: Rest-of-Asia-Pacific Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 75: Latin America Protein Expression Market (by Application), \$Million, 2022-2033

Table 76: Latin America Protein Expression Market (by End User), \$Million, 2022-2033

Table 77: Latin America Protein Expression Market (by Product), \$Million, 2022-2033

Table 78: Latin America Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 79: Brazil Protein Expression Market (by Application), \$Million, 2022-2033

Table 80: Brazil Protein Expression Market (by End User), \$Million, 2022-2033

Table 81: Brazil Protein Expression Market (by Product), \$Million, 2022-2033

Table 82: Brazil Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 83: Mexico Protein Expression Market (by Application), \$Million, 2022-2033

Table 84: Mexico Protein Expression Market (by End User), \$Million, 2022-2033

Table 85: Mexico Protein Expression Market (by Product), \$Million, 2022-2033

Table 86: Mexico Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 87: Rest-of-Latin America Protein Expression Market (by Application), \$Million, 2022-2033

Table 88: Rest-of-Latin America Protein Expression Market (by End User), \$Million, 2022-2033

Table 89: Rest-of-Latin America Protein Expression Market (by Product), \$Million,

2022-2033

Table 90: Rest-of-Latin America Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 91: Middle East and Africa Protein Expression Market (by Application), \$Million, 2022-2033

Table 92: Middle East and Africa Protein Expression Market (by End User), \$Million, 2022-2033

Table 93: Middle East and Africa Protein Expression Market (by Product), \$Million, 2022-2033

Table 94: Middle East and Africa Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 95: Israel Protein Expression Market (by Application), \$Million, 2022-2033

Table 96: Israel Protein Expression Market (by End User), \$Million, 2022-2033

Table 97: Israel Protein Expression Market (by Product), \$Million, 2022-2033

Table 98: Israel Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 99: Saudi Arabia Protein Expression Market (by Application), \$Million, 2022-2033

Table 100: Saudi Arabia Protein Expression Market (by End User), \$Million, 2022-2033

Table 101: Saudi Arabia Protein Expression Market (by Product), \$Million, 2022-2033

Table 102: Saudi Arabia Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 103: South Africa Protein Expression Market (by Application), \$Million, 2022-2033

Table 104: South Africa Protein Expression Market (by End User), \$Million, 2022-2033

Table 105: South Africa Protein Expression Market (by Product), \$Million, 2022-2033

Table 106: South Africa Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 107: Rest-of-Middle East and Africa Protein Expression Market (by Application), \$Million, 2022-2033

Table 108: Rest-of-Middle East and Africa Protein Expression Market (by End User), \$Million, 2022-2033

Table 109: Rest-of-Middle East and Africa Protein Expression Market (by Product), \$Million, 2022-2033

Table 110: Rest-of-Middle East and Africa Protein Expression Market (by Expression System), \$Million, 2022-2033

Table 111: Market Share

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