



Monthly Outlook

Web3 Breakthroughs in Decentralized Science

December, 2024

- **Revolutionizing Science:** DeSci utilizes blockchain to tackle funding gaps, enhance data accessibility, and foster collaboration in research. Supported by leaders like CZ, Vitalik, and a16z, DeSci is accelerating innovation and expanding its presence in the biotech ecosystem.
- **Biotech Growth and Challenges:** The biotech sector shows steady growth, driven by strong revenues and resilient VC funding in areas like immunology and regenerative medicine. However, challenges such as patent expirations and limited early-stage funding pose hurdles, highlighting the need for continued innovation and investment.
- **Decentralized Knowledge Ownership:** Blockchain platforms like ResearchHub and VitaDAO tokenize IP, enabling transparent collaboration, equitable access, and community-driven governance.

Decentralized science (DeSci) utilizes blockchain technology to foster a transparent, community-focused, and incentivized framework for scientific research. It aims to tackle issues in conventional science, including insufficient funding, limited data accessibility, and collaboration restrictions, by safeguarding the authenticity of scientific records and reducing barriers to participation.

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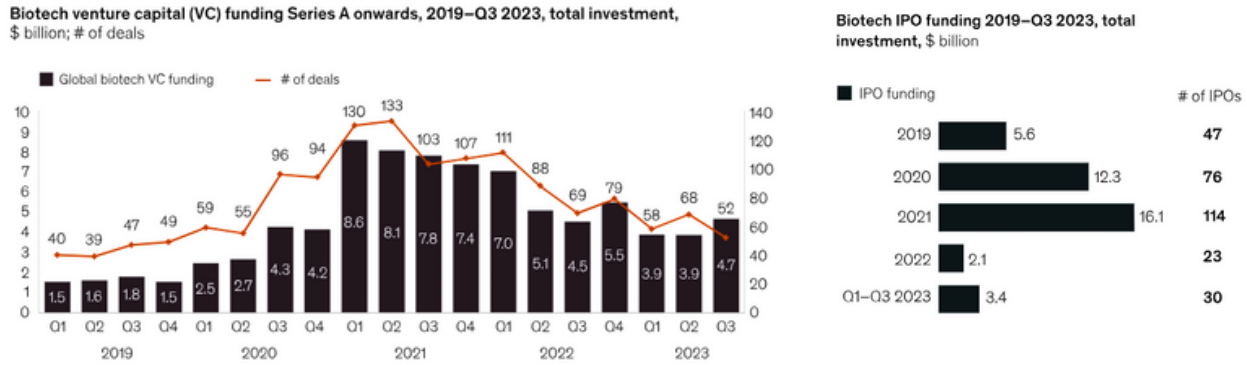
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Binance Labs investment in BIO Protocol marks the rise of the DeSci ecosystem by emphasizing decentralized science as a key innovation driver. Binance founder CZ has highlighted his interest in integrating decentralized technology with biotechnology to advance scientific progress. CZ's collaboration with Ethereum's Vitalik on DeSci discussions has strengthened confidence in this emerging field, spotlighting its transformative potential.

a16z makes its first DeSci investment in AminoChain, marking a significant milestone in decentralized science. AminoChain leverages L2 technology to build a decentralized biobank, enabling transparent and traceable management of biological samples for medical and scientific research. This platform connects researchers and donors, ensuring ownership rights while facilitating secure and efficient data exchange within a decentralized ecosystem.

Biotech Venture Capital: Trends, Resilience, and Emerging Focus Areas

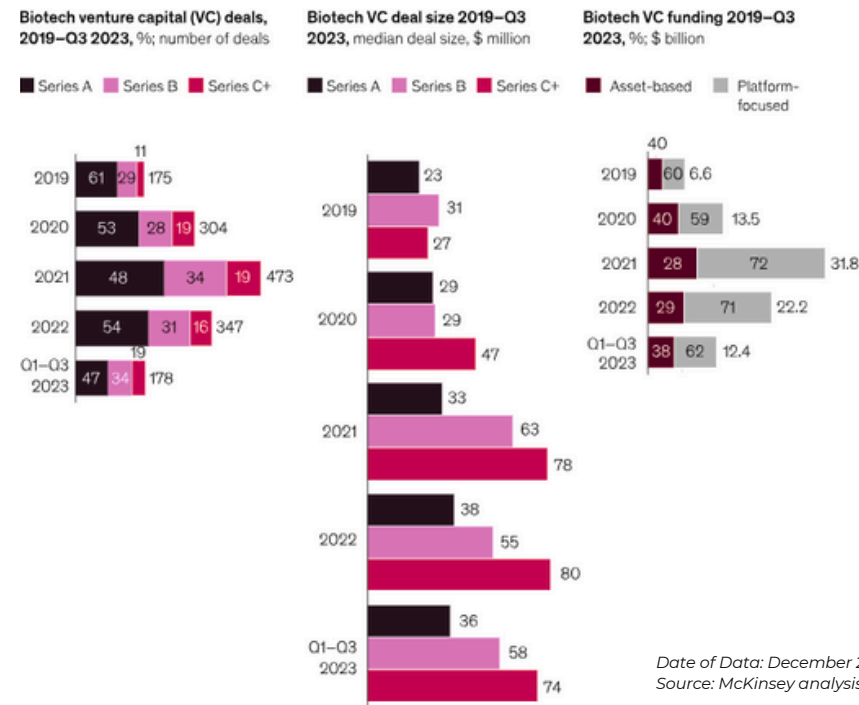
Chart 1: Biotech Venture Capital Funding and Deals: Resilience and Trends



Date of Data: December 2023
 Source: McKinsey analysis based on PitchBook, Inc.

Despite the challenging public-market environment, the number of biotech VC deals remains significantly higher than in 2019, with Series A investments continuing to be active. Substantial investor interest is directed toward platform biotechs, particularly in cutting-edge advancements such as integrating large omics data sets, developing regenerative medicines, and enabling large-scale genomic edits. These trends underscore the enduring role of venture capital in driving transformative innovations in biotech.

Chart 2: Trends in Biotech Venture Capital: Deals, Funding, and Investment Focus



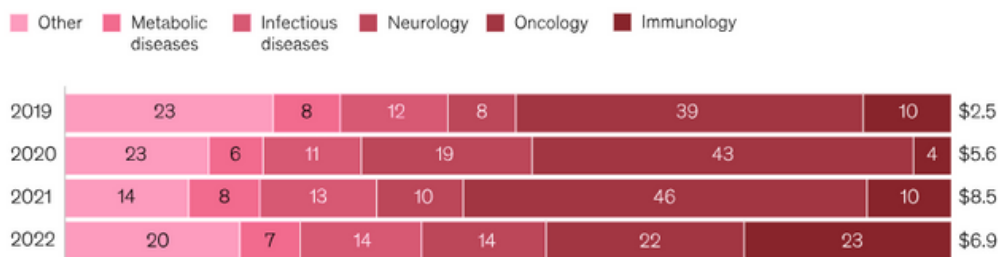
Date of Data: December 2023
 Source: McKinsey analysis based on PitchBook, Inc.

Venture capital (VC) funding in the biotech sector has experienced notable fluctuations in recent years, with a discernible shift towards later-stage investments. In 2022, startups secured over \$22 billion across early- and late-stage rounds, while 2023 saw more than \$12 billion raised through the third quarter. Despite this substantial funding, the number of deals has declined, indicating a concentration of capital into fewer, more mature companies. Notably, Series A funding rounds accounted for nearly half of all deals, highlighting a sustained interest in early-stage innovation.

Trends in asset-based deals

Chart 3: Venture Capital Funding by Therapeutic Focus

Venture capital funding, \$ billion, %



Date of Data: December 2023
 Source: McKinsey analysis based on PitchBook, Inc.

In 2022, asset-based biotechs, which develop specific treatments for particular diseases, accounted for one-third of VC funding. Immunology emerged as a key focus, capturing 23% of asset-based funding—a significant increase from previous years. Several companies in this space raised over \$100 million, reflecting strong interest in regenerative cell therapies aimed at reversing immune-related diseases.

How Web3 Revolutionizes Biotech Funding and Innovation

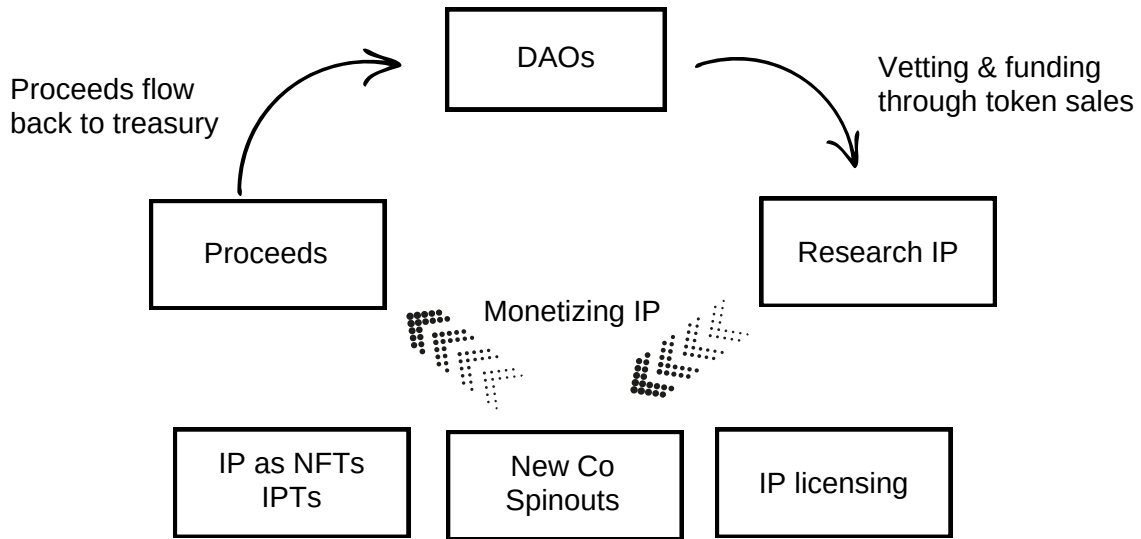
Web3 technologies offer transformative solutions to address these challenges. First, decentralized science (DeSci) and blockchain-enabled decentralized autonomous organizations (DAO) can tackle the funding gap created by declining IPO activity. By democratizing investment, DAOs allow global contributors to pool resources and directly support early-stage and asset-based research. This community-driven funding model reduces dependency on traditional capital markets and ensures vital innovations, especially in high-risk fields like immunology, receive the backing they need.

“—
 BioDAO, ResearchHub and VitaDAO exemplify how DeSci is reshaping biotech innovation by leveraging blockchain technology and DAOs to bridge funding gaps and foster collaboration. For instance, Pfizer became the first major pharmaceutical company to participate in a DAO proposal within VitaDAO, actively engaging in deal flow, scientific evaluations, incubation, and commercialization efforts. This collaboration highlights how traditional stakeholders can integrate with Web3 ecosystems to support early-stage biotech projects.



Advancing Biotechnology: Funding Small Research Labs

Chart 4: BioDAO: Sub-DAOs focused on specific scientific or medical research



Data updated as of October 2024
Source: BIO Protocol

BIO was described as "the Y Combinator of on-chain science." as announced by Binance Labs. Y Combinator is a renowned startup accelerator that supports early-stage companies with funding, mentorship, and resources to facilitate rapid growth and development.

BioDAO brings together global stakeholders, including patients, scientists, and biotech innovators, to pool resources like data, capital, and labor. This collective effort accelerates R&D and fosters the creation of new intellectual property. By raising funds through token sales, BioDAO supports biotech projects aligned with its mission, enabling shared ownership of intellectual property among its members and promoting collaborative innovation.

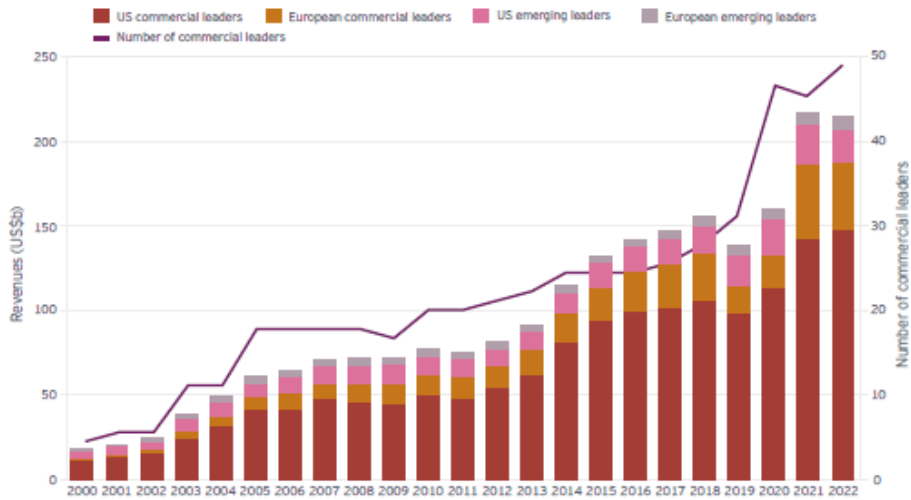
BIO Protocol enables the tokenization of biotech intellectual property (IP) through NFTs or fungible tokens (FTs), supported by a secondary market for liquidity. IP Tokens (IPTs) grant holders partial governance rights, allowing active participation in research development and strategic decisions, with ownership linked to IP like patents or proprietary systems. Instead of financial returns, IP Tokens provide exclusive benefits such as research updates, progress reports, and priority access to innovations and collaborations, fostering deeper stakeholder engagement in biotech advancements.



“ The Bio Protocol Dashboard showcases its success in decentralized biotech innovation, with a \$37.44M tokenized IP value and \$7.37M funding 60 BioDAO projects. It supports a strong ecosystem of 27,290 token holders and a 96,853-member community, reflecting global engagement. The transparent tracking of tokenized IP value further reinforces trust and highlights its impact on advancing biotech research. ”

Biotech's Resilient Growth Post-Pandemic

Chart 5: Long-Term Revenue Growth of US and European Biotech Companies

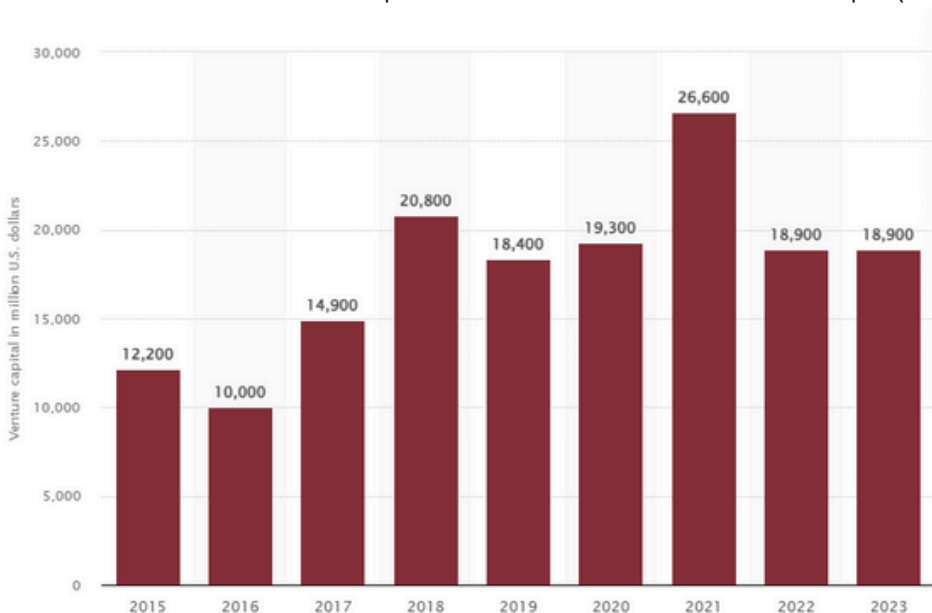


Data updated as of December 2023
 Source: EY analysis, company reports

The biotech industry demonstrated resilience and steady growth in 2022, with underlying revenues increasing by 3.7%, reflecting strong fundamentals despite challenges. Total revenues for US and European public biotech companies reached \$215 billion, normalizing after the COVID-19 boom and declining by only 1% from 2021 due to reduced COVID-related product demand. Leading players like BioNTech, Gilead Sciences, and Regeneron experienced significant revenue drops tied to declining demand for vaccines and therapies. However, the sector’s long-term growth trajectory remains robust, as shown by consistent increases in revenues since 2000. Looking ahead, the industry faces challenges such as an impending patent cliff but is well-positioned to continue its innovation-driven expansion.

Biotech venture capital peaked in 2021 due to COVID-19 innovations but normalized by 2023, with nearly \$19 billion raised, highlighting strong investor confidence and sector resilience.

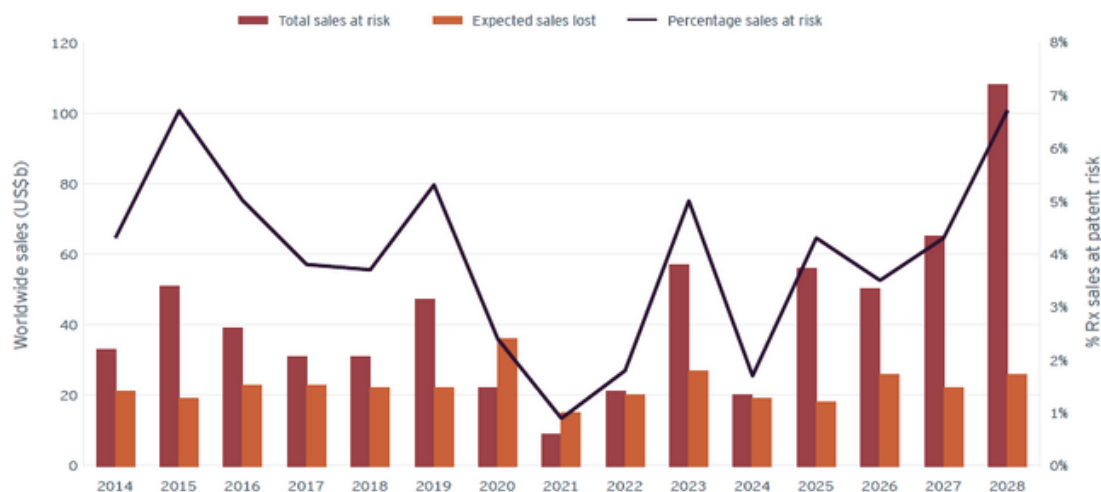
Chart 6: Biotech Venture Capital Raised in the U.S. and Europe (2015–2023)



Data updated as of December 2023
 Source: Statista

Blockchain Solutions for Biotech's LOE Challenges

Chart 7: Historic and projected revenue erosion through loss of exclusivity



Data updated as of December 2023
Source: EY analysis, company reports

The next wave of Loss of Exclusivity (LOE) is set to reshape the biotech market as \$145 billion in annual revenues from 17 major products face patent expirations in the next five years. This includes blockbusters like AbbVie's Humira, which has already seen biosimilar competition gain significant market share. As biosimilars continue to rise, capturing over 80% of the market for key oncology drugs like Herceptin and Avastin, the industry faces intensified competition and steep revenue declines. To sustain growth, innovation and adaptation will be crucial for biotech companies navigating this transition.

Blockchain technology offers transformative solutions to address these challenges. Through on-chain intellectual property (IP) systems, blockchain can enhance transparency in patent management, enabling efficient transitions to biosimilar development post-LOE. Decentralized science (DeSci) platforms and DAOs can democratize funding for biosimilar R&D, fostering collaboration among global stakeholders. Furthermore, tokenization of IP enables fractional ownership and liquidity for biotech assets, providing much-needed financial flexibility. By improving supply chain traceability and incentivizing innovation, blockchain empowers the biotech industry to adapt and thrive in a competitive, post-LOE landscape.

Supply Chain Transparency

- **MediLedger:** This blockchain-based platform, developed by Chronicled, enables end-to-end **tracking of prescription drugs in compliance with the Drug Supply Chain Security Act (DSCSA)**. It ensures traceability, combats counterfeit medicines, and enhances trust among stakeholders.

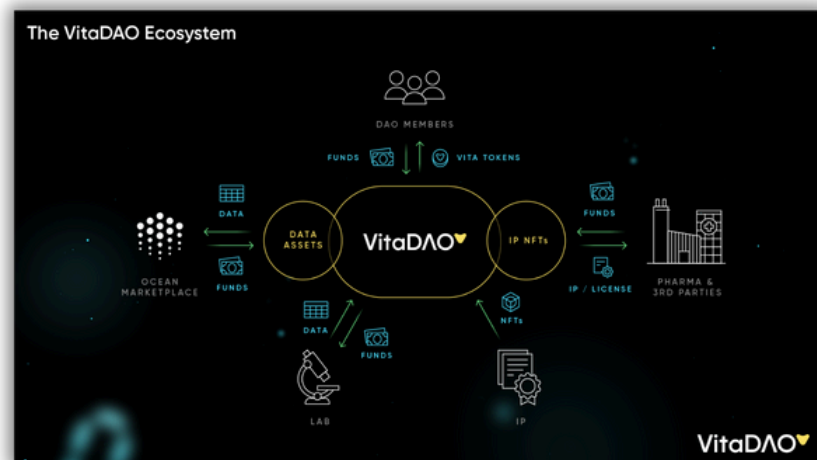
Clinical Trial Data Integrity

- **PharmaLedger:** This project utilizes blockchain to **provide a tamper-proof ledger for clinical trials, ensuring data accuracy and secure patient consent management**. It improves the reliability of trials and speeds up regulatory approval processes.

Data updated as of December 2024
Source: drugpatentwatch

Decentralized Longevity Research: VitaDAO and Blockchain

Chart 8: VitaDAO Ecosystem: Network Architecture and Blockchain Integration



Data updated as of June 2024
Source: VitaDAO

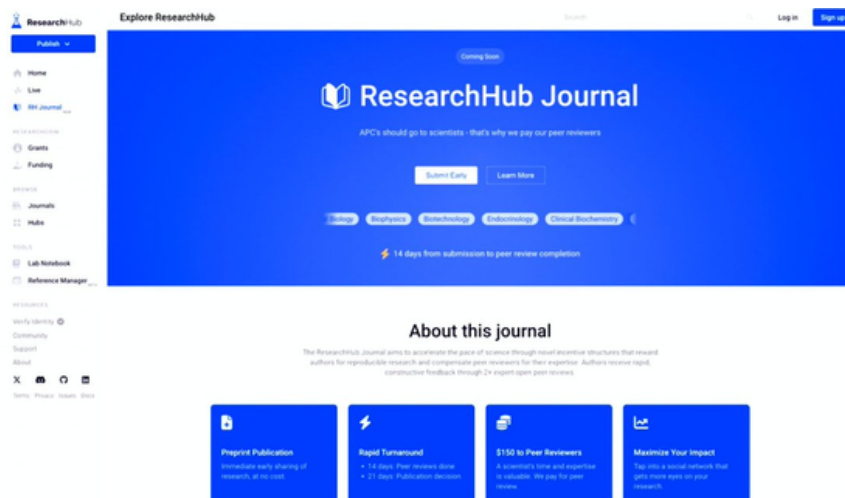
VitaDAO distinguishes itself by adopting a decentralized, community-driven approach to funding longevity research, utilizing blockchain technology to democratize ownership and decision-making in scientific endeavors. One notable initiative is the development of a longevity supplement product. This project aims to create a scientifically-backed supplement for the longevity community, aligning with VitaDAO's mission to promote practical applications of longevity research and explore innovative ways to deliver value to its members.

In January 2023, VitaDAO raised \$4.1 million in funding from strategic investors, including Pfizer Ventures, Shine Capital, L1 Digital, and Web3 organizations like Beaker DAO and Spaceship DAO, along with prominent figures like Balaji Srinivasan and Joe Betts-LaCroix. Pfizer had previously invested \$500,000 in September 2022 to accelerate longevity research and became the first pharmaceutical company to vote on DAO proposals within VitaDAO. Pfizer also actively participates in VitaDAO through deal flow, scientific evaluation, incubation, and commercialization. Notably, VitaDAO's white paper author, Paul Kohlhaas, is also the founder of DeSci projects Molecule and BIO Protocol, while Tyler Golato serves as co-founder of VitaDAO, Molecule, and BIO Protocol.

As of now, VitaDAO has deployed \$4.2 million to fund 24 projects, showcasing its extensive efforts in advancing longevity research. Key initiatives include Matrix Bio, studying anti-aging effects of high molecular weight hyaluronic acid from naked mole rats, funded with \$300,000 through IP-NFTs; Scheibye-Knudsen Lab, using machine learning on 1.04 billion prescription records to analyze drug impacts on lifespan; and Fang Lab, combining AI and lab testing to identify mitochondria-targeting drugs for Alzheimer's treatment. Other projects include An Lab, focused on reversing periodontitis, and Humanity, using wearable devices to monitor digital biomarkers for personalized aging management. VitaDAO also supports GERO, leveraging AI and physics to develop therapies for chronic age-related diseases, and Oisín Biotechnologies, creating genetic therapies for muscle loss and aging-related conditions, recently raising \$15 million in a Series A led by AbbVie Ventures.

Decentralized Research: Transforming Science Through ResearchHub

Chart 9: ResearchHub Ecosystem: Decentralized Science and Blockchain Integration



Data updated as of October 2024
 Source: ResearchHub

ResearchHub is a decentralized platform dedicated to accelerating scientific research by fostering open publishing, collaborative peer reviews, and community-driven funding. Its mission is to make science a public good, eliminating inefficiencies and lowering barriers to participation in academia. By leveraging blockchain technology and decentralized science (DeSci) principles, ResearchHub empowers researchers worldwide to share findings, source expert opinions, and build upon each other's work in real time.

The platform operates under the ResearchHub Foundation, which functions similarly to a decentralized autonomous organization (DAO). This structure allows token holders of ResearchCoin (RSC) to vote on various proposals, ensuring that the community plays a central role in the platform's development and success. ResearchHub's core values include acting in the best interest of the scientific community, seeking truth, promoting self-awareness, and encouraging freedom and responsibility among its members.

In addition to its collaborative features, ResearchHub offers research grants to support innovative ideas across all fields. Each grant recipient receives \$5,000, with the aim of democratizing access to funding and supporting early-stage scientific endeavors. By integrating open-access principles with blockchain technology, ResearchHub is building a future where science is truly a public good, facilitating the free flow of ideas and accelerating the pace of discovery.

ResearchHub is a decentralized platform that leverages blockchain technology and tokenization, similar to how GitHub fosters collaboration in software development. By using ResearchCoin (RSC), the platform empowers a global community of researchers to openly share, review, and build upon scientific findings, with a focus on democratizing funding and decision-making. This decentralized approach eliminates traditional inefficiencies, ensures community-driven governance, and accelerates innovation, making science a truly accessible and collaborative public good.

Performance of DeSci Tokens: Growth Insights and Market Trends

Chart 10: Key DeSci Tokens in 2024 Market Dynamics



Data updated as of December 2024
Source: Trading View

The chart illustrates the 2024 performance of key tokens in the decentralized science (DeSci) and Web3 ecosystem, specifically ResearchCoin (RSC), OriginTrail (TRAC), and VitaDAO (VITA). Among them, RSC showcased exceptional growth, surging by 164.93%, driven by increasing adoption of its decentralized research funding model. TRAC, linked to supply chain tracking solutions, demonstrated a more moderate rise of 56.47%, reflecting steady market adoption. Meanwhile, VITA, representing VitaDAO's focus on longevity research, recorded a growth of 36.48%, signaling sustained yet comparatively slower traction.

This strong performance highlights the growing interest in DeSci platforms, which leverage blockchain for transparency, democratized ownership, and innovation funding. The adoption of ResearchHub's blockchain-aligned principles has likely propelled RSC's significant user engagement.

The sustained growth of these tokens reflects an emerging shift toward decentralized funding and IP ownership in science and technology. As institutional adoption grows, scaling these platforms will depend on robust user engagement and operational frameworks, underscoring the transformative potential of DeSci tokens in reshaping innovation ecosystems.

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