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Global 3D Printed Organ Market - 2024 -2031

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Abstracts

Market Overview

The Global 3D printed organ market reached US$ 2.41 billion in 2023 and is expected to reach US$ 6.18 billion by 2031, growing at a CAGR of 12.6% during the forecast period 2024-2031.

A 3D-printed organ is a replica of body tissue created with a 3D bioprinter. They're made out of cellular bio-inks and are artificially grown in a lab. The bioink is designed to help cells build the function and structure of the natural organ it mimics.

Individual patients' distinct anatomical and physiological needs can be addressed using 3D-printed organs. By employing a patient's own cells to construct the organ, the chance of rejection is reduced, resulting in improved outcomes. 3D-printed organs can be used as models to research diseases and test novel medications. This skill enables researchers to gain a better understanding of how diseases affect human tissues and design more effective treatments without having to rely on animal experimentation.

Market Dynamics: Drivers & Restraints

Increasing Prevalence of Chronic Diseases

Chronic disorders such as diabetes, hypertension, and kidney disease are major causes of organ failure. As these disorders become more common around the world, the number of patients seeking organ transplants increases. For instance, there are currently over 103,000 persons on the national transplant waiting list in the United States, with one added every eight minutes, underlining the urgent need for novel approaches like 3D-printed organs to meet this demand.

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3D-printed organs can be made from a patient's own cells, increasing biocompatibility and significantly reducing the possibility of transplant rejection. This personalization is especially advantageous for individuals suffering from chronic diseases since it enables individualized treatment options closely aligned with their physiological needs. By addressing compatibility difficulties, 3D-printed organs can boost transplant success rates and patient well-being.

Regulatory Challenges

Regulatory bodies require significant safety and efficacy evidence before approving new medical items. Because 3D-printed organs are custom-made for each patient, typical testing methods such as randomized controlled trials may be ineffective. Each organ is unique, making it difficult to predict outcomes from one example to the next, raising questions about the dependability of safety statistics. The inability to test organs on other people before implantation hampers regulatory evaluations.

Meeting regulatory criteria can be excessively expensive, particularly for bioprinting startups and smaller organizations. Extensive study, testing, and paperwork are required to establish compliance with safety regulations, which may discourage investment and limit innovation. The cost difficulty of navigating regulatory processes may limit the number of market participants.

Market Segment Analysis

The global 3D printed organ market is segmented based on type, material, fixation type, technology, end-user and region.

Type:

Kidney segment is expected to dominate the 3D-printed organ market share

The kidney segment is likely to dominate the 3D printed organ market due to several compelling factors, including increasing demand for innovative organ transplantation options, rising number of individuals with chronic kidney diseases and others. Kidney transplants account for a substantial share of organ transplant treatments worldwide. For instance, according to the United Network for Organ Sharing, in 2022, 42,887 organ transplants were performed in the United States, an increase of 3.7 percent over 2021.

The significant shortage of suitable donor kidneys is a pressing issue, with over 110,000

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people on waiting lists for organ transplants in the United States. Many patients have lengthy waits for a qualified donor, which might last many years. This scarcity emphasizes the urgent requirement for alternative alternatives, such as 3D-printed kidneys, which could be an appealing choice for patients who would otherwise face long wait times or rely on dialysis treatments.

Recent advancements in bioprinting technologies are focused on tackling the complex structures of kidneys, which improves the chances of successfully creating these engineered organs for transplantation. Researchers are consistently improving methods to accurately replicate the intricate functions of kidneys, which is essential for developing organs that can perform the necessary biological tasks effectively.

Market Geographical Share

North America is expected to hold a significant position in the 3D-printed organ market share

North America is at the forefront of the 3D printed organ market, driven by a combination of a strong healthcare system, significant investments in research and development, and an increasing demand for organ transplants. The region has a well-established healthcare infrastructure that supports advanced medical research and innovation, facilitating the integration of cutting-edge technologies like 3D printing into clinical practice. This environment enables rapid advancements in the fabrication of organs.

Moreover, substantial investments from both government and private sectors are directed towards advancing bioprinting technologies in North America. These investments are crucial for developing innovative solutions to address the complexities involved in organ printing, including enhancing bioink formulations and refining printing techniques.

Rising government initiatives to meet the rising demand for organs are also contributing to the overall region’s market growth. For instance, In March 2024, the Advanced Research Projects Agency for Health (ARPA-H), an agency within the U.S. Department of Health and Human Services (HHS), announced the Personalized Regenerative Immunocompetent Nanotechnology Tissue (PRINT) program. The PRINT program aims to create a process to enable biofabrication of the kidney, heart, and liver by leveraging 3D bioprinting, cell manufacturing, biomaterials, modeling, and tissue engineering. The goal is to use patient cells or a biobank to quickly produce immune matched

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replacement organs and restore normal organ function. These factors are expected to contribute to the region's market growth.

Asia-Pacific is growing at the fastest pace in the 3D-printed organ market

Asia-Pacific is expected to experience the fastest growth in the global 3D-printed organ market. This is due to rising technological advancement, increasing research and capabilities, and rising funding from the government.

The region faces a significant demand for organ transplants. For instance, according to the publication by Taipei Times in 2022, organ donor registrations dropped by 48 percent during the COVID-19 pandemic, Taiwan Organ Sharing Registry and Patient Autonomy Promotion Center data show. As of the end of June, more than 10,000 people were waiting to receive an organ transplant, including 8,254 people waiting for a kidney, 1,002 people waiting for a liver, 217 people waiting for a heart, 93 people waiting for a lung, and 89 people waiting for a pancreas. Thus, the above factors are rising the region's growth.

Market Competitive Landscape

The major global players in the 3D-printed organ market include CELLINK, Organovo Holdings Inc., CYFUSE BIOMEDICAL K.K., 3D Systems, Inc., Stratasys, United Therapeutics Corporation, Prellis Biologics, CollPlant Biotechnologies Ltd., Aspect Biosystems Ltd. and Materialise among others.

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The global 3D printed organ market report delivers a detailed analysis with 60+ key tables, more than 50 visually impactful figures, and 176 pages of expert insights, providing a complete view of the market landscape.

Target Audience 2024

Manufacturers: Pharmaceutical, Medical Device, Biotech Companies, Contract Manufacturers, Distributors, Hospitals.

Regulatory & Policy: Compliance Officers, Government, Health Economists, Market Access Specialists.

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