

# **Organ-on-chip Market Report by Offering (Products, Services), Type (Liver, Heart, Lung, Kidney, and Others), Application (Physiological Model Development, Drug Discovery, Toxicology Research), End Use (Pharmaceutical and Biotechnology Companies, Academic and Research Institutes, Cosmetics Industry, and Others), and Region 2024-2032**

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## **Abstracts**

The global organ-on-chip market size reached US\$ 61.6 Million in 2023. Looking forward, IMARC Group expects the market to reach US\$ 541.8 Million by 2032, exhibiting a growth rate (CAGR) of 26.5% during 2024-2032. The market is driven by its critical role in enhancing pharmaceutical R&D, stimulated by technological advancements, collaborative efforts, and increasing regulatory and ethical emphasis on reducing animal testing through more accurate and humane alternatives in medical research.

Organ-on-chip Market Analysis:

**Major Market Drivers:** The organ-on-chip market is expanding rapidly, driven by the need for more accurate and ethical research methods in pharmaceuticals and biotechnology.

**Key Market Trends:** Technological advancements such as 3D bioprinting and microfluidics are revolutionizing organ-on-chip models, increasing their accuracy and applicability.

**Geographical Trends:** North America leads the market, supported by robust research infrastructure and proactive regulatory policies; however, Europe and Asia-Pacific are

quickly catching up due to rising investments in biotech.

**Competitive Landscape:** Some of the major market players in the organ-on-chip industry include Allevi Inc., Altis Biosystems, AxoSim, BiomimX S.r.l., Elveflow, Emulate Inc., InSphero, MIMETAS, Nortis Inc., TARA Biosystems Inc., TissUse GmbH., etc. among many others.

**Challenges and Opportunities:** While technological complexities and high costs pose challenges, the growing shift towards personalized medicine and the expansion into multi-organ models present significant organ-on-chip market opportunities.

**Organ-on-chip Market Trends:**

**Pharmaceutical Research and Development Enhancement**

The organ-on-chip market potential is greatly increased because it can dramatically enhance drug development and discovery. These techniques provide a more precise simulation of how human organs respond compared to conventional 2D cell cultures, and animal models and hence they help to reduce the time taken in drug testing and development. This innovation, thus, offers unparalleled prediction accuracy, essential for decreasing the duration, cost, and failure rates during drug discovery. As a result, pharmaceutical organizations are starting to integrate organ-on-chip technologies into their R&D processes to narrow the gap, leading to the advancement of personalized and precise medicine and higher therapeutic success rates. Besides, this shift produces the prospect of many quick drug approvals which partly cover the cost of those that failed in the final stage.

**Technological Innovations and Collaborations**

Continuous technological advancements are one of the major stimuli that are transforming the organ-on-chip industry. The manufacturing of chips capable of replicating several organ systems' functionalities at the same time is a more complete analysis tool, covering the first stage of preclinical testing and bringing clinical trials closer to the population. The inventions being made include incorporating microfluidics, 3D printing of cells within multi-dimensional structures, and automated imaging which allows for better functionality and scalability of organ-on-chip systems. Furthermore, associations between biotech firms, research institutions, and technology specialists have formed a strategic environment for cross-disciplinary studies that, in turn, results in fast improvements in this field. These collaborations are vital to overcoming technical issues and improving applications, as well as promoting various sectors like toxic things testing, disease modeling, and precision medicine. For instance, Organ-on-chip (OOC) technology revolutionizes traditional in vitro ADME and toxicity tests by offering a more

accurate predictive model, enhancing drug development with an estimated growth rate of 15% annually. Incorporating multi-organ systems, OOC platforms enhance pharmacokinetic and pharmacodynamic studies, providing insights into the time and dose-dependent effects of drug molecules. Based on organ-on-chip market revenue, these advanced technology, projected to reach a market size of \$220 million by 2025, outperforms conventional 2D cultures with its precise flow control and rapid sample processing, making it essential for efficacy studies and toxicity evaluations.

### Regulatory and Ethical Shifts

Ethical issues and stricter regulations concerning the application of animals in scientific research are additionally stimulating the growth of the organ-on-chip industry. Agencies and departments all around the world are coming to recognize the value of these technologies in providing more relevant data than animal models. This is what is being promoted by endeavors such as the USFDA's Organ-on-Chip program. Therefore, this transition is consistent with the growing public and governmental push for animal-friendly investigation techniques. Organ-on-chip technologies, not only qualifying for higher regulatory standards, are also ethically warranted, since they can promote a paradigm shift towards more human and scientifically advanced research techniques. This ethical standpoint is getting an increasing role in wider approval for organ-on-chip devices to be used in research and development.

### Organ-on-chip Market Segmentation:

IMARC Group provides an analysis of the key trends in each segment of the market, along with forecasts at the global, regional, and country levels for 2024-2032. Our report has categorized the market based on offering, type, application, and end use.

### Breakup by Offering:

Products

Services

The report has provided a detailed breakup and analysis of the market based on the offering. This includes products and services.

### Breakup by Type:

Liver

Heart

Lung  
Kidney  
Others

Lung holds the largest share of the industry

A detailed breakup and analysis of the market based on the type have also been provided in the report. This includes the liver, heart, lung, kidney, and others. According to the report, lung accounted for the largest market share.

According to the organ-on-chip market trend, the lung-on-chip is the most expanded due to its high application in respiratory studies and drug discovery. This technology is suitable for modeling the complex structure and function of the human lung to provide a dynamic platform for respiratory diseases, drug response evaluation, and inhaled substances toxicity assessment. Its role in the process of speeding up the development of personalized therapies for different lung diseases, such as asthma and chronic obstructive pulmonary disorder (COPD), is truly emphasized. Lung-on-chip model leads to a more reliable and ethical replacement of animal testing, hence the assurance of drug efficacy and safety to the authorities, which is a prerequisite for successful market entry. This shifts drug discovery and biotechnology to the leadership role in this area, continuing and increasing the organ-on-chip market share.

Breakup by Application:

Physiological Model Development  
Drug Discovery  
Toxicology Research

Drug discovery represents the leading market segment

The report has provided a detailed breakup and analysis of the market based on the application. This includes physiological model development, drug discovery, and toxicology research. According to the report, drug discovery represented the largest segment.

As per the organ-on-chip market overview, drug discovery is the largest segment for all phases of drug development. This is because the segment has such a key transforming way of developing the processes of pharmaceutical products. Organ-on-chip systems can mimic human organs' responses under various conditions in a way that otherwise

would be impossible, allowing scientists to do early screenings for a prospective drug. This ability of the computer successfully enables us to estimate how those drugs will be affected by the human tissues, which in turn creates a step in the right direction of the efficacy and safety test process. It therefore follows that the drug discovery time frame is greatly shortened, and the clinical trial costs and risk become lower. The broadening utilization of these technologies by a pharmaceutical company indicates a great opportunity in this area to make drug hunting faster but not only, less costly and in line with better regulatory requirements for safety and effectiveness.

#### Breakup by End Use:

- Pharmaceutical and Biotechnology Companies
- Academic and Research Institutes
- Cosmetics Industry
- Others

Pharmaceutical and biotechnology companies exhibit a clear dominance in the market

A detailed breakup and analysis of the market based on the end use have also been provided in the report. This includes pharmaceutical and biotechnology companies, academic and research institutes, cosmetics industry, and others. According to the report, pharmaceutical and biotechnology companies accounted for the largest market share.

The pharmaceutical and biotechnology companies account for the largest market share. This superiority is mainly caused by the increased usage of micro-organ models in the drug discovery and development phases of these industries. The organ-on-chip companies use technology to copy human body functions and its responses to a higher level than conventional methods which use animal experimenting and 2D cell cultures. Improved capacities to match human organ functions and interact in a laboratory setting provide better detection of drug efficacy and toxicity at an early stage of development. It not only improves the prospects of success in the clinical trials but also decreases the time and cost involved in the process of commercialization of a new drug. Being that pharmaceutical and biotechnology company are constantly in search of inventive ways that will accelerate the research and development process, the utilization of organ-on-chip technologies is anticipated to keep increasing, therefore making this segment the largest one in the market and creating a positive organ-on-chip market outlook.

#### Breakup by Region:

North America  
United States  
Canada  
Asia-Pacific  
China  
Japan  
India  
South Korea  
Australia  
Indonesia  
Others  
Europe  
Germany  
France  
United Kingdom  
Italy  
Spain  
Russia  
Others  
Latin America  
Brazil  
Mexico  
Others  
Middle East and Africa

North America leads the market, accounting for the largest organ-on-chip market share

The report has also provided a comprehensive analysis of all the major regional markets, which include North America (the United States and Canada); Europe (Germany, France, the United Kingdom, Italy, Spain, Russia, and others); Asia Pacific (China, Japan, India, South Korea, Australia, Indonesia, and others); Latin America (Brazil, Mexico, and others); and the Middle East and Africa. According to the report, North America represents the largest regional market for organ-on-chip.

According to the organ-on-chip market report, the largest segment here is North America. This superiority comes from a strong research infrastructure, good funding of the biotechnology and pharmaceutical industry, and the exemplary support given to innovative healthcare solutions by the government and the private sector North

American confident leadership in the market is further fortified by the existence of leading universities and research institutions that always drive the frontiers of the medical fieldwork with the Increasing organ-on-chip demand in technologies. Other than that, the area fosters an already existing regulatory framework that provides high adoption opportunities of cutting-edge tools for drug development and personalized medicine which include organ-on-chip. The dominance of these economic entities is what pushes other players to innovate the development and deployment of such technologies contribute to the regional prominence in the global market. This active and advanced veterinary system provides organ-on-chip market growth models which makes these models in use in medical research and pharmaceutical testing.

#### Competitive Landscape:

The market research report has also provided a comprehensive analysis of the competitive landscape in the market. Detailed profiles of all major companies have also been provided. Some of the major market players in the organ-on-chip industry include:

Allevi Inc.  
Altis Biosystems  
AxoSim  
BiomimX S.r.l.  
Elveflow  
Emulate Inc.  
InSphero  
MIMETAS  
Nortis Inc.  
TARA Biosystems Inc.  
TissUse GmbH

(Please note that this is only a partial list of the key players, and the complete list is provided in the report.)

Major players in the organ-on-chip industry keep improving and broadening their technological arsenals by different means, including research and development, cooperation, and mergers and acquisitions. According to organ-on-chip recent developments businesses aim to develop more specific and versatile organ-on-chip models capable of simulating human physiology more precisely for drug testing and disease modeling. The pragmatic cooperation is responsible for the quick product commercialization of new technologies in addition to broadening the microfluidic systems' application scope in personalized medicine, safety pharmacology, and



complex biological research, which consequently fortifies their market positions. According to the organ-on-chip market forecast, strategic collaborations with pharmaceutical companies, academic institutions, and technology providers are creating a positive outlook for the market.

#### Organ-on-chip Market News:

On March 7, 2023, Allevi, a pioneer in 3D bioprinting, adopted this transformative technology for its ability to accurately mimic human biological systems in animal-free research. Its expanding applications in drug discovery, regenerative and translational medicine, and preclinical research highlight the significant potential of this platform.

On January 23, 2024, CN Bio and Altis Biosystems partnered to create an advanced human Gut/Liver in vitro model for improved ADME studies, leveraging their organ-specific expertise for more accurate predictions. This next-generation Organ-on-a-Chip solution is available early through CN Bio's Contract Research Services.

On October 24, 2023, AxoSim, Inc., a leader in biomimetic human drug discovery platforms for neurological diseases, has completed its acquisition of microBrain™ assets from Vyant Bio's StemoniX subsidiary. This move enhances AxoSim's capabilities in advancing neurological research.

#### Key Questions Answered in This Report

1. What was the size of the global organ-on-chip market in 2023?
2. What is the expected growth rate of the global organ-on-chip market during 2024-2032?
3. What are the key factors driving the global organ-on-chip market?
4. What has been the impact of COVID-19 on the global organ-on-chip market?
5. What is the breakup of the global organ-on-chip market based on the type?
6. What is the breakup of the global organ-on-chip market based on the application?
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