

Microphysiological Systems (Organ-on-a-Chip) Market Forecasts to 2034 – Global Analysis By Product (Single-Organ-on-a-Chip Systems, Multi-Organ (Body-on-a-Chip) Systems, Disease-Specific Chip Models, High-Throughput Screening Platforms, Integrated Organ-on-Chip Workstations, Modular & Customizable Chip Platforms, Other Products), By Organ Type, By Component, By Material, By Application and By Geography

<https://marketpublishers.com/r/MB25B06297BEEN.html>

Date: March 2026

Pages: 200

Price: US\$ 4,150.00 (Single User License)

ID: MB25B06297BEEN

Abstracts

According to Statistics MRC, the Global Microphysiological Systems (Organ-on-a-Chip) Market is accounted for \$307.61 million in 2026 and is expected to reach \$448.33 million by 2034 growing at a CAGR of 35.2% during the forecast period.

Microphysiological Systems (Organ-on-a-Chip) are advanced microfluidic devices that replicate the structure and function of human organs using living cells arranged in engineered environments. These systems simulate physiological conditions such as blood flow, mechanical forces, and cellular interactions, enabling realistic models of organs like the lung, liver, heart, or brain. They are widely used in drug discovery, toxicity testing, and disease modeling. By providing human-relevant biological insights, organ-on-a-chip platforms reduce reliance on animal testing, improve predictive accuracy in preclinical studies, and accelerate pharmaceutical research and personalized medicine development.

Market Dynamics:

Driver:

Rising demand for advanced drug testing

Traditional animal models and 2D cell cultures often fail to replicate human physiological responses, leading to high drug failure rates during clinical trials. Organ-on-a-chip technologies provide microengineered environments that mimic the structure and function of human organs. This enables researchers to better evaluate drug toxicity, efficacy, and pharmacokinetics before clinical testing. Pharmaceutical companies are increasingly adopting these systems to reduce development costs and improve success rates. As the pharmaceutical industry focuses on safer and faster drug development, demand for advanced testing platforms continues to grow.

Restraint:

Lack of standardized validation protocols

Different research institutions and companies often use varied chip designs, cell sources, and testing methodologies. This lack of uniform standards makes it difficult to compare results across laboratories. Regulatory agencies also require consistent validation data before accepting organ-on-chip systems for drug approval processes. Without globally accepted testing frameworks, pharmaceutical companies may hesitate to fully integrate these systems into their pipelines. The need for regulatory clarity and standardized guidelines is therefore critical for widespread market adoption.

Opportunity:

Integration with AI-driven drug discovery

AI technologies can analyze complex biological data generated from microphysiological systems to predict drug responses more accurately. Combining AI with organ-on-chip platforms enables high-throughput screening and improved modeling of disease mechanisms. This approach helps researchers identify promising drug candidates faster while reducing experimental errors. AI-powered analytics can also optimize chip design and experimental parameters. As pharmaceutical companies increasingly adopt digital and data-driven research methods, the synergy between AI and organ-on-chip technology is expected to accelerate innovation.

Threat:

Competition from traditional cell culture models

Conventional methods are widely established, inexpensive, and familiar to researchers across laboratories. Many pharmaceutical companies already have infrastructure and expertise built around 2D and 3D cell culture systems. Transitioning to organ-on-chip platforms may require additional investment in equipment and training. Furthermore, some early-stage research applications may still rely on simpler models that are easier to implement. This ongoing reliance on conventional models may slow the widespread adoption of microphysiological systems.

Covid-19 Impact:

The COVID-19 pandemic had a mixed but overall positive impact on the Microphysiological Systems market. During the pandemic, researchers sought advanced models to study viral infections and evaluate potential therapeutics. Organ-on-chip platforms were used to replicate human lung and immune responses to SARS-CoV-2. This accelerated research interest and investment in microphysiological technologies. However, supply chain disruptions and temporary laboratory shutdowns initially slowed research activities. Funding priorities also shifted toward pandemic-related projects.

The liver-on-a-chip segment is expected to be the largest during the forecast period

The liver-on-a-chip segment is expected to account for the largest market share during the forecast period as the liver plays a crucial role in drug metabolism and toxicity assessment. Pharmaceutical companies prioritize evaluating hepatotoxicity early in the drug development process. Liver-on-chip models closely mimic human liver microarchitecture and biochemical responses. These systems allow researchers to study metabolic interactions and long-term drug effects more accurately than traditional cell cultures. The high incidence of drug-induced liver injury in clinical trials further drives demand for reliable liver models.

The personalized medicine segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the personalized medicine segment is predicted to witness the highest growth rate due to increasing interest in patient-specific treatment approaches. Organ-on-chip platforms can incorporate cells derived from individual patients to model disease conditions more precisely. This enables researchers to evaluate how different

patients respond to specific drugs or therapies. Such capabilities are particularly valuable in complex diseases like cancer and neurological disorders. Pharmaceutical companies and research institutions are increasingly investing in personalized treatment development.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share owing to strong research infrastructure and high investment in biomedical innovation. The region hosts many leading biotechnology firms, pharmaceutical companies, and academic research institutions. Government agencies and private investors actively fund research related to advanced drug testing technologies. Additionally, collaborations between universities and industry players accelerate technological advancements in organ-on-chip platforms. The presence of major market participants further strengthens regional growth.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR driven by increasing pharmaceutical research activities and expanding biotechnology sectors. Countries such as China, Japan, South Korea, and India are investing heavily in life science research infrastructure. Growing collaborations between global pharmaceutical companies and regional research institutions also contribute to market expansion. Governments in the region are supporting innovation through funding programs and biotechnology initiatives. Additionally, the rising demand for advanced drug testing technologies is boosting adoption of organ-on-chip systems.

Key players in the market

Some of the key players in Microphysiological Systems (Organ-on-a-Chip) Market include Emulate, Inc., CN Bio Innovations Ltd., MIMETAS BV, TissUse GmbH, InSphero AG, AxoSim, Inc., Kirkstall Ltd., Nortis Inc., AlveoliX AG, Hesperos, Inc., Cherry Biotech, Altis Biosystems, NETRI, Draper Laboratory and Organovo Holdings, Inc.

Key Developments:

In June 2025, Emulate launched the AVA Emulation System, a high-throughput benchtop instrument that automates the culture, incubation, and real-time imaging of up

to 96 independent Organ-Chip samples simultaneously. The system utilizes the new Chip-Array consumable and is designed to integrate with standard laboratory workflows, reducing consumable costs by four-fold and hands-on time by more than half compared to previous technologies.

In April 2025, CN Bio entered a long-term strategic partnership with Pharmaron to validate and integrate its PhysioMimix® OOC technology into Pharmaron's global R&D platform, focusing on disease modelling, toxicity testing, and ADME studies . The agreement includes the installation of PhysioMimix instruments at Pharmaron's global facilities to co-develop new applications addressing unmet needs in drug discovery.

Products Covered:

Single-Organ-on-a-Chip Systems

Multi-Organ (Body-on-a-Chip) Systems

Disease-Specific Chip Models

High-Throughput Screening Platforms

Integrated Organ-on-Chip Workstations

Modular & Customizable Chip Platforms

Other Products

Organ Types Covered:

Liver-on-a-Chip

Heart-on-a-Chip

Lung-on-a-Chip

Kidney-on-a-Chip

Skin & Barrier Models

Other Organ Types

Components Covered:

Microfluidic Chips

Cell Lines & Organoids

Reagents & Media

Pumps & Flow Controllers

Other Components

Materials Covered:

PDMS

Thermoplastics

Glass-Based Chips

Silicon-Based Platforms

Hydrogel Matrices

Other Materials

Applications Covered:

Drug Discovery & Screening

Toxicology Testing

Disease Modeling

Personalized Medicine

Other Applications

Regions Covered:

North America

United States

Canada

Mexico

Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

Rest of the World (RoW)

Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

Africa

South Africa

Egypt

Morocco

Rest of 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
- 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:

Microphysiological Systems (Organ-on-a-Chip) Market Forecasts to 2034 – Global Analysis By Product (Single-Org...

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

Contents

1 EXECUTIVE SUMMARY

- 1.1 Market Snapshot and Key Highlights
- 1.2 Growth Drivers, Challenges, and Opportunities
- 1.3 Competitive Landscape Overview
- 1.4 Strategic Insights and Recommendations

2 RESEARCH FRAMEWORK

- 2.1 Study Objectives and Scope
- 2.2 Stakeholder Analysis
- 2.3 Research Assumptions and Limitations
- 2.4 Research Methodology
 - 2.4.1 Data Collection (Primary and Secondary)
 - 2.4.2 Data Modeling and Estimation Techniques
 - 2.4.3 Data Validation and Triangulation
 - 2.4.4 Analytical and Forecasting Approach

3 MARKET DYNAMICS AND TREND ANALYSIS

- 3.1 Market Definition and Structure
- 3.2 Key Market Drivers
- 3.3 Market Restraints and Challenges
- 3.4 Growth Opportunities and Investment Hotspots
- 3.5 Industry Threats and Risk Assessment
- 3.6 Technology and Innovation Landscape
- 3.7 Emerging and High-Growth Markets
- 3.8 Regulatory and Policy Environment
- 3.9 Impact of COVID-19 and Recovery Outlook

4 COMPETITIVE AND STRATEGIC ASSESSMENT

- 4.1 Porter's Five Forces Analysis
 - 4.1.1 Supplier Bargaining Power
 - 4.1.2 Buyer Bargaining Power
 - 4.1.3 Threat of Substitutes
 - 4.1.4 Threat of New Entrants

- 4.1.5 Competitive Rivalry
- 4.2 Market Share Analysis of Key Players
- 4.3 Product Benchmarking and Performance Comparison

5 GLOBAL MICROPHYSIOLOGICAL SYSTEMS (ORGAN-ON-A-CHIP) MARKET, BY PRODUCT

- 5.1 Single-Organ-on-a-Chip Systems
- 5.2 Multi-Organ (Body-on-a-Chip) Systems
- 5.3 Disease-Specific Chip Models
- 5.4 High-Throughput Screening Platforms
- 5.5 Integrated Organ-on-Chip Workstations
- 5.6 Modular & Customizable Chip Platforms
- 5.7 Other Products

6 GLOBAL MICROPHYSIOLOGICAL SYSTEMS (ORGAN-ON-A-CHIP) MARKET, BY ORGAN TYPE

- 6.1 Liver-on-a-Chip
- 6.2 Heart-on-a-Chip
- 6.3 Lung-on-a-Chip
- 6.4 Kidney-on-a-Chip
- 6.5 Skin & Barrier Models
- 6.6 Other Organ Types

7 GLOBAL MICROPHYSIOLOGICAL SYSTEMS (ORGAN-ON-A-CHIP) MARKET, BY COMPONENT

- 7.1 Microfluidic Chips
- 7.2 Cell Lines & Organoids
- 7.3 Reagents & Media
- 7.4 Pumps & Flow Controllers
- 7.5 Other Components

8 GLOBAL MICROPHYSIOLOGICAL SYSTEMS (ORGAN-ON-A-CHIP) MARKET, BY MATERIAL

- 8.1 PDMS
- 8.2 Thermoplastics

- 8.3 Glass-Based Chips
- 8.4 Silicon-Based Platforms
- 8.5 Hydrogel Matrices
- 8.6 Other Materials

9 GLOBAL MICROPHYSIOLOGICAL SYSTEMS (ORGAN-ON-A-CHIP) MARKET, BY APPLICATION

- 9.1 Drug Discovery & Screening
- 9.2 Toxicology Testing
- 9.3 Disease Modeling
- 9.4 Personalized Medicine
- 9.5 Other Applications

10 GLOBAL MICROPHYSIOLOGICAL SYSTEMS (ORGAN-ON-A-CHIP) MARKET, BY GEOGRAPHY

- 10.1 North America
 - 10.1.1 United States
 - 10.1.2 Canada
 - 10.1.3 Mexico
- 10.2 Europe
 - 10.2.1 United Kingdom
 - 10.2.2 Germany
 - 10.2.3 France
 - 10.2.4 Italy
 - 10.2.5 Spain
 - 10.2.6 Netherlands
 - 10.2.7 Belgium
 - 10.2.8 Sweden
 - 10.2.9 Switzerland
 - 10.2.10 Poland
 - 10.2.11 Rest of Europe
- 10.3 Asia Pacific
 - 10.3.1 China
 - 10.3.2 Japan
 - 10.3.3 India
 - 10.3.4 South Korea
 - 10.3.5 Australia

- 10.3.6 Indonesia
- 10.3.7 Thailand
- 10.3.8 Malaysia
- 10.3.9 Singapore
- 10.3.10 Vietnam
- 10.3.11 Rest of Asia Pacific
- 10.4 South America
 - 10.4.1 Brazil
 - 10.4.2 Argentina
 - 10.4.3 Colombia
 - 10.4.4 Chile
 - 10.4.5 Peru
 - 10.4.6 Rest of South America
- 10.5 Rest of the World (RoW)
 - 10.5.1 Middle East
 - 10.5.1.1 Saudi Arabia
 - 10.5.1.2 United Arab Emirates
 - 10.5.1.3 Qatar
 - 10.5.1.4 Israel
 - 10.5.1.5 Rest of Middle East
 - 10.5.2 Africa
 - 10.5.2.1 South Africa
 - 10.5.2.2 Egypt
 - 10.5.2.3 Morocco
 - 10.5.2.4 Rest of Africa

11 STRATEGIC MARKET INTELLIGENCE

- 11.1 Industry Value Network and Supply Chain Assessment
- 11.2 White-Space and Opportunity Mapping
- 11.3 Product Evolution and Market Life Cycle Analysis
- 11.4 Channel, Distributor, and Go-to-Market Assessment

12 INDUSTRY DEVELOPMENTS AND STRATEGIC INITIATIVES

- 12.1 Mergers and Acquisitions
- 12.2 Partnerships, Alliances, and Joint Ventures
- 12.3 New Product Launches and Certifications
- 12.4 Capacity Expansion and Investments

12.5 Other Strategic Initiatives

13 COMPANY PROFILES

13.1 Emulate, Inc.

13.2 CN Bio Innovations Ltd.

13.3 MIMETAS BV

13.4 TissUse GmbH

13.5 InSphero AG

13.6 AxoSim, Inc.

13.7 Kirkstall Ltd.

13.8 Nortis Inc.

13.9 AlveoliX AG

13.10 Hesperos, Inc.

13.11 Cherry Biotech

13.12 Altis Biosystems

13.13 NETRI

13.14 Draper Laboratory

13.15 Organovo Holdings, Inc.

List Of Tables

LIST OF TABLES

Table 1 Global Microphysiological Systems (Organ-on-a-Chip) Market Outlook, By Region (2023-2034) (\$MN)

Table 2 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Product (2023–2034) (\$MN)

Table 3 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Single-Organ-on-a-Chip Systems (2023–2034) (\$MN)

Table 4 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Multi-Organ (Body-on-a-Chip) Systems (2023–2034) (\$MN)

Table 5 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Disease-Specific Chip Models (2023–2034) (\$MN)

Table 6 Global Microphysiological Systems (Organ-on-a-Chip) Market, By High-Throughput Screening Platforms (2023–2034) (\$MN)

Table 7 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Integrated Organ-on-Chip Workstations (2023–2034) (\$MN)

Table 8 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Modular & Customizable Chip Platforms (2023–2034) (\$MN)

Table 9 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Other Products (2023–2034) (\$MN)

Table 10 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Organ Type (2023–2034) (\$MN)

Table 11 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Liver-on-a-Chip (2023–2034) (\$MN)

Table 12 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Heart-on-a-Chip (2023–2034) (\$MN)

Table 13 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Lung-on-a-Chip (2023–2034) (\$MN)

Table 14 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Kidney-on-a-Chip (2023–2034) (\$MN)

Table 15 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Skin & Barrier Models (2023–2034) (\$MN)

Table 16 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Other Organ Types (2023–2034) (\$MN)

Table 17 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Component (2023–2034) (\$MN)

Table 18 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Microfluidic

Chips (2023–2034) (\$MN)

Table 19 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Cell Lines & Organoids (2023–2034) (\$MN)

Table 20 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Reagents & Media (2023–2034) (\$MN)

Table 21 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Pumps & Flow Controllers (2023–2034) (\$MN)

Table 22 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Other Components (2023–2034) (\$MN)

Table 23 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Material (2023–2034) (\$MN)

Table 24 Global Microphysiological Systems (Organ-on-a-Chip) Market, By PDMS (2023–2034) (\$MN)

Table 25 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Thermoplastics (2023–2034) (\$MN)

Table 26 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Glass-Based Chips (2023–2034) (\$MN)

Table 27 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Silicon-Based Platforms (2023–2034) (\$MN)

Table 28 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Hydrogel Matrices (2023–2034) (\$MN)

Table 29 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Other Materials (2023–2034) (\$MN)

Table 30 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Application (2023–2034) (\$MN)

Table 31 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Drug Discovery & Screening (2023–2034) (\$MN)

Table 32 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Toxicology Testing (2023–2034) (\$MN)

Table 33 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Disease Modeling (2023–2034) (\$MN)

Table 34 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Personalized Medicine (2023–2034) (\$MN)

Table 35 Global Microphysiological Systems (Organ-on-a-Chip) Market, By Other Applications (2023–2034) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Rest of the World (RoW) are also represented in the same manner as above.

I would like to order

Product name: Microphysiological Systems (Organ-on-a-Chip) Market Forecasts to 2034 – Global Analysis By Product (Single-Organ-on-a-Chip Systems, Multi-Organ (Body-on-a-Chip) Systems, Disease-Specific Chip Models, High-Throughput Screening Platforms, Integrated Organ-on-Chip Workstations, Modular & Customizable Chip Platforms, Other Products), By Organ Type, By Component, By Material, By Application and By Geography

Product link: <https://marketpublishers.com/r/MB25B06297BEEN.html>

Price: US\$ 4,150.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/MB25B06297BEEN.html>