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Patient-Derived Xenograft Model Market Size and Forecasts (2021 - 2031), Global and Regional Share, Trend, and Growth Opportunity Analysis Report Coverage: By Model Type (Mice Models and Rats Models), Tumor Type (Gastrointestinal Tumor Models, Gynecological Tumor Models, Respiratory Tumor Models, and Other Tumor Models), Application (Preclinical Drug Development, Biomarker Analysis, Translational Research, and Biobanking), End User (Pharmaceutical and Biotechnology Companies, Contract Research Organizations, and Academic and Government Research Institutions), and Geography (North America, Europe, Asia Pacific, Middle East & Africa, and South & Central America)

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Abstracts

The patient-derived xenograft model market size is expected to grow from US$ 468.75 million in 2024 to US$ 1,119.36 million by 2031; it is projected to register a CAGR of 13.5% during 2025-2031. The rising prevalence of cancer and growing demand for personalized medicine are noteworthy factors contributing to the expansion of the patient-derived xenograft model market size. Additionally, the hybrid models combining PDX with organoids and 3D cultures are projected to bring new patient-derived xenograft model market trends in the near future.

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Hybrid modalities combine the best features of PDXs' in vivo fidelity with organoids' fast, scalable 3D culturing, thus facilitating cost-efficient, ethically acceptable alternatives that have the potential to both preclinical oncology research and personalized medicine. These hybrids, commonly known as PDX-derived organoids (PDXOs), basically entail taking tumors from the PDX mice and producing 3D organoid cultures in an extracellular matrix such as Matrigel. This tandem keeps the genetic and phenotypic variation intact, at the same time allowing the long-term growth of these cultures for high-throughput screening. It is in pancreatic ductal adenocarcinoma (PDAC) where Huang et al. illustrated that PDXO models are not only a reflection of in vivo drug responses but also the producers of such biomarkers as CA19-9 that activate EGFR signaling and thus oncogenesis. Through a study of neoadjuvant FOLFIRINOX-treated patients, organoids were able to mirror the therapy resistance with a 90% agreement to clinical outcomes, thus achieving better results than 2D cultures that lose tumor heterogeneity after passaging.

The case of lung cancer demonstrates the clinical relevance of this trend. Kim et al. created patient-derived organoids (PDOs) from primary lung tissues that accurately resembled the originals both histologically and genomically. The drug sensitivity tests for erlotinib, crizotinib, and olaparib were in 80-95% accordance with genomic predictions and PDX validations, thus personalized regimens are getting fast-tracked. Likewise, colorectal cancer hybrids like GFP-labeled PDX-derived organoids from Okazawa et al., facilitate micrometastasis detection not only in the liver but in the lungs as well, thus uncovering the lesions less than 2 mm that are missed by standard histopathology and are therefore indispensable for metastasis studies, which are responsible for 90% of cancer deaths.

Organoid-PDX hybrids are segmented as a key model type alongside tumor explants and genetically engineered variants, and are expected to emerge as a significant trend in the patient-derived xenograft model market.

End User-Based Insights

Based on end user, the patient-derived xenograft model market is segmented into pharmaceutical and biotechnology companies, academics and research institutes, and contract research organizations. The pharmaceutical and biotechnology companies segment held the largest patient-derived xenograft model market share in 2024. Pharmaceutical and biotechnology firms are a major end-user segment that has been instrumental in using these cutting-edge preclinical tools to shorten the time from lab to clinical outcomes in oncology drug development. PDX models that are directly taken

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from patient tumor tissues and then implanted into immunodeficient mice retain the genetic and phenotypic heterogeneity of human cancers and so have better predictive accuracy than cell line xenografts. To give an example, companies as Pfizer and Roche employ PDX technologies to rapidly test the effectiveness of new targeted therapies, i.e., kinase inhibitors for non-small cell lung cancer, thus enabling the first identification of responsive patient subgroups and lowering the risk of clinical failure in the last stages.

The increase in this segment is driven by numerous factors that are highly interrelated. Rising worldwide cancer incidence—expected to be the cause of more than 20 million new cases per year by 2030—is the main factor that intensifies the need for personalized medicine approaches, in which PDX models serve as a tool for biomarker validation and co-clinical trials that reflect patient responses. AstraZeneca's collaborations with academic biobanks for PDX repositories are one of the examples of the many partnerships that are helping to pool resources and accelerate the R&D pipelines, with more than 1,000 PDX lines now being accessible for commercial purposes. As biotech firms innovate in CAR-T and antibody-drug conjugates, PDX's role in de-risking high-stakes investments drives sustained market momentum, thereby fueling the patient-derived xenograft model market growth.

The World Health Organization and the National Center for Chronic Disease Prevention and Health Promotion are among the primary and secondary sources referred to while preparing the patient-derived xenograft model market report.

Reason to buy

Save and reduce time carrying out entry-level research by identifying the growth, size, leading players and segments in the global Patient-Derived Xenograft Model market.

Highlights key business priorities in order to assist companies to realign their business strategies

The key findings and recommendations highlight crucial progressive industry trends in the global Patient-Derived Xenograft Model market, thereby allowing players across the value chain to develop effective long-term strategies

Develop/modify business expansion plans by using substantial growth offering developed and emerging markets

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Scrutinize in-depth global Patient-Derived Xenograft Model market trends and outlook coupled with the factors driving the market, as well as those hindering it.

Enhance the decision-making process by understanding the strategies that underpin commercial interest with respect to client products, segmentation, pricing and distribution

The List of Companies - Patient-Derived Xenograft Model Market

Charles River Laboratories International Inc.

Noble Life Sciences

Crown Bioscience Inc.

Experimental Pharmacology & Oncology Berlin-Buch GmbH

Hera Biolabs

WuXi AppTec Co Ltd

Oncodesign Services

BioDuro LLC

XenTech SAS

Shanghai LIDE Biotech. Co. Ltd.

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