

Future of Biotechnology: Protein Engineering Market Expected to Expand at a Steady 2024-2031 | Codexis Inc, Abzena, Ltd

protein engineering market was valued at US\$ 1,936.7 Mn in 2021 and is forecast to reach a value of US\$ 5,355.8 Mn by 2028 at a CAGR of 15.6% Forecast 2022-2028

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/EINPresswire.com/ -- Market Overview:

Protein engineering involves modifying the structure and functionality of native proteins or designing new proteins/enzymes with desired traits and activities. Rapid advancements in biotechnology and customized protein design are enabling researchers to modify protein properties for therapeutic and industrial applications.

Market Dynamics:

The growth of the protein engineering market is driven by advancements in biotechnology domain coupled with rising demand for biopharmaceuticals. Biopharmaceutical companies are extensively utilizing protein engineering techniques to develop targeted protein therapeutics for treating various diseases including cancer. Further, growing adoption of protein engineering tools in industrial biotechnology for manufacturing specialty chemicals and materials is also fueling the market growth. Customized protein design through mutagenesis, directed evolution, and rational design methods allows industrial biotechnologists to engineer enzymes for a wide range of reactions. On the other hand, high capital investment requirements and technical challenges associated with protein engineering processes hinders the market growth to some extent.

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Moreover, it will also include the opportunities available in micro markets for stakeholders to invest, a detailed analysis of the competitive landscape, and product services of key players. Analysis of Protein Engineering companies, key tactics followed by Leading Key Players:

- Codexis Inc.
- Abzena Ltd.
- Enantis s.r.o
- GenScript Biotech Corp.
- Waters Corporation
- PerkinElmer Inc.
- Bruker Corporation
- Agilent Technologies
- Bio-Rad Laboratories Inc.
- Thermo Fisher Scientific Inc.
- among others

Pharmaceutical Industry Reliance on Protein Drugs is a Major Driver for Protein Engineering Market

The pharmaceutical industry has increasingly relied on protein drugs such as monoclonal antibodies, vaccines, hormones, and enzymes to treat various diseases. Many blockbuster drugs are protein based, and the protein drug market size is expected to reach over \$250 billion by 2025. As new protein drugs are discovered and existing ones need to be improved, protein engineering techniques play a vital role in modifying protein properties for optimal therapeutic effects. Protein engineering enables modifying proteins to increase stability, enhance binding affinity, reduce immunogenicity, and prolong half-life. These modifications help develop effective protein drugs with desired pharmaceutical properties and commercial viability. The growing dependence of drug development on protein-based molecules has fueled significant demand for protein engineering services and technologies.

Advancements in Protein Engineering Tools and Technologies is Another Key Driver

Tools and technologies used for protein engineering have witnessed major advancements in recent years. Developments such as site-directed mutagenesis, molecular cloning, in vitro evolution methods like phage display, yeast and bacterial display systems have significantly expanded protein engineers' capabilities. Computational tools for protein design and molecular modeling have also matured. Machine learning and artificial intelligence are now finding increasing usage in rational protein design. Systems biology approaches provide a more holistic understanding of protein function and interaction networks. Automated high-throughput screening technologies enable rapid validation of protein variants. Together, these advancements in protein engineering tools have augmented capabilities, accelerated research, and brought down costs. They have expanded the scope of protein engineering applications and helped introduce more effective solutions, driving greater demand.

High Demand for Biosimilars and Biobetters Creates Significant Opportunity

The commercial viability of biosimilars and biobetters has created a major opportunity for protein engineering market players. Biosimilars offer cost savings compared to original biologics that have lost patent protection. Biobetters are improved versions of existing biologics with better efficacy, safety or dosing. Both require sophisticated protein engineering of the original biologic to modify specific properties. Developing biosimilars and biobetters demands protein engineering capabilities for analytical, preclinical and clinical testing. Their growing market size worldwide provides a sizable opportunity. For instance, the biosimilars market is predicted to reach over \$35 billion by 2024. Protein engineering companies can capitalize on contract services and partnerships with pharma firms developing biosimilars and biobetters using diverse protein engineering techniques.

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Growing Adoption of Molecular Simulation Restrains Reliance on Empirical Methods

While advancements in protein engineering tools have accelerated research and development, over-reliance on empirical methods like random mutagenesis and screening has certain drawbacks. It involves trial and error experimentation, is time-consuming and resource-intensive. However, molecular modeling and simulation software packages are gaining widespread acceptance and use in protein engineering workflows. Computational tools allow rational, structure-guided protein design by simulating interactions at the atomic level. This helps predict outcomes before embarking on wet-lab experiments. The growing adoption of molecular simulation restrains the need for exhaustive empirical testing, speeds up discovery, and reduces costs. It enables expanding the scope and expedites protein engineering projects. As computational capabilities improve further, reliance on empirical trial-and-error is likely to decrease even more in the coming years.

Outsourcing and Partnerships are a Major Trend in the Protein Engineering Market

A major trend witnessed in the protein engineering industry is the rising outsourcing of research and development to contract service providers. Pharma companies often lack in-house protein engineering expertise and focus on drug development. This has driven significant outsourcing of protein engineering work like mutagenesis, screening, expression studies etc. Key players are also increasingly preferring strategic partnerships and collaborations over costly acquisitions to gain access to new technologies. This allows spreading investment risks as well. The availability of specialized CRO/CMO contractors with advanced infrastructure and multidisciplinary protein engineering capabilities has facilitated the trend of outsourcing and partnerships. It has substantially grown the market for protein engineering services. This outsourcing and open innovation trend is expected to continue as pharma firms seek improved efficiencies and

concentrate on drug commercialization.

Segment Details Analysis

By Product Type:

Modified Enzymes

Insulin

Monoclonal Antibodies

Coagulation Factors (Blood Factors + Tissue Plasminogen)

Vaccines

Growth Factors (Hormones + Cytokine)

Other Product Types

By Technology:

Irrational Protein Design

Rational Protein Design

By End User:

Pharmaceutical and Biotechnology Companies

Contract Research Organizations (CRO)

Academic Institutions

The Study Objectives are:

A comprehensive insight into key players operating in the Protein Engineering Market and their corresponding data.

It includes product portfolio, annual revenue, expenditure on research and development, geographical presence, key developments in recent years, and growth strategies.

Regional analysis, which includes insight into the dominant market and corresponding market share.

It also includes various socio-economic factors affecting the evolution of the market in the region.

The report offers a comprehensive insight into different individuals from value chains such as raw materials suppliers, distributors, and stockholders.

Table of Contents:

Market scenario 2024

Chapter 1: Introduction, Market Driving Force Product Objective of Study and Research Scope the Protein Engineering market

Chapter 2: Exclusive Summary - the basic information of the Protein Engineering Market.

Chapter 3: Displaying the Market Dynamics- Drivers, Trends, and Challenges & Opportunities of the Protein Engineering

Chapter 4: Presenting the Protein Engineering Market Factor Analysis, Supply/Value Chain, PESTEL analysis, Market Entry, and Patent/Trademark Analysis.

Chapter 5: Displaying the by Type, End User, and Region/Country 2024 - 2031

Chapter 6: Evaluating the leading manufacturers of the Protein Engineering market which consists of its Competitive Landscape, Peer Group Analysis, Market positioning & Company Profile

Chapter 7: To evaluate the market by segments, by countries, and by Manufacturers/Companies with revenue share and sales by key countries in these various regions (2024-2031)

Chapters 8 & 9: Displaying the Appendix, Methodology, and Data Source

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Key Questions Answered:

What is the market size and CAGR of the Protein Engineering Market during the forecast period?

How is the growing demand impacting the growth of Protein Engineering Market shares?

What is the growing demand of the Market during the forecast period?

Who are the leading vendors in the market and what are their market shares?

What is the impact of the COVID-19 pandemic on the APAC Protein Engineering Market?

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