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Structural Biology & Molecular Modeling Market Forecasts to 2034 – Global Analysis By Product (Reagents & Kits, Instruments, Consumables and Other Products), Tools (Software as a Service (SaaS) & Standalone Modeling, Visualization & Analysis, Databases and Other Tools), Technology, Application and By Geography

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Abstracts

According to Stratistics MRC, the Global Structural Biology & Molecular Modeling Market is accounted for $8.0 billion in 2026 and is expected to reach $30.8 billion by 2034 growing at a CAGR of 18.2% during the forecast period. Structural Biology and Molecular Modeling are two closely related fields that play a crucial role in understanding the structure and function of biological macromolecules at the molecular level. They are versatile tools with applications ranging from basic research to practical applications in medicine, agriculture, and industry. They provide a molecular-level understanding of biological processes, facilitating advancements in various scientific and technological fields.

According to the MDPI Journal research article published in September 2021, the prevalence of Peripheral Arterial Disease (PAD) is estimated to be 3–12%, affecting nearly 27 million people in America and Europe.

Market Dynamics:

Driver:

Rising incidence of chronic diseases

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Chronic diseases often involve complex molecular pathways. Structural biology helps identify and validate potential drug targets by providing detailed information. Structural biology and molecular modeling contribute to the identification of potential drug targets and the design of specific therapeutics. The increasing prevalence of chronic diseases, such as cancer and neurodegenerative disorders, has fuelled the demand for targeted and personalized therapies.

Restraint:

Limited understanding of biological systems

Despite advancements, understanding of complex biological systems is still evolving. A limited understanding of the three-dimensional structures of target proteins can impede the identification and design of effective drug candidates. This can result in a slower and less efficient drug development process. Additionally, factors such as inaccuracy in predicting protein-ligand interactions and complexities of biological systems hampers the market growth.

Opportunity:

Integration of artificial intelligence (AI)

The integration of artificial intelligence (AI) and machine learning (ML) in structural biology and molecular modeling processes enhances the speed and accuracy of data analysis. AI algorithms can analyze biological data to identify potential drug targets. It presents opportunities for the development of more efficient drug discovery pipelines, improving treatment efficacy and minimizing side effects. This integration further enhances the efficiency, accuracy, and overall success rate of drug discovery and development efforts in this field.

Threat:

High initial costs

Structural biology and molecular modeling techniques often involve expensive equipment, software, and skilled personnel. They heavily rely on cutting-edge technologies and specialized equipment. Also, establishing & maintaining state-of-the-art laboratories and specialized facilities requires significant capital investment.

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Additionally, the costs associated with analyzing experimental data, including software licenses and skilled personnel for interpretation contribute to the overall initial expenses thereby hampering the market demand.

Covid-19 Impact

Many research efforts in the life sciences were redirected toward covid related studies, including vaccine development, drug repurposing, and understanding the virus's structure and function. This redirection of resources has impacted non-covid-related research areas, including structural biology and molecular modeling. Economic uncertainties and shifting priorities during the pandemic have led to funding challenges for research projects. Further, the urgency of finding treatments for covid has spurred increased interest and investment in antiviral drug discovery, which indirectly benefitted the structural biology and molecular modeling sector.

The electron microscopy segment is expected to be the largest during the forecast period

The electron microscopy segment is estimated to have a lucrative growth. Electron microscopy technique offers high resolution and allows researchers to visualize structures at the molecular and even atomic levels. It is a powerful tool in structural biology and molecular modeling, providing detailed structural information that is crucial for understanding biological processes, disease mechanisms, and facilitating drug discovery efforts. The continuous advancements in EM technology further contribute to its significance in the field.

The drug discovery segment is expected to have the highest CAGR during the forecast period

The drug discovery segment is anticipated to witness the highest CAGR growth during the forecast period. Structural biology and molecular modeling play crucial roles in drug discovery by providing valuable insights into the molecular mechanisms of diseases and facilitating the design of novel therapeutic agents. These techniques help streamline the drug discovery pipeline, making it more efficient and cost-effective.

Region with largest share:

Asia Pacific is projected to hold the largest market share during the forecast period owing to the increasing investments and advances in research and development. The

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pharmaceutical and biotechnology industries in the Asia Pacific region are likely to contribute significantly to the demand for structural biology and molecular modeling tools. Further, government initiatives and funding for scientific research and biotechnology can positively influence the market.

Region with highest CAGR:

Europe is projected to have the highest CAGR over the forecast period, owing to the continuous advancements, collaborations and partnerships. Government funding, private investments and grants play a significant role in advancing research in structural biology and molecular modeling in the region. Some prominent players in the European market include Dassault Syst?mes, Agile Molecule and Acellera Limited. Further, funding availability and growing emphasis on personalized medicine can impact the growth of the market in europe.

Key players in the market

Some of the key players profiled in the Structural Biology & Molecular Modeling Market include Acellera Limited, Thermo Fisher Scientific Inc, Illumina Inc., Horiba, Chemical Computing Group ULC, Bruker Daltonics, Agilent Technologies Inc., Charles River Laboratories, Dassault Systemes, Biomax Informatics AG, Agile Molecule and Bioinformatic LLC.

Key Developments:

In November 2023, The Accelra Company released a new version of ACEMD, Accela's molecular dynamics simulation software. ACEMD is a highly optimized molecular dynamics (MD) engine that runs on NVIDIA GPUs. It's free for non-profit research, but commercial licenses are available for other uses.

In September 2023, Thermo Scientific launched the new Hydra Bio Plasma-Focused Ion Beam (Plasma-FIB) for cell biologists seeking simplified workflows while undertaking volume electron microscopy for cryo or resin-embedded samples. The Hydra Bio Plasma-FIB is a versatile, multi-application instrument that supports volume electron microscopy and sample preparation for the cryo-electron tomography workflow.

Products Covered:

- Reagents & Kits

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- Instruments
- Consumables
- Other Products

Tools Covered:

- Software as a Service (SaaS) & Standalone Modeling
- Visualization & Analysis
- Databases
- Other Tools

Technologies Covered:

- Electron Microscopy
- Nuclear Magnetic Resonance (NMR) Spectroscopy
- Computational Modeling
- Other Technologies

Applications Covered:

- Drug Development
- Drug Discovery
- Other Applications

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  - Italy
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  - Spain
  - Rest of Europe
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  - China
  - India
  - Australia
  - New Zealand
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  - Rest of Asia Pacific

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Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

Market share assessments for the regional and country-level segments

Strategic recommendations for the new entrants

Covers Market data for the years 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)

Strategic recommendations in key business segments based on the market estimations

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- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

- Company Profiling
  - Comprehensive profiling of additional market players (up to 3)
  - SWOT Analysis of key players (up to 3)
- Regional Segmentation
  - Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)
- Competitive Benchmarking
  - Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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