StartUs insights

BioTech

Trend Report

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Innovation Intelligence at Your Fingertips

At **StartUs Insights**, we make the world's information on innovation, emerging companies, and technologies accessible. Our **Big Data & AI-powered Discovery Platform** covers over **2,5 million startups & scaleups globally**, making it the world's leading resource for data on emerging companies.

This technology enables you to identify what's next by quickly and exhaustively scouting startups, scaleups, emerging technologies & trends that matter.

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The BioTech industry is adopting trends like artificial intelligence (AI), data analytics, and automation to optimize production. Consequently, there has been a rise in consumer BioTech or BioTech products targeted directly at customers instead of biopharma or healthcare businesses. While the industry largely still focuses on medicine, startups are working on solutions ranging from food and materials to environmental monitoring. The COVID-19 pandemic really highlighted the far-reaching impact of the BioTech industry, with startups and companies alike developing rapid testing kits, repurposed drugs, and vaccines.

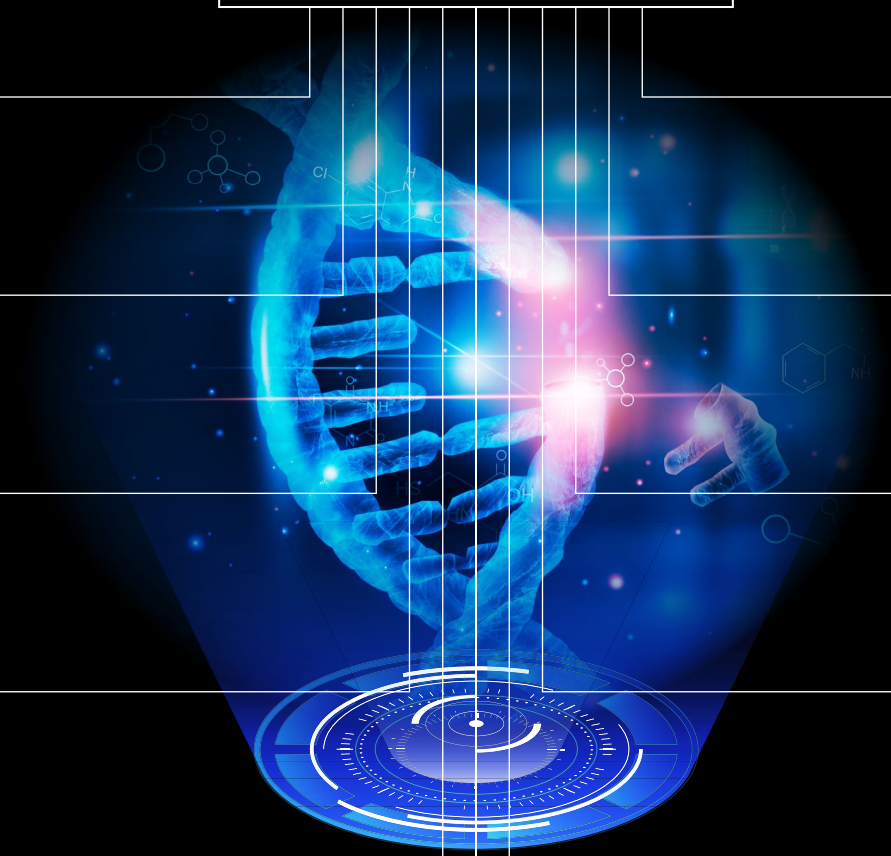
Covering over 2,5 million startups & scaleups globally, we use our Big Data and AI-powered Discovery Platform to identify innovative applications, technologies, and companies impacting the BioTech Industry. This exhaustive, data-driven startup scouting pinpoints emerging trends and technologies in the BioTech Industry. For this research, we analyzed a sample of 4 351 startups and scaleups and present the Top 10 Trends along with 20 highly relevant solutions.

In the Innovation Map below, you get an overview of the Top 10 BioTech Industry Trends & Innovations that impact companies worldwide.

Innovation Map: BioTech

4351
Startups & Scaleups

- Artificial Intelligence
- Big Data
- Gene Editing
- Precision Medicine
- Gene Sequencing



- Biomanufacturing
- Synthetic Biology
- Bioprinting
- Microfluidics
- Tissue Engineering

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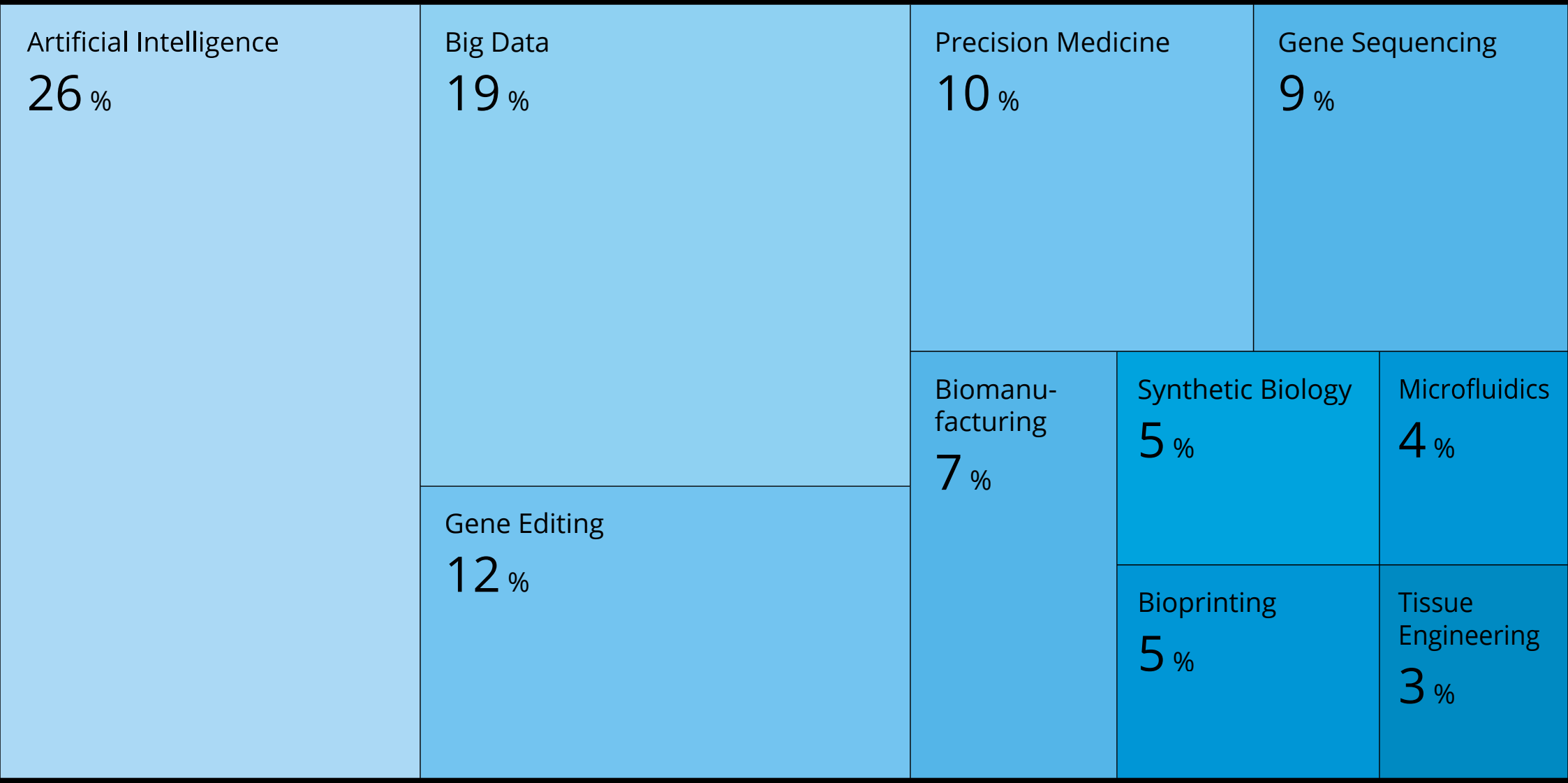
Tree Map: The Impact Of BioTech Industry Trends

Based on the BioTech Innovation Map, the Tree Map below illustrates the impact of the Top 10 BioTech Industry Trends. BioTech startups & scaleups leverage AI, big data, and analytics to interpret the massive amounts of biological data available now to speed up innovation in the industry. Gene sequencing and gene editing technologies allow companies to understand genomes and engineer them for commercial purposes.

This facilitates applications in precision medicine and synthetic biology, with the latter employing DNA synthesis as well. Biomanufacturing enables sustainable and scalable manufacturing of a wide range of products. Lastly, startups utilize bioprinting, microfluidics, and tissue engineering to re-invent what a BioTech product means – with offerings ranging from cultured meat and artificial organs to miniaturized labs.

Top 10 BioTech Industry
Trends & Innovations



StartUs insights | This tree map illustrates the top 10 innovation trends & their impact on the BioTech Industry

Global Startup Heat Map: BioTech Startups & Emerging Companies

The Global Startup Heat Map below highlights the global distribution of the 4.351 exemplary startups & scaleups that we analyzed for this research. Created through the StartUs Insights Discovery Platform, the Heat Map reveals that the US is home to most of these companies while we also observe increased activity in Europe, particularly in France.

Below, you get to meet 20 out of these 4.351 promising startups & scaleups as well as the solutions they develop. These 20 startups were hand-picked based on criteria such as founding year, location, funding raised, and more. Depending on your specific needs, your top picks might look entirely different.

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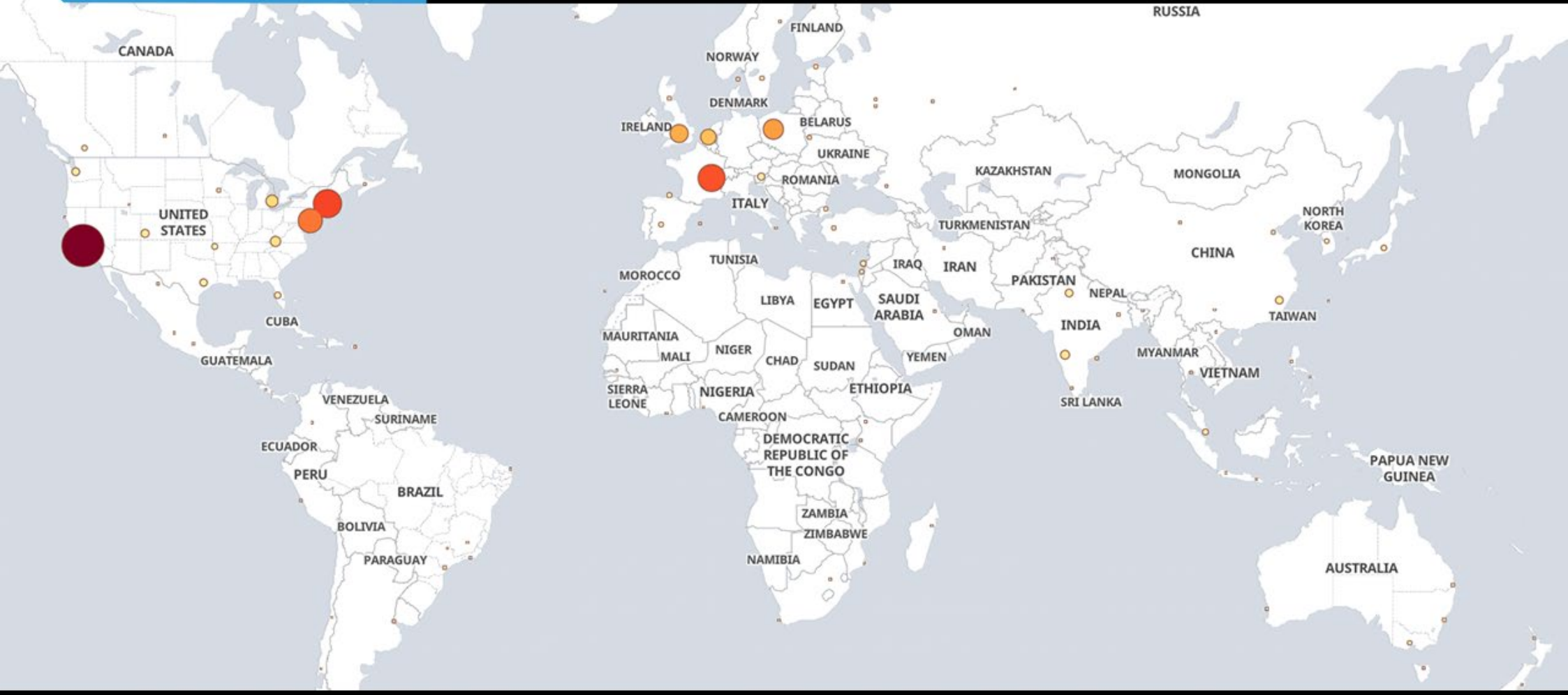
4351

STARTUPS ANALYZED

Global Startup Heat Map: BioTech



This Global Startup Heat Map illustrates the geographical distribution of 4351 startups & emerging companies we analyzed for this topic

Artificial Intelligence

AI enables BioTech startups to automate a wide range of processes, helping them scale up their operations. For instance, biopharma startups leverage AI to speed up the drug discovery process, screening biomarkers as well as scraping through the scientific literature to discover novel products. Image classification algorithms allow rapid detection of different traits – cancer cells from medical scans and crop disease symptoms from leaf images, for instance. Further, startups are leveraging deep learning to analyze microbiomes, screen phenotypes, and develop rapid diagnostics.

Arpeggio Bio is a US-based startup developing an RNA platform to guide therapeutic development. The startup's solution uses AI to interpret RNA time series data for signaling pathway reconstruction. It turns RNA analysis data into visualizations that provide insights into how drugs affect RNA levels depending on dose, time, and tissue.

Swedish startup DeepTrait uses AI to identify genetic markers. The startup's proprietary deep neural network architectures analyze genomic data to understand the genetic mechanisms of a trait. DeepTrait's solution finds applications in plant and livestock breeding, novel drug design, and the development of diagnostics.

Big Data

There is an unprecedented amount of data available in BioTechnology today, from the ever-growing omics technologies and integration of sensors and the Internet of Things (IoT) devices. Big data & analytics solutions allow BioTech startups to tap into this wealth of data to drive innovation. It allows biopharma companies to recruit patients for clinical trials more effectively. Startups and companies deploy bioinformatics solutions to develop better feed, improve crop and livestock varieties, and explore undiscovered microbes.

German startup BioXplor leverages big data to discover better and safer treatment regimens. It performs network pharmacology analysis to develop treatments from unstructured and disparate data sources. The startup's solution determines the synergistic or antagonistic effects of drug combinations. It also analyzes patient data for responder and non-responder signals, improving patient outcomes and treatment response analysis.

Canadian startup BioBox Analytics develops a genomic data analytics platform. It uses a data library to manage all models, samples, and data and runs bioinformatic pipelines in the cloud. The solution identifies gene enrichment, tissues/cell expression, and ontology. The startup also provides solutions to visualize insights and query papers, datasets, and genes.

Gene Editing

Genetic engineering has come a long way from genetically modifying organisms by random insertion of foreign DNA to making precise edits in genomes. The increased efficiency of gene editing is due to the development of engineered nucleases, and lately CRISPR, as molecular scissors. This opens up applications in gene therapy for the treatment of genetic disorders as well as other conditions, with gene editing techniques adding, replacing, or silencing particular genes. The targeted gene modification also enables the development of better transgenic plants and animals.

PLANTeDIT is an Irish startup producing non-transgenic, genome-edited plant products. The startup uses patented genome editing tools and its in-house transformation technology to enable efficient direct delivery and swift regeneration of genome-edited plants. PLANTeDIT mutates the FAD2 gene in soya to create a high oleic variant. The high oleic oils help food companies lengthen the shelf-life of food items.

US-based startup Plastomics develops a next-generation delivery technology. The startup undertakes breeding with chloroplast engineered traits. Unlike nuclear traits, this leads to more effective trait integration, as well as speeds up time to market. This makes the startup's solution suitable for applications such as modifying photosynthetic pathways and metabolic pathway engineering.

Precision Medicine

The falling costs of gene editing and gene sequencing make them more routinely applied in clinical practice. It enables precision medicine, an approach that allows physicians to determine which treatment and prevention strategies will work for a particular group. Moreover, it enables personalized treatment for the treatment of several diseases, including cancers. Biotech startups are leveraging precision medicine to identify new drug targets, discover novel drugs, offer gene therapies, and develop new drug delivery technologies.

British startup iLoF offers a precise, patient-centric drug development platform. The blood-based platform finds biological nanostructures in liquid dispersions such as plasma. The platform is rapid and non-invasive and facilitates the development of precise and personalized therapies. The start-up's screening test classifies patients for clinical trials.

Dyno Therapeutics is a US-based startup developing AI-powered gene therapies. The startup's CapsidMap platform optimizes adeno-associated viral (AAV) vectors to improve targeting ability. The solution maps the synthetic AAV capsid sequence space to develop better gene therapy vectors.

Gene Sequencing

The costs of DNA sequencing have fallen by 5 orders of magnitude since the early 2000s, opening up a wide range of applications in the industry. The reduced cost of sequencing whole genomes allows the identification of pediatric disorders, personalized treatments, and setting up large cohorts with extensive phenotyping. Sequencing also presents a rapid and inexpensive method to detect the presence of microbes, ranging from detection of pathogens in clinical and dairy samples to beneficial soil microbes. Biotech startups are innovating with new sequencing technologies, as well as novel applications for gene sequencing.

British startup BioClavis offers personalized diagnostics. The startup's TempO-Seq platform enables quick and inexpensive high-throughput profiling of the protein-coding transcriptome. By using defined input sequences, the solution increases the efficiency and needs only 10 % sequencing reads as compared to RNA-Seq. The startup also develops a solution for the rapid and accurate identification of active COVID-19 infections.

Bioskryb is a US-based startup developing ResolveDNA, a whole-genome sequencing workflow. The startup's workflow is compatible with single cells, multiple cells, and low-input DNA samples. BioSkryb also offers the BaseJumper Bioinformatics Platform, compatible with most sequencing platforms, for DNA sequencing analysis.

Biomanufacturing

Biomanufacturing utilizes biological systems for the production of medical products and therapies, biomaterials, food & beverages, and specialty chemicals. Startups are advancing different cell culture, fermentation, and recombinant production technologies to make biomanufacturing inexpensive and scalable. The use of biological raw materials also makes it comparatively more sustainable as compared to other manufacturing paradigms. The industry's production models are also adopting machine learning and automation. By integrating Industry 4.0 models, BioTech startups offer bioprocessing 4.0 to optimize each step of the production process.

US-based startup Proteinea develops an insect-based production platform for next-gen biomanufacturing. The startup InsectaPro technology leverages mass-produced insect larvae as mini-bioreactors for recombinant production. It grows them in data-driven vertical farms, making the process predictable and environmentally sustainable. The solution enables a more scalable and robust alternative to conventional bioreactors.

Deep Branch is a British startup that converts carbon dioxide from industrial emissions into high-value chemicals. It uses a proprietary gas fermentation process to turn captured carbon dioxide into Proton, a single-cell protein. Proton is optimized for use as animal feed and has high protein and vitamin content and an optimal amino acid profile.

Synthetic Biology

An unprecedented ability to read and write genomes allows BioTech startups and companies to develop products faster than ever before. Moreover, synthetic biology offers increased standardization and reproducibility, allowing manipulating organisms at the level of gene networks. Synthetic biology startups work on challenges ranging from computational drug design and cellular agriculture to microbiome-based solutions. Bacterial cell factories provide a high yield of valuable biochemicals for applications in pharma, materials, and food. Moving beyond microbes, startups are developing mammalian synthetic biology solutions as well.

German startup LenioBio develops plant-based, cell-free protein expression solutions. The startup's ALiCE kit produces over 500 proteins with post-translational modifications at a high yield of 3 mg/ml. It simply requires the addition of a gene in a plasmid to the lysate, eliminating the need for multiple pipetting steps. The startup manufactures reporter proteins, antigens, antibodies, allergens, and hormones for use in BioTech and biopharma sectors.

Ribbon Biolabs is an Austrian startup developing new methods for DNA synthesis. The startup's process combines biochemistry, algorithms, and automation to drive precise and multiplexed DNA synthesis. It synthesizes DNA for diverse applications in BioTech, biopharma, and agriculture by building entire genomes or developing libraries for antibody screening. Moreover, it also facilitates DNA-based nanotechnology and storing information or computing with DNA.

Bioprinting

With the introduction of additive manufacturing in Bio-Technology, bioprinting startups offer a wide range of materials and products. These startups utilize bioprinters that work with bio-inks developed from bio-based materials or biomaterials. For medical applications, cells act as substrates and grow around a scaffold. This enables the development of bone, skin, or vascular grafts from the patient's own cells for personalized medicine. Other startups leverage bioprinting for rapid prototyping and the development of biopolymers.

3D Biotechnology Solutions is a Brazilian startup developing bioprinting solutions. Genesis, the startup's bioprinter for 3D biofabrication, serves the needs of researchers working on tissue engineering and regenerative medicine. The startup also offers BioFDM, another printer that performs fused deposition modeling (FDM) with biocompatible polymers.

Italian startup Prometheus offers 3D bioprinting of human tissues with high cell viability. The startup combines cells with biomaterials to create a bio-ink which is then printed layer by layer. The artificial 3D human tissue has a similar composition, functionality, and architecture to that of real human tissue. The startup also develops Ematik Ready, a veterinary patch that promotes wound healing in dogs and horses.

Microfluidics

The interest in microfluidics in the BioTechnology industry stems from the need for lab-on-a-chip (LOC) devices. These miniaturized labs allow inexpensive and rapid testing of infectious diseases, facilitating point-of-care (PoC) diagnostics. Startups are also developing paper-based microfluidics for diagnostics and environmental monitoring. The technology finds more biopharma applications in organ-on-a-chip (OOC) devices that simulate the physiology of organs or organ types on small chips. OOC systems find applications in drug screening and disease modeling.

Eden Tech is a French startup leveraging microfluidics for microfabrication solutions. The startup provides a range of microfluidic equipment and accessories, as well as Flexdym, a biocompatible polymer. It develops high-volume artificial organs for use in the MedTech sector. For cleantech applications, the startup's solutions use smart microchannel networks for ultra-efficient wastewater filtration.

Spanish startup Droplite develops a smart medical diagnostics device. The startup's device combines microfluidics, nanotechnology, surface chemistry, and photonics to analyze immunoassay test cartridges within minutes. The lab-on-a-chip device is under development for diagnostic tests ranging from fertility and allergies to pet diseases.

Tissue Engineering

Tissue engineering startups have grown sharply in number in recent years, thanks in large part to developments in bioprinting and microfluidics. It enables the creation of autologous tissue grafts to treat burns or for organ transplantation, as well as regenerative medicine. Traditionally limited to biomedical applications, startups are engineering tissues to create sustainable alternatives to animal products such as meat or leather. However, this needs to reach an enormous scale for the food products to be cost-comparative to animal-based products.

Aleph Farms is an Israeli startup that produces cultured meat. The startup isolates cells from healthy cows and grows them into an ethical and sustainable meat alternative. It produces indistinguishably real beef steaks without the need for slaughtering animals or producing carbon emissions. The startup's process also offers a way to sustainably grow food in long-term space missions.

US-based startup LyGenesis develops an organ regeneration technology platform. It transforms lymph nodes into functioning ectopic organs, enabling the treatment of dozens of patients from a single donor organ. The startup transplants its cell therapy using outpatient endoscopic ultrasound, eliminating the need for surgery.

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Discover all BioTech Technologies & Startups

These BioTech trends rapidly accelerate research in bio-manufacturing, bioprinting, precision medicine, among other upcoming applications. The industry is adopting Industry 4.0 technologies, whereas developments in the BioTech industry often percolate into the pharma industry. BioTech is essential to sustainability as well, providing eco-friendly alternatives to the production of materials and food and promoting a circular economy by utilization of biomass feedstocks.

The BioTech Industry Trends & Startups outlined in this report only scratch the surface of trends that we identified during our in-depth research. Among others, AI & Big Data will transform the sector as we know it today. Identifying new opportunities and emerging technologies to implement into your business early on goes a long way in gaining a competitive advantage. Get in touch to easily and exhaustively scout relevant technologies & startups that matter to you.

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WHAT OUR PARTNERS SAY

STARTUP CREASPHERE

StartUs Insights provides us with actionable Innovation Intelligence at a glance. Their deliverables are easy to navigate and give us a great understanding of relevant startups. StartUs enables us to identify relevant startups and emerging companies – fast & exhaustively.

Startup Creasphere
Managing Director Digital Startups
Dr. Christian Korz

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Identify What's Next

The [StartUs Insights Discovery Platform](#) covers over **2,5 million startups & scaleups globally** – making it the world's largest resource for data on emerging companies. The SaaS Platform enables you to **easily**, **quickly**, **and exhaustively scout relevant companies**, **technologies**, **& trends** for your innovation activities. This saves your time and increases efficiency, which is why more than 650 leading corporate partners including Samsung, Kyocera, and Nestlé already trust our technology.

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