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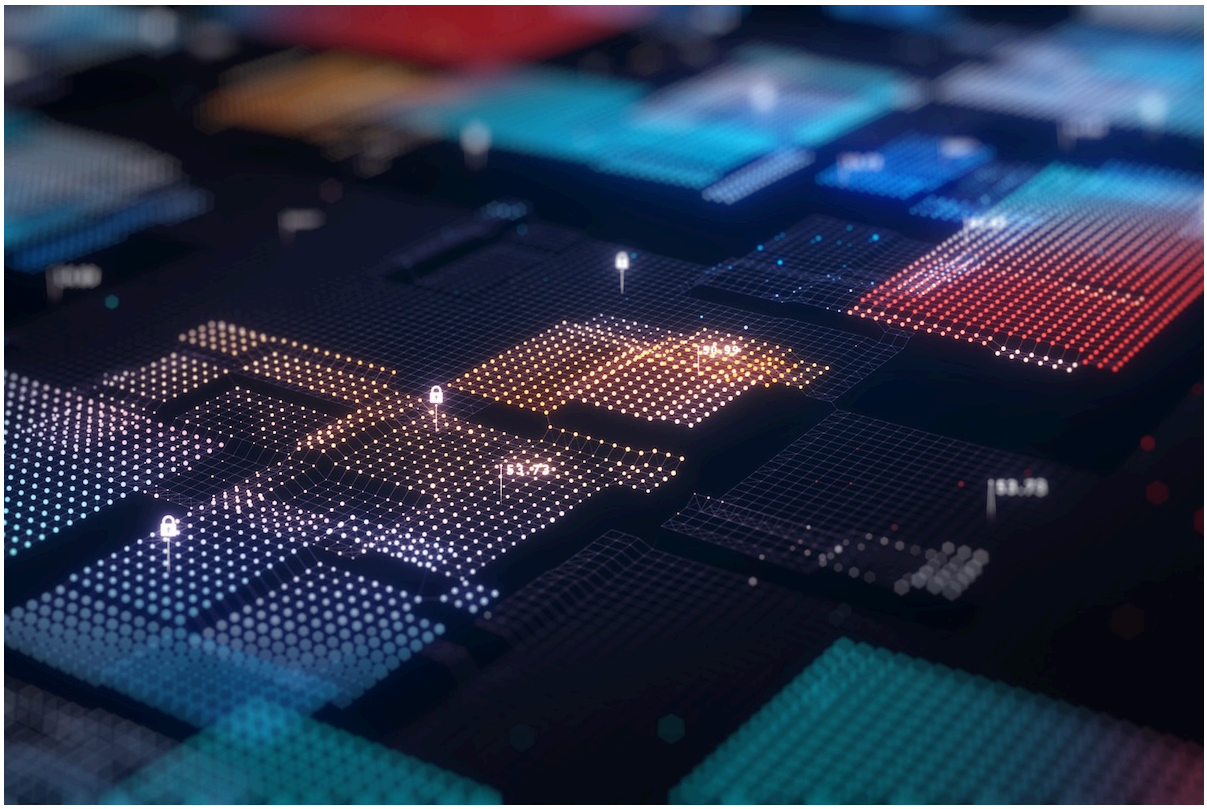
Blockchain

Can Decentralized Science Be the Next Frontier of Scientific Research?

Anchit Jain



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Clear, practical grounding in Decentralized Science (DeSci)—its structures, benefits, and challenges.

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In an era defined by rapid technological change and rising demand for transparency and collaboration, traditional scientific research models face mounting scrutiny. A new approach—Decentralized Science (DeSci)—is emerging, combining decentralization principles with the rigor of scientific inquiry.

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DeSci uses community ownership to fund, manage, and openly share research, bypassing traditional barriers such as limited grant availability. Imagine a global laboratory where scientists, patients, and advocates co-govern projects and allocate resources through token-based voting in real time. Leveraging blockchain and Web3, DeSci aims to democratize access to scientific data, ensuring that knowledge creation and dissemination are no longer confined to elite institutions.

As of Dec 2024, there are over 50 active DeSci projects worldwide [1], attracting more than $60 million [2] in combined institutional and community funding. This growth reflects increasing recognition of DeSci's ability to improve the efficiency, accessibility, and integrity of scientific research.

What Is DeSci?

DeSci applies blockchain and Web3 technologies to restructure scientific collaboration, funding, and intellectual property (IP) management. The goal: make scientific discovery, knowledge dissemination, and IP ownership more accessible, transparent, and collaborative.

Unlike traditional science—where control rests with academic publishers, institutions, and grant committees—DeSci distributes decision-making power across a global network of participants. Core enabling features include[3]:

1. Transparency: Blockchain records are immutable and auditable, ensuring complete visibility into research processes and outcomes.

2. Collaboration: Decentralized platforms allow global scientific cooperation without intermediaries, reducing barriers and accelerating innovation.

3. Incentivization: Tools like IP-NFTs digitize intellectual property and link legal contracts to blockchain records, creating new funding mechanisms and enabling the sale or licensing of discoveries.

By integrating these elements, DeSci expands participation in the scientific process while strengthening data integrity and security.

Key Principles of DeSci[1]

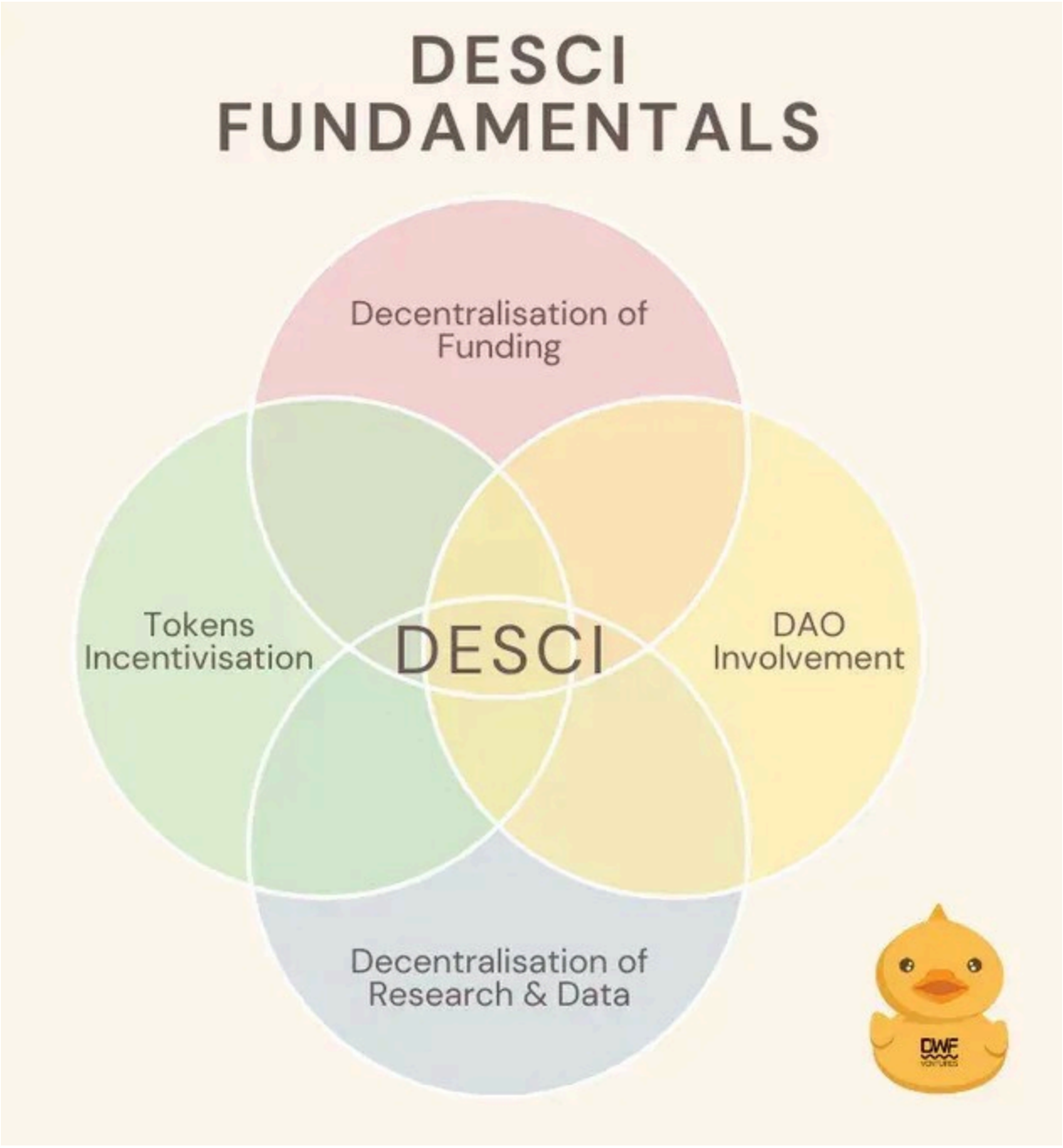

Figure 1: Key Principles of Decentralized Science[1]

Decentralized Funding

Community-driven funding models democratize access to research capital, overcoming the bottlenecks of traditional fundraising.

Decentralized Research and Data

Blockchain provides a tamper-proof ledger for storing research data, ensuring it remains immutable and transparent. For example, experimental results can be logged directly from lab instruments to the blockchain, preventing post hoc alteration—critical in areas like clinical trials or environmental monitoring.

Decentralized storage solutions such as IPFS and Filecoin enable secure, distributed storage of large datasets. These peer-to-peer networks protect against data loss, censorship, or localized system failures, ensuring accessibility and longevity—especially valuable in fields such as genomics and environmental science.

Token Incentivization

Tokenizing scientific outputs aligns the interests of researchers, funders, and the public. IP-NFTs allow researchers to retain and monetize ownership rights to discoveries, such as a new chemical compound, which can then be licensed or sold to industry.

DAO Participation

Decentralized Autonomous Organizations (DAOs) bring collective governance to science. In DeSci, DAOs manage research funding, peer review, and project selection through smart contract–based voting. VitaDAO, for example, focuses on longevity research, funding projects based on community token-holder votes.

Potential Benefits of DeSci

Potential Benefits of DeSci

Benefit	Description	Example
Increased Transparency	Blockchain ensures all changes, contributions, and results are recorded and auditable.	**OpenEarth Foundation** uses blockchain to secure environmental data.
Improved Accessibility	Removes geographic and institutional barriers, enabling global participation.	**OpenTrail** allows researchers worldwide to publish and access papers via blockchain.
Enhanced Collaboration	DAOs enable efficient, direct scientific cooperation across borders.	**ResearchHub** facilitates peer review, data sharing, and collaboration through DAO governance.
Efficient Funding Models	Blockchain streamlines transparent, community-driven funding decisions.	**VitaDAO** allocates longevity research funding through token-based voting.

Figure 2: Potential Benefits of Decentralized Science [3]

Figure 3: DeSci Ecosystem Map[4]

Case Study 1: Funding Longevity Research through VitaDAO[5]

VitaDAO advances biomedical longevity research through decentralized governance and funding. Launched in 2021, VitaDAO has raised over $10m through a token sale and from notable investors including Pfizer Ventures, Balaji Srinivasan and L1 Digital [6]. Using its native governance token, $VITA, the DAO coordinates funding decisions, community participation, and project oversight.

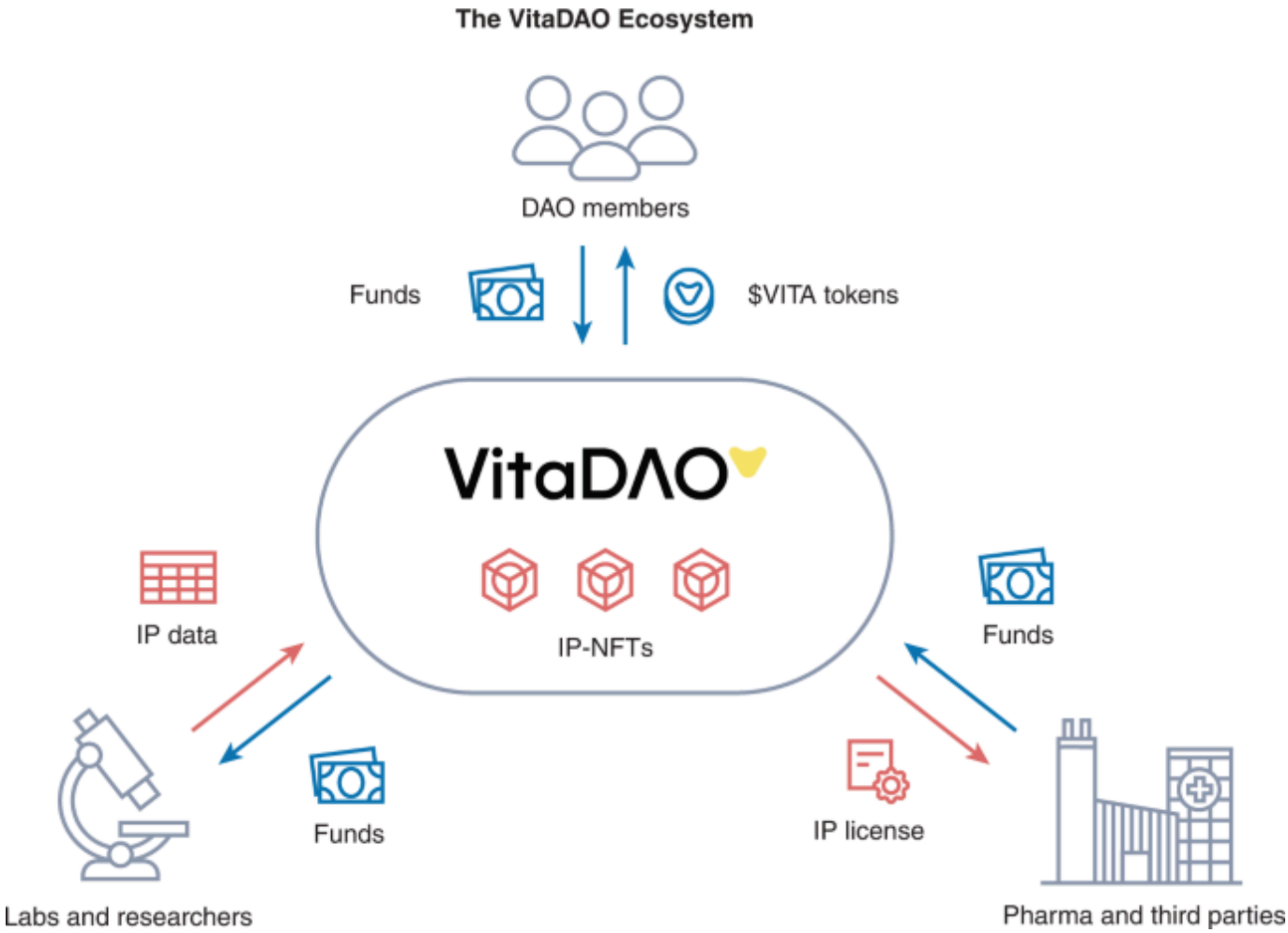

Figure 4: The VitaDAO ecosystem and its stakeholders[7, 8]

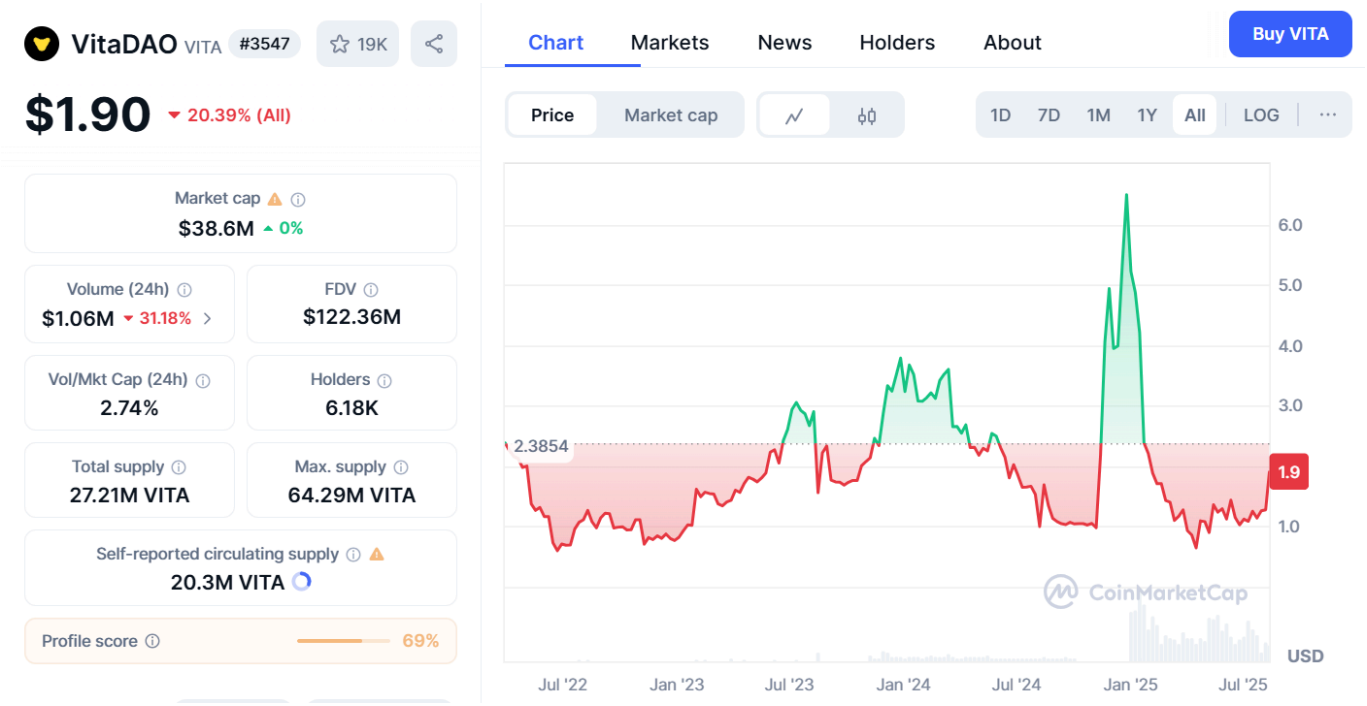

Figure 5: $VITA (CoinMarketCap, Aug 12, 2025)

1. Proposal Submission: Companies, teams, and individuals researching longevity can submit a proposal to request for a grant. Proposals include background, research aims, methodology, team composition, and budget.

2. Funding: Projects approved via token-holder votes receive funding. Smaller funding decisions may be handled by working groups; larger requests require a full community vote.

3. Structure: Organized in pods or working groups of people who offer specific expertise and participation roles. Anyone can apply to join and participate in one or more of the pods. There are three main working groups—Longevity Dealflow, Community & Awareness, and Coordination—plus a Scientific Advisory Board of longevity experts.

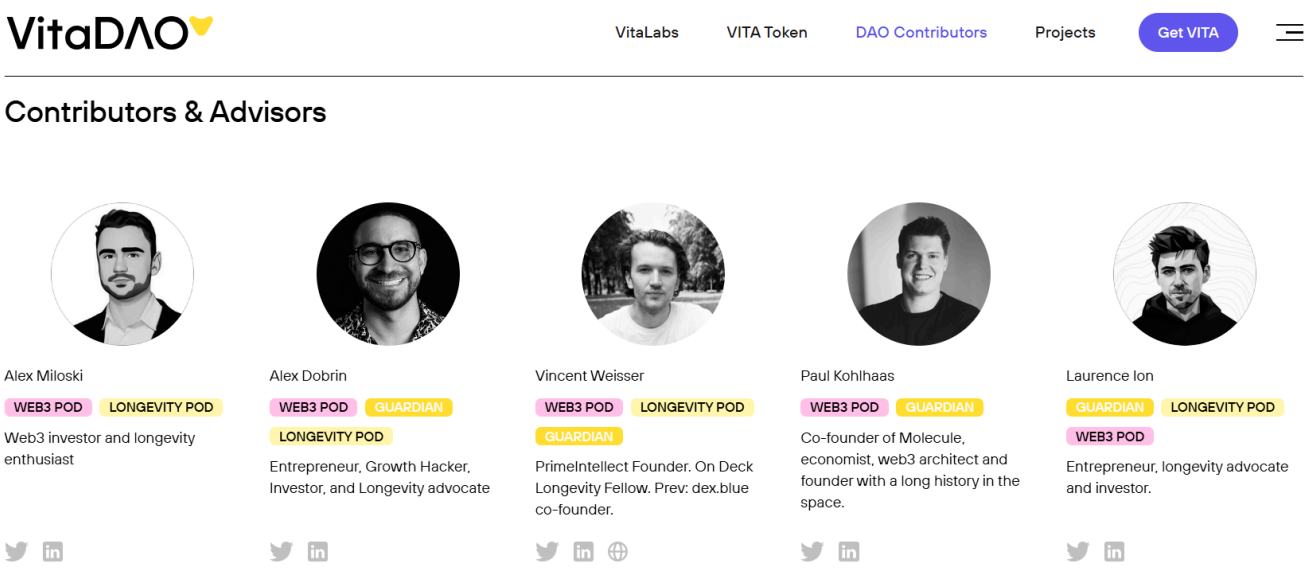

Figure 6: Some of VitaDAO Pods (Source: VitaDAO, Aug 12, 2025)

4. Governance: $VITA tokens confer voting rights. Voting is gasless via Snapshot, but participants must hold $VITA in an Ethereum wallet.

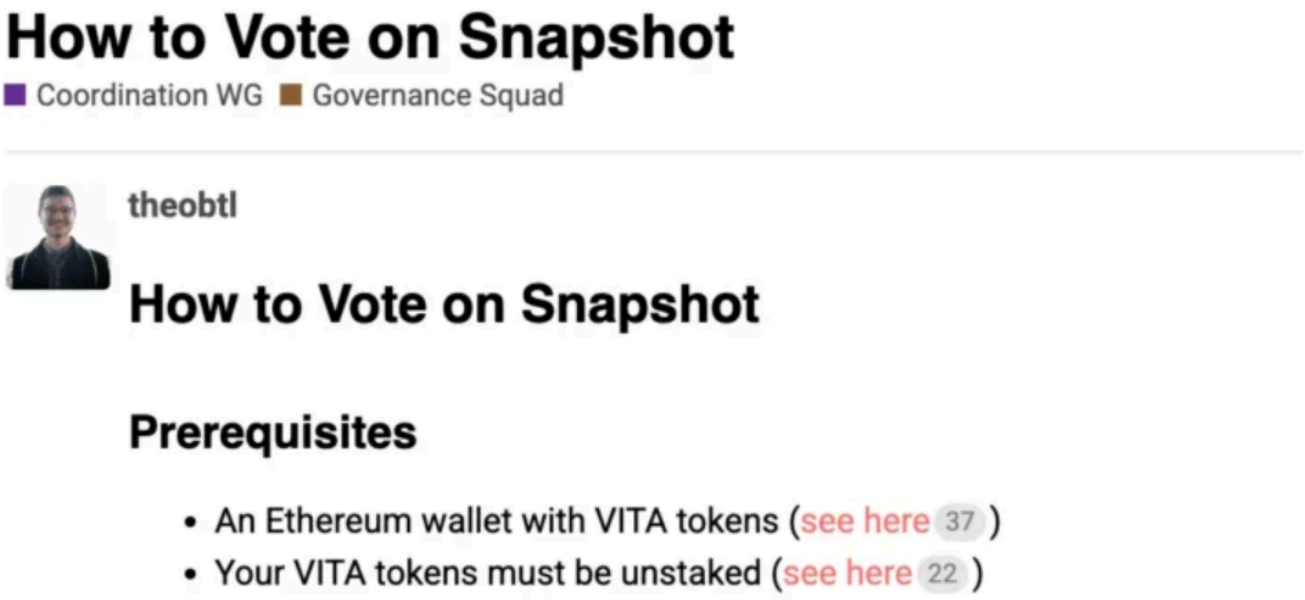

Figure 7: Voting on Snapshot on VitaDAO (Source: VitaDAO, Aug 12, 2025)

5. IP Management: VitaDAO uses IP-NFTs to record and license research IP, creating revenue opportunities and reinvestment potential for future projects.

Some of the projects funded by VitaDAO are [5]:

- **BE Therapeutics** – Brain Tissue Replacement for Age Reversal: $100,000 funding to explore replacing neocortex regions to reverse brain aging.
- **Korolchuk Lab** – Autophagy Activators: $285,000 to identify compounds that restore cell recycling functions weakened by age.
- **Matrix Bio** – Longevity Biotech from Naked Mole Rats: $300,000 to study high-molecular-weight hyaluronic acid's cancer resistance and lifespan benefits.

Case Study 2: Accelerating Collaborative Research using ResearchHub

Founded in 2020 by Coinbase CEO Brian Armstrong and Patrick Joyce, ResearchHub accelerates scientific discovery by removing structural inefficiencies in publishing—limited funding access, slow peer review, and restricted distribution. In June 2023, it

raised $5 million from Open Source Software Capital, Boost VC, Bob Young (RedHat), Guillermo Rauch (Vercel), Amjad Masad (Replit), Garry Tan (Y Combinator), and others [9].

At its core is ResearchCoin (RSC), an ERC-20 token on Ethereum Layer 1 and its Base Layer 2, earned by uploading literature, participating in discussions, curating content, conducting peer reviews or publishing openly accessible research.

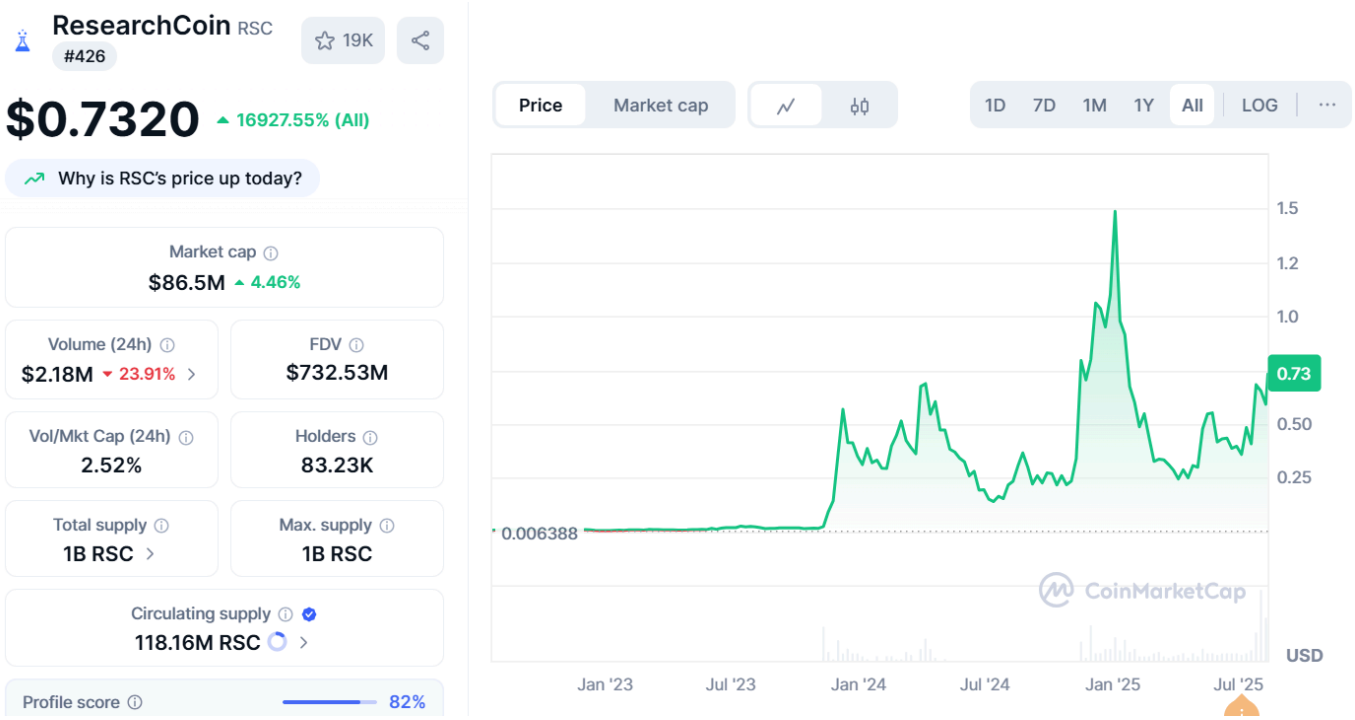

Figure 8: $RSC (CoinMarketCap, Aug 12, 2025)

RSC can fund experiments, sponsor pre-registered proposals, pay open-access publishing fees, or be converted to USDC/fiat via exchanges like Uniswap and Gate.io. Funders can post Requests for Proposals (RFPs) with budgets, attracting applications from researchers worldwide. [10]

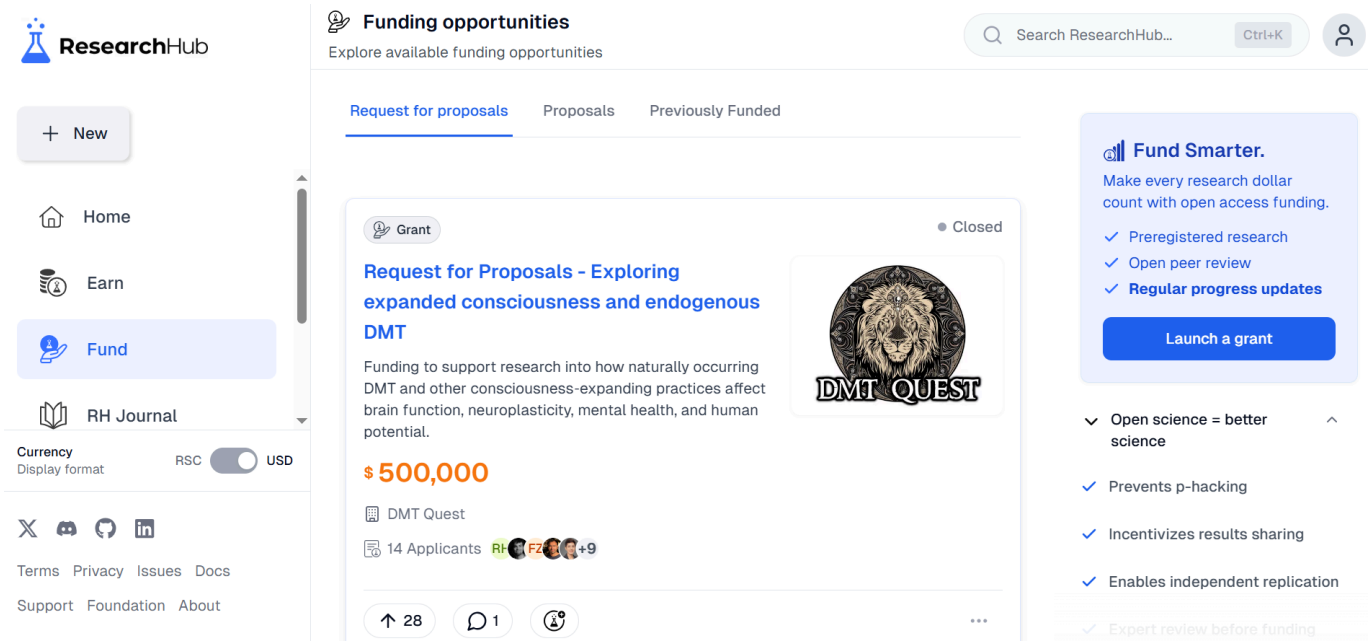

Figure 9: Funding Opportunities on ResearchHub (Source: ResearchHub, Aug 12, 2025)

Future Outlook

Decentralized Science holds the promise of transforming the way research is conducted, funded, and shared. By removing the structural barriers of modern science—limited grant availability, closed data silos, and centralized gatekeeping—DeSci opens new pathways for funding through community-driven mechanisms and tokenized intellectual property. It enables crowdfunding of projects that might never pass through conventional filters, while fostering open collaboration across borders and disciplines. The use of blockchain ensures transparency at every stage of the research process, recording data, methods, and findings in ways that are publicly verifiable, thereby restoring trust in scientific outputs.

However, realizing this vision will require navigating significant challenges. Regulatory frameworks for blockchain and cryptocurrency remain in flux, creating uncertainty for projects seeking to operate across multiple jurisdictions. Data privacy poses a complex tension between the immutability of blockchain records and compliance requirements such as the “right to be forgotten.” Technical scalability and interoperability will determine whether DeSci platforms can grow without compromising efficiency or compatibility.

Perhaps most importantly, the governance of decentralized scientific organizations must be carefully designed to prevent concentration of influence and ensure equitable participation.

Despite these obstacles, early examples like VitaDAO and ResearchHub demonstrate that DeSci can deliver tangible impact. The road ahead will require a balance between innovation and pragmatism—building systems that are open and inclusive, yet resilient and compliant with evolving legal and ethical standards. If these challenges are met, DeSci could indeed emerge as the next frontier of scientific research: a global, transparent, and community-owned ecosystem that channels resources, expertise, and trust toward solving humanity's most pressing problems.

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