



INDUSTRY TRENDS REPORT

HEALTHCARE, BIOTECH AND PHARMA SECTOR STARTUPS IN THE GENETICS

INDUSTRY











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EXECUTIVE SUMMARY

Technology is transforming the way we interact with our bodies and health, and recent advances have moved human augmentation beyond science fiction into reality. It now represents a powerful set of technologies designed to extend human potential—restoring lost functions or enhancing performance beyond natural limits. While exoskeletons, neural implants, and digital interfaces illustrate the convergence of biology, engineering, and medicine, the most profound progress is unfolding at the genomic level.

The genome has become the new frontier of healthcare and augmentation. Advances in gene editing, regenerative medicine, and synthetic biology are moving from research into clinical applications. mRNA therapeutics are reshaping prevention and treatment, while next-generation sequencing (NGS) and Aldriven analytics are making personalized medicine more precise and widely accessible.

Pharmaceuticals are the cornerstone of this transformation. The sector's two core categories—small molecule drugs and biopharmaceuticals (biopharma)—are no longer confined to illness management. Instead, they are enabling genetic therapies that restore or enhance function, engineered tissues that integrate with the body, and biological-digital interfaces that redefine how medicine interacts with human biology. In doing so, small molecules and biopharma have become the living layer of genomic innovation that makes augmentation not just mechanical or digital, but profoundly human.

Behind this pharmaceutical-led revolution is biotechnology, which has been central to the development of advanced therapies such as monoclonal antibodies, gene therapies, cell therapies, and RNA-based treatments.

Advances in biotech, combined with the sector's essential role, have fueled strong investor interest. As a result, pharmaceuticals capture a large share of venture capital within the healthcare ecosystem.

Funding dynamics, however, have evolved. The end of the pandemic triggered a return to normal capital flows, but the cyclical nature of innovation has also influenced this trend. Major breakthroughs often spark surges of investment, while the long and uncertain timelines of R&D naturally create slower phases in between.

A further shift can be seen in capital allocation by innovation area. Small molecule drugs now attract more investment than cell and gene therapies (CGT) due to their shorter development timelines, lower costs, and proven scalability.

Beyond technology, geography has become an increasingly important factor in funding decisions. Established pharma hubs—such as Boston, Cambridge (UK), Basel, Shanghai, and Singapore—bring together universities, hospitals, research institutions, skilled talent, and industry networks, creating environments where startups are more likely to secure funding and scale successfully.

Being located in such ecosystems, especially with university roots, allows startups to access cutting-edge research and emerging technologies, helping them transform the pharmaceutical industry. This model has proven highly effective, with many of today's leading pharma and biotech firms originating in innovation hubs.

Finally, while most startups have traditionally specialized in a single therapeutic area, a growing number of startups are now building platforms to tackle multiple diseases. This scalable model provides broader opportunities for innovation and commercial growth, positioning these companies at the frontier of the industry's next wave.





The pharmaceutical industry is a key part of the life sciences sector, responsible for discovering, developing, producing, and marketing medicines. It is divided into two main categories: small molecule drugs and biopharmaceuticals (biopharma).

Small molecule drugs are mostly made through chemical synthesis and form the majority of approved medicines. Biopharma, on the other hand, uses living sources to create advanced therapies such as monoclonal antibodies, gene therapies, cell therapies, RNA-based treatments, among others. Such therapies, while growing fast, currently represent a smaller though increasingly active component of the market.

Both categories depend on advanced sciences and technologies — including biotechnology, bioinformatics, and artificial intelligence — to develop therapies for a wide range of diseases. But because biopharma products come from living systems, they rely more heavily on biotechnology as compared to the small molecule drugs.

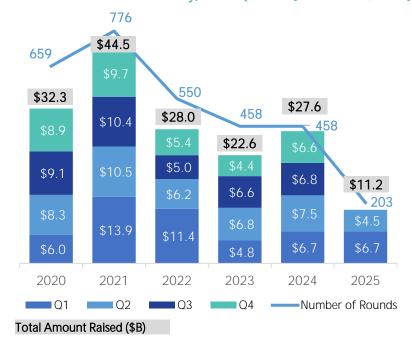
Advances in biotechnology have therefore been central to the growth of the pharmaceutical industry, especially the biopharma segment.

These advances have allowed companies to develop more precise and often personalized treatments that traditional medicines cannot match.

In addition, industry growth is supported by global trends, such as **aging populations** and the **rising prevalence of chronic diseases**. The **COVID-19 pandemic** further drove the market growth by highlighting the importance of biopharma explicitly, with **mRNA vaccines emerging as the most effective treatment**.

These factors, combined with the sector's essential role, have attracted strong investor interest, with pharmaceuticals securing a large share of venture capital within healthcare.

Pharma Venture Deal Activity, 2020-Q2'2025 [Deal value in \$ billion]



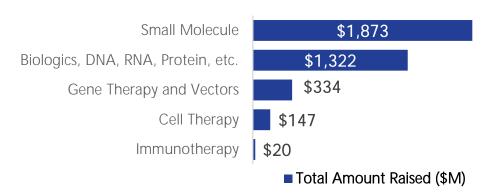
Funding peaked in 2021 at USD 44.1 billion across 776 deals, fueled by the urgency of the pandemic and optimism about biotech breakthroughs. From 2022 onward, however, investment slowed as the pandemic subsided, valuations corrected, and investor sentiment cooled. By 2023, funding had returned to pre-pandemic levels, signaling a period of normalization.

While the end of the pandemic triggered a return to normal capital flows, the cyclical nature of innovation also influenced this trend. Breakthroughs often spark investment surges, while the long and uncertain timelines of R&D lead to slower phases in between.

As of 2025, the funding outlook is mixed. In the first quarter (Q1), startups raised USD 6.7 billion, up from 2024 levels. But by the second quarter, funding dropped 40% to USD 4.5 billion, as compared to the second quarter of 2024. The deal counts also fell by around 20%. This decline reflects a wider venture capital trend, where firms have narrowed down their focus to a few specific segments to manage risks tied to U.S. tariff policies and rising global political tensions.

Another notable trend is the shift in capital allocation by innovation area. In the past, cell and gene therapies (CGT) attracted most venture funding. More recently, however, investment seems to have shifted toward small molecules.

Top Pharma Technologies for Venture, Q2'2025 [Deal value in \$ billion]



Therefore, venture capital (VC) investors favored small molecule drugs in Q2 2025 because they typically have shorter development timelines, clearer regulatory pathways, lower production costs, and broader applicability across diseases. They also have a proven record of commercial success and scalability, making them a more predictable and less capital-intensive investment compared to CGT.

As a result, small molecule companies received the most funding in Q2 2025, raising about USD

1.9 billion. Biologics startups came second at USD1.3 billion, while gene therapy, cell therapy, and immunotherapy firms together raised only USD334 million.

Nonetheless, the innovation is continuing in CGT. New companies are still emerging, and more therapies are gaining approvals despite the funding slowdown.

Beyond technology and innovation areas, geography is also becoming an increasingly important factor in funding decisions.



With investors more cautious, the **location of startups** now plays a critical role in determining investment attractiveness and growth potential. While strong science remains key, being **based in an established pharma hub** gives investors added confidence.

This is because established hubs bring together world-class universities, hospitals, research institutions, skilled talent, and industry networks — creating environments where startups are more likely to secure funding and scale successfully.

Examples of leading **pharma hubs** can be seen worldwide. In **North America**, cities such as **Boston–Cambridge**, **the San Francisco Bay Area**, **San Diego**, **and Toronto** stand out, supported by strong research institutions, clinical trial centers, leading universities, established pharmaceutical companies, and venture investors. In **Europe**, key hubs include **Basel**, **Cambridge (UK)**, **Munich**, and **Paris**

In **Asia**, cities like **Shanghai**, **Tokyo**, **Seoul**, **and Singapore** are becoming major centers for **clinical**

trials, manufacturing, and digital health technologies. At the same time, emerging hubs are developing in places such as Hyderabad (India), Melbourne (Australia), Taipei (Taiwan), and Bangkok (Thailand). These ecosystems are particularly active in early-stage research and testing, reflecting their rapidly growing pharma capabilities.

The strength of these hubs comes from **close collaboration across the value chain** — universities, hospitals, startups, investors, and big pharma working side by side.

In fact, this highly collaborative environment has been a key cornerstone of many of today's growing pharma startups. **DNAnexus, for example, was founded at Stanford University** to manage large-scale DNA data. **Genomics plc** originated from the University of Oxford, with a focus on population genetics. **Alia Therapeutics, based in Italy**, was founded at the **University of Trento** to work on gene editing. **ElevateBio and Ultima Genomics** also have academic roots and are now major players in the biopharma space.



Being located in such ecosystems and having university roots allows startups to access cutting-edge research and emerging technologies, helping them transform the pharmaceutical industry.

Many of these companies are applying breakthroughs in gene editing, next-generation sequencing (NGS), and multi-omics (the study of DNA, RNA, proteins, and more together) to develop therapies with far greater precision. Others are using advanced technologies like artificial intelligence (AI) and machine learning (ML) to create new methods of drug discovery. In practice, they are able to produce treatments that are faster to develop, more affordable, and in some cases, entirely new approaches to treating disease.

Furthermore, these technologies are not only being used as stand-alone tools but also as **unified platforms**, unlocking synergies that **offer broader opportunities and greater scalability**. One example is **Kriya**, which is building a gene therapy platform with its own manufacturing system. This integrated model helps lower costs, speed up timelines, and expand applications — targeting not just rare diseases, but also common conditions where gene therapy has barely been used.

Overall, this ecosystem-centric model has proven highly successful, with many of today's publicly listed pharmaceutical firms starting out in innovation hubs.

For example, **Illumina** began in 1998 through a collaboration between Tufts University and a VC firm, and is now a global leader in genetics. **Beam Therapeutics**, founded in 2017 from MIT and Harvard programs, is now an established

gene editing company. Others, like **Genenta** and **Nuvectis**, started small and are now publicly listed, advancing cancer and rare disease therapies.

And as this landscape continues to evolve, startups operating out of innovation hubs will continue to be at the forefront of translating breakthrough science into real-world solutions.

These innovation hubs are quickly becoming launchpads for technologies that once seemed impossible. Exoskeletons, neural implants, and brainmachine interfaces are now rapidly moving from lab concepts to real-world use. Yet the most powerful breakthroughs are happening deep within the body – at the genomic level. There, new tools are enabling us not just to treat disease, but to reshape the building blocks of life.

The future of biopharma—and of human augmentation as a whole—is being shaped by bold, science-driven startups that combine deep research, cutting-edge technologies, and rapid execution to deliver better medicines and transformative solution.

What comes next isn't just progress, it's a complete rethinking of what's biologically possible. The line between therapy and enhancement is blurring, leading to a future where the limits of human potential may no longer be set by nature, but by design.

The following profiles highlight some of these notable startups that not only reflect these trends but also demonstrate the **diverse strategies**, **therapeutic areas**, **and platform approaches** shaping the next wave of **pharmaceutical innovation**.







AAV	Adeno-Associated Virus	CNV	Copy Number Variation
ABCA4	ATP Binding Cassette Subfamily A Member 4	CRISPR	Clustered Regularly Interspaced Short Palindromic Repeats
ACE	Artificial Intelligence Classification Engine	СТА	Clinical Trial Application
ACMG	American College of Medical Genetics and Genomics	DMPK	Drug Metabolism and Pharmacokinetics
ADMET	Absorption, Distribution, Metabolism, Excretion, and Toxicity	DNA	Deoxyribonucleic Acid
adRP	Autosomal Dominant Retinitis Pigmentosa	EHR	Electronic Health Record
Al	Artificial Intelligence	FDA	Food and Drug Administration
АМР	Association for Molecular Pathology	FSGS	Focal Segmental gGlomerulosclerosis
API	Application Programming Interface	GDPR	General Data Protection Regulation
ASCO	American Society of Clinical Oncology	Gen-Al	Generative AI
АТР	Adenosine Triphosphate	Gene Therapy	A therapeutic approach that treats genetic diseases by correcting or replacing faulty genes within a patient's cells
AWS	Amazon Web Services	Genomics	It is the comprehensive study of an organism's entire genetic material
САР	College of American Pathologists	GHP	Global Health & Pharma
Cas12	CRISPR-associated protein 12	GMP	Good Manufacturing Practice
Cas9	CRISPR-associated protein 9	GPU	Graphics Processing Unit
CCCs	Cation-Chloride Cotransporters	НІРАА	Health Insurance Portability and Accountability Act
CD8+	Cluster of Differentiation 8+	HKEX	Hong Kong Stock Exchange
CE	Conformité Européenne	ICMC	Initiative for Certification of Manufacturing Capabilities
сGMР	Current Good Manufacturing Practice	lgA	Immunoglobulin A
СКВ	Cancer Knowledge Base	IND	Investigational New Drug
СМС	Chemistry Manufacturing and Controls	IPO	Initial Public Offering
CNS	Central Nervous System	iPSCs	Induced Pluripotent Stem Cells

ISLVs	Immune Shielded Lentiviral Vector	ppmSeq	Paired Plus-Minus Sequencing
IVD	In Vitro Diagnostics	R&D	Research and Development
LIMS	Laboratory Information Management System	RGC	Regeneron Genetics Center
LLLMs	Large Language of Life Models	RGNs	RNA-Guided Nucleases
MASH	Metabolic dysfunction-associated steatohepatitis	RNA	Ribonucleic Acid
MIT	Massachusetts Institute of Technology	RNAi	RNA Interference
ML	Machine Learning	SaaS	Software as a Service
ММА	Methylmalonic Acidemia	SCI	Spinal Cord Injury
MRD	Minimal Residual Disease	siRNA	Small Interfering RNA
mRNA	Messenger Ribonucleic Acid	SMV	Single-Nucleotide Variant
MUT enzyme's	Methylmalonyl CoA mutase	SNV	Single-nucleotide Variant
NGS	Next Generation Sequencing	SOC 2	Systems and Organization Controls 2
NICU	Neonatal Intensive Care Unit	SRNS	Steroid-Resistant Nephrotic Syndrome
NK-cell	Natural Killer Cell	SR-Tiget	San Raffaele Telethon Institute for Gene Therapy
NPHS2	Nephrotic Syndrome 2	TNBC	Triple-Negative Breast Cancer
NSCLC	Non-Small Cell Lung Cancer	USPTO	United States Patent and Trademark Office
PAM	Protospacer Adjacent Motif	VAAST	Variant Annotation, Analysis & Search Tool
PCR	Polymerase Chain Reaction	vc	Venture Capital
PGx	Pharmacogenomics	VVP	VAAST Variant Prioritizer
PHEVOR	Phenotype Driven Variant Ontological Re-ranking tool	WES	Whole-Exome Sequencing
PICU	Pediatric Intensive Care Unit	wgs	Whole Genome Sequencing

ABOUT INTESA SANPAOLO INNOVATION CENTER:

Intesa Sanpaolo Innovation Center is the company of Intesa Sanpaolo Group dedicated to innovation: it explores and learns new business and research models and acts as a stimulus and engine for the new economy in Italy. The company invests in applied research projects and high potential start-ups, to foster the competitiveness of the Group and its customers and accelerate the development of the circular economy in Italy.

Based in the Turin skyscraper designed by Renzo Piano, with its national and international network of hubs and laboratories, the Innovation Center is an enabler of relations with other stakeholders of the innovation ecosystem - such as tech companies, start-ups, incubators, research centres and universities - and a promoter of new forms of entrepreneurship in accessing venture capital. Intesa Sanpaolo Innovation Center focuses mainly on circular economy, development of the most promising start-ups, venture capital investments of the management company Neva SGR and applied research

For further detail on Intesa Sanpaolo Innovation Center products and services, please contact businessdevelopment@intesasanpaoloinnovationcenter.com

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