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Patient-derived Xenograft Model Market Forecasts to 2030 – Global Analysis By Model Type (Mice Models and Rat Models), Tumor Type (Gastrointestinal Tumors, Gynecological Tumors, Respiratory Tumors and Other Tumor Types), Implantation Method (Subcutaneous and Orthotopic), Application, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Patient-derived Xenograft Model Market is accounted for $494.3 million in 2024 and is expected to reach $1102.3 million by 2030 growing at a CAGR of 14.3% during the forecast period. An experimental system known as a patient-derived xenograft (PDX) model involves implanting tumor tissues from human patients into immunocompromised mice. This model is a useful tool for cancer research because it maintains the original tumor's genetic and phenotypic features. Compared to conventional cell line models, PDX models provide a more realistic depiction of human cancer and are utilized to investigate tumor biology, test therapeutic medications, and create personalized medicine strategies.

According to Dana-Farber Cancer Institute study, 16 out of 29 patients with advanced sarcoma successfully established PDX models.

Market Dynamics:

Driver:

Rising demand for personalized medicine

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The rising demand for personalized medicine is driving the patient-derived xenograft (PDX) model market. PDX models enable researchers to study patient-specific cancer biology and drug responses, making them essential for tailoring treatments to individual genetic profiles. This approach improves therapeutic efficacy and reduces adverse effects, aligning with the growing focus on precision oncology. The increasing prevalence of cancer and advancements in genomics further amplify the need for personalized medicine.

Restraint:

High costs of development and maintenance

Establishing and sustaining PDX models require significant financial resources, specialized expertise, and advanced infrastructure. The complex processes involved in tumor implantation and maintenance limit accessibility for smaller research organizations. Additionally, the high cost of immunodeficient animals and human tumor samples further increases expenses. These financial barriers pose challenges to widespread adoption.

Opportunity:

Advancements in cancer research

Advancements in cancer research are creating opportunities for the PDX model market. Innovations such as CRISPR-based gene editing, AI-driven data analysis and humanized PDX models are enhancing the accuracy and efficiency of preclinical studies. These advancements allow researchers to explore novel therapeutic targets, improve biomarker discovery, and accelerate drug development processes. Additionally, increasing public and private investments in oncology research are driving demand for advanced PDX models.

Threat:

Ethical concerns and regulatory challenges

Ethical concerns and regulatory challenges threaten the growth of the PDX model market. The use of animals in research raises ethical issues, leading to stringent guidelines that can delay or restrict studies. Regulatory agencies like the FDA have introduced measures to reduce reliance on animal models, potentially affecting market

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dynamics. These challenges necessitate compliance with complex protocols, increasing operational costs and timeframes for research organizations.

Covid-19 Impact:

The COVID-19 pandemic negatively impacted the PDX model market due to disruptions in laboratory operations, supply chains, and research funding. Many oncology studies were delayed as resources were diverted toward COVID-19 research. However, the pandemic underscored the importance of personalized medicine, highlighting the relevance of PDX models in cancer research. As restrictions eased, demand rebounded with renewed focus on innovative cancer therapies.

The mice models segment is expected to be the largest during the forecast period

The mice models segment is expected to account for the largest market share during the forecast period. Mice are widely used due to their genetic similarity to humans, ease of handling, and cost-effectiveness compared to other animals. They provide a robust platform for studying tumor growth, drug efficacy, and resistance mechanisms in vivo. The availability of well-established protocols for mice-based PDX models further supports their dominance in preclinical oncology research.

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

Over the forecast period, the biobanking segment is expected to witness the highest CAGR due to its role in preserving patient-derived tumor samples for future use. Biobanks enable researchers to access diverse tumor specimens for developing new PDX models and conducting retrospective studies. This capability accelerates drug discovery processes while ensuring reproducibility in experiments. The growing emphasis on personalized medicine drives demand for biobanking services as an essential component of preclinical research infrastructure.

Region with largest share:

The North America region is anticipated to account for the largest market share during the forecast period. Factors such as a high prevalence of cancer, advanced healthcare infrastructure, and significant public-private investments in oncology research drive regional growth. The presence of key industry players further strengthens North America's position as a leader in PDX model adoption. Additionally, government

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initiatives supporting precision medicine also contribute significantly to this dominance.

Region with highest CAGR:

The Asia Pacific region is anticipated to register the highest growth rate over the forecast period. Rapid urbanization, increasing healthcare expenditure, and rising cancer incidence drive demand for advanced research tools like PDX models in this region. The shift toward modern healthcare practices positions Asia Pacific as a key growth hub. Furthermore, countries like China and India are investing heavily in biotechnology and pharmaceutical R&D, fostering market expansion.

Key players in the market

Some of the key players in Patient-derived Xenograft Model Market include Champions Oncology, Charles River Laboratories, Crown Bioscience, EPO Berlin-Buch, Hera BioLabs, Horizon Discovery Group, Inotiv, JSR Corporation, Oncodesign Precision Medicine, Pharmatest Services, Taconic Biosciences, The Jackson Laboratory, Urolead, WuXi AppTec, Xenopat and Xentech.

Key Developments:

In December 2024, Can-Fite BioPharma Ltd. recently announced that its work titled The Liver Protective Effect of the Anti-Cancer Drug Candidate Namodenoson is mediated via Adiponectin will be presented at the 2025 ASCO Gastrointestinal Cancers Symposium to take place at San Francisco & On Line, January 23-25.

In October 2019, Crown Bioscience announced the launch of a new tumor organoid drug development platform with the potential to significantly improve the predictivity and speed of preclinical drug discovery. The initial phase of the platform launch features the first commercially available 3D in vitro PDX-derived organoid (PDXO) models generated from CrownBio’s uniquely-characterized library of 2500+ patient-derived xenograft (PDX) models.

In May 2015, Taconic Biosciences and Cellaria Biosciences have entered into a scientific collaboration designed to improve the utility of patient-derived xenografts (PDXs) in animal models for oncology and immuno-oncology research. Cellaria’s novel methodologies for generating cells from patient tumors will complement Taconic’s industry-leading portfolio of tissue humanized mouse models, which are said to be well suited as hosts for PDXs.

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Model Types Covered:

- Mice Models
- Rat Models

Tumor Types Covered:

- Gastrointestinal Tumors
- Gynecological Tumors
- Respiratory Tumors
- Breast Cancer Tumors
- Hematological Tumors
- Urological Tumors
- Neurological Tumors
- Other Tumor Types

Implantation Methods Covered:

- Subcutaneous
- Orthotopic

Applications Covered:

- Preclinical Drug Development
- Biomarker Analysis

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- Biobanking
- Translational Research

End Users Covered:

- Pharmaceutical & Biotechnology Companies
- Academic & Research Institutions
- Contract Research Organizations

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France
  - Spain
  - Rest of Europe

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- Asia Pacific
  - Japan
  - China
  - India
  - Australia
  - New Zealand
  - South Korea
  - Rest of Asia Pacific
- South America
  - Argentina
  - Brazil
  - Chile
  - Rest of South America
- Middle East & Africa
  - Saudi Arabia
  - UAE
  - Qatar
  - South Africa
  - Rest of Middle East & Africa

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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 2022, 2023, 2024, 2026, and 2030
- 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:

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

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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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