

Middle East & Africa In-Vitro Lung Model Market Size and Forecast (2021 - 2031)

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Abstracts

The Middle East & Africa In-Vitro Lung Model Market is projected to grow significantly, reaching an estimated US\$ 30.6 million by 2031, up from US\$ 9.7 million in 2024. This growth reflects a compound annual growth rate (CAGR) of 18.1% from 2025 to 2031, driven by various factors including the rising prevalence of respiratory diseases and advancements in healthcare infrastructure.

Executive Summary and Market Analysis

The in vitro lung model market in the Middle East & Africa is categorized into several regions, including the UAE, Saudi Arabia, South Africa, and the Rest of the Middle East & Africa. The increasing incidence of respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), and lung cancer has created a heightened demand for reliable preclinical models. In vitro lung models provide controlled environments that facilitate the study of disease mechanisms, drug responses, and potential treatments, addressing the urgent need for effective solutions in respiratory health.

Additionally, the growing elderly population, advancements in healthcare infrastructure, and a strong emphasis on ethical research practices are contributing to the market's expansion. The reduction of animal testing in scientific studies is also accelerating the adoption of in vitro models, as researchers seek more humane and effective alternatives.

Strategic Insights

Market Segmentation Analysis

The Middle East & Africa In-Vitro Lung Model Market is segmented by type, application, and end user:

By Type: The market is divided into 3D Models and 2D Models. In 2024, 3D Models held the largest market share due to their ability to better replicate the complex interactions found in living tissues compared to traditional 2D models.

By Application: The market is segmented into Drug Discovery and Toxicology Studies, Physiological Research, Regenerative Medicine, and Others. Drug Discovery and Toxicology Studies accounted for the largest share in 2024, reflecting the critical role of in vitro models in the pharmaceutical industry.

By End User: The market is categorized into Pharmaceutical and Biotechnology Companies, Academic and Research Institutes, and Others. Pharmaceutical and Biotechnology Companies dominated the market in 2024, driven by their need for effective preclinical testing models.

Market Outlook

Two-dimensional (2D) cell cultures, commonly used in cellular biology for disease study and drug screening, are cost-effective and easy to replicate. However, they fail to accurately mimic the complex tumor microenvironment (TME) found in living organisms, which limits their effectiveness in modeling cancer behavior and drug responses. As cancer research progresses, there is a growing reliance on animal models, which, despite their use, often show low success rates in translating preclinical findings into clinical treatments. This has raised concerns about their reliability in predicting human responses.

To overcome these limitations, there is a shift towards more physiologically relevant human in vitro models, particularly 3D cell culture systems such as spheroids, organoids, tumoroids, and microfluidic systems. These models more accurately mimic the TME, gene expression, and drug responses observed in clinical settings, making them essential for validating drug efficacy and enhancing preclinical testing, especially in lung cancer research.

The integration of 3D models into high-throughput drug screening presents challenges, particularly in automating analysis systems. However, the incorporation of artificial

intelligence (AI) and machine learning (ML) into the analysis of 3D models holds significant promise. These technologies can enhance predictive accuracy, automate data processing, and optimize experimental design, allowing researchers to gain deeper insights into tumor biology and progression, personalize treatments, and reduce reliance on animal testing.

Compared to traditional 2D cultures and animal models, 3D models provide superior physiological relevance, making them vital tools for preclinical testing and personalized medicine. By leveraging ML and AI, researchers can extract complex, multidimensional data from these 3D culture systems, improving their accuracy in mimicking human tumor biology. This technological advancement represents a transformative shift in cancer drug development, paving the way for more effective and individualized therapies.

Country Insights

The market is further segmented by country, with Saudi Arabia, South Africa, the United Arab Emirates, and the Rest of the Middle East & Africa. Saudi Arabia held the largest market share in 2024. The prevalence of chronic obstructive pulmonary disease (COPD) in Saudi Arabia has risen significantly, with a 49% increase in age-standardized prevalence from 1990 to 2019. This alarming trend has intensified the demand for advanced research models, as in vitro lung models provide a cost-effective and ethical alternative to animal testing, enabling more efficient studies of disease mechanisms and therapeutic interventions.

Saudi Arabia's Vision 2030 initiative emphasizes healthcare innovation, leading to increased investments in medical research and infrastructure. Institutions like the King Faisal Specialist Hospital and Research Centre and the King Abdullah International Medical Research Center are at the forefront of biomedical research, particularly in respiratory diseases, and are promoting the development of in vitro models.

Company Profiles

Key players in the Middle East & Africa In-Vitro Lung Model Market include Charles River Laboratories International Inc, Lonza Group AG, Merck KGaA, American Type Culture Collection (ATCC), Draper, Inc., PromoCell GmbH, Emulate, Inc., MIMETAS BV, Organovo Holdings Inc, MatTek Corp, CN Bio Innovations Ltd, InSphero AG, Epithelix, AlveoliX AG, and TissUse GmbH. These companies are pursuing various strategies such as expansion, product innovation, and mergers and acquisitions to

enhance their market presence and offer innovative products to consumers.

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