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Global Inhalable Biologics Market Size Study, By Type (Peptides & Proteins, Monoclonal Antibodies, RNAi-based Therapeutics, Vaccines), By Application (Respiratory Diseases, Diabetes, Cancer), By Dosage Form (Dry Powder Inhalers, Metered Dose Inhalers, Nebulizers), By Distribution Channel (Hospital Pharmacies, Retail Pharmacies, Online Pharmacies), and Regional Forecasts 2022-2032

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Abstracts

The global inhalable biologics market was valued at USD 3.22 billion by 2023 and is projected to grow significantly, reaching USD 13.85 billion by 2032, with a compound annual growth rate (CAGR) of 17.6% over the forecast period from 2024 to 2032. This rapid expansion is fueled by the rising prevalence of respiratory diseases, growing demand for non-invasive drug delivery, and advancements in inhalable biologic formulations.

As respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD), and cystic fibrosis continue to rise globally, the demand for inhalable biologics as an effective and patient-friendly therapeutic option is increasing. The Centers for Disease Control and Prevention (CDC) reports that asthma affects approximately 24.9 million Americans, leading to over 900,000 emergency visits annually. Traditional treatments, such as inhaled corticosteroids and immunotherapy, have limitations, driving innovation in inhalable monoclonal antibodies, peptides, and RNAi-based therapeutics.

The market is also witnessing significant investments from key players such as Ocugen,

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Moderna, Pfizer-BioNTech, and AstraZeneca, who are advancing inhalable biologic formulations, including mucosal and inhaled vaccines. In January 2025, Ocugen, Inc. announced FDA clearance for a Phase 1 trial for OCU500, an inhaled and intranasal COVID-19 vaccine, reinforcing the industry's commitment to inhalable drug delivery platforms.

In addition, inhalable insulin therapies such as Afrezza (developed by MannKind Corporation) are gaining regulatory approvals worldwide. Afrezza's rapid onset of action within 12 minutes, mimicking natural insulin responses, has improved patient compliance and convenience. With a rising global diabetes burden, non-injectable solutions like inhaled biologics are becoming increasingly popular, driving adoption across healthcare systems.

Expanding Research and Innovations in Inhalable Biologics

The development of inhalable biologics is transforming the landscape of respiratory therapies, with biologics now accounting for 30% of the respiratory drug pipeline. Traditionally, small molecules dominated respiratory treatments, but the industry is shifting toward protein-based therapies due to their enhanced efficacy and patient adherence.

One of the most promising innovations includes the creation of inhalable mRNA medicines using lipid nanoparticles (LNPs). Recent studies published in the Journal of the American Chemical Society in November 2024 demonstrated the stability of nebulized mRNA delivery in animal models, marking a breakthrough in gene therapy for respiratory conditions such as cystic fibrosis.

Additionally, Lonza and other pharmaceutical manufacturers are investing in spray-drying protein formulations for pulmonary drug delivery, aiming to eliminate cold chain requirements and improve global accessibility. These advancements in formulation technologies and respiratory drug delivery platforms are expected to drive substantial market growth in the coming years.

Market Growth Driven by Strategic Acquisitions and Collaborations

The inhalable biologics industry is witnessing increased mergers and acquisitions, with major pharmaceutical firms acquiring biotech companies to expand their inhalable drug portfolios. Strategic collaborations between drug manufacturers and inhalation technology developers are fostering the development of next-generation inhaled

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therapies.

For example, in December 2024, MannKind Corporation and Cipla Ltd. received regulatory approval for Afrezza in India, further expanding access to inhaled insulin treatments in emerging markets. Similarly, Ab Initio Pharma's participation in the Drug Delivery to the Lungs (DDL) Conference in December 2024 showcased its advancements in intranasal mRNA delivery and inhaled oligonucleotide formulations.

The growing preference for inhalable biologics over traditional injectable therapies, along with increasing regulatory support, is expected to accelerate market adoption.

Regional Insights: Strong Growth in North America and Emerging Markets in Asia-Pacific

North America dominates the inhalable biologics market, accounting for the largest revenue share (38.69%) in 2024. The high prevalence of respiratory diseases, diabetes, and cancer, along with robust biopharma investments and early FDA approvals, has positioned the region as a leader in inhalable biologic adoption.

The U.S. inhalable biologics market is expanding rapidly, with major pharmaceutical players such as Pfizer, AstraZeneca, and Moderna investing in inhalable vaccine technologies. The rising demand for monoclonal antibody inhalables and RNAi-based therapeutics has further boosted market growth.

Meanwhile, Asia-Pacific is anticipated to witness the fastest CAGR over the forecast period, driven by growing healthcare investments, increasing adoption of inhaled insulin therapies, and rising prevalence of chronic diseases. Countries like China, India, and Japan are leading the charge, supported by expanding clinical trials and government initiatives promoting inhalable therapies.

Major Market Players Included in This Report:

Kamada Pharmaceuticals

MannKind Corporation

Ab Initio Pharma

Ocugen, Inc.

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CanSino Biologics

AstraZeneca

Pfizer Inc.

Moderna Inc.

Sanofi

Novartis AG

Lonza Group AG

Boehringer Ingelheim

The Detailed Segments and Sub-Segments of the Market Are Explained Below:

By Type:

Peptides and Proteins

Vaccines

Monoclonal Antibodies

RNAi-based Therapeutics

Others

By Application:

Respiratory Diseases

COPD

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Asthma

Cystic Fibrosis

COVID-19

Others

Diabetes

Cancer

Others

By Dosage Form:

Dry Powder Inhalers

Metered Dose Inhalers

Nebulizers

Others

By Distribution Channel:

Hospital Pharmacies

Retail Pharmacies

Online Pharmacies

By Region:

North America

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- U.S.
- Canada
- Mexico

Europe

- UK
- Germany
- France
- Spain
- Italy
- Denmark
- Sweden
- Norway
- Rest of Europe

Asia-Pacific

- China
- India
- Japan
- Australia
- South Korea

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Thailand

Rest of Asia Pacific

Latin America

Brazil

Argentina

Rest of Latin America

Middle East & Africa

Saudi Arabia

South Africa

UAE

Kuwait

Rest of Middle East & Africa

Years Considered for the Study:

Historical Year – 2022

Base Year – 2023

Forecast Period – 2024 to 2032

Key Takeaways:

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Market Estimates & Forecast for 10 years (2022-2032)

Annualized revenue and segment-wise breakdowns

Regional-level market insights

Competitive landscape analysis and market positioning of key players

Emerging treatment innovations and respiratory disease therapeutics trends

Supply-demand trends, investment opportunities, and regulatory outlook

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