PoSciDonDAO

Building Bridges, Breaking Barriers, Funding Tomorrow's Research

Version 1.5

Authors: Marco Huberts and Ayat Abourashed

Last updated: March 08, 2024

0 Abstract

Current treatments for life-altering diseases, such as solid cancers, multiple sclerosis, Alzheimer's disease and rheumatoid arthritis, often utilize a one-size-fits-all approach, leading to high rates of treatment failure. The key to increasing treatment success lies in personalized medicine, which consists of treating patients using therapies tailored to their unique genetic profiles. However, the development of such targeted therapies is hindered by systemic issues in the funding process. This process is centralized and bias-prone, often characterized by political influence, inefficient fund allocation, favoritism, and a lack of incentives for scientific innovation due to restrictive intellectual property ownership and reward system by institutions.

To address these challenges, PoSciDonDAO, a Decentralized Autonomous Organization (DAO), has been established. PoSciDonDAO represents the first-ever decentralized biotech organization dedicated to funding personalized medicine research for life-altering disease. PoSciDonDAO operates on the PoSciDonDAO Protocol, a set of smart contracts deployed on the Polygon network, which is built on top of Ethereum's blockchain technology. This protocol leverages the core strengths of blockchain - transparency, decentralization, and censorship-resistance - to facilitate transactions between donors and investors to scientists with reduced intermediaries.

Unique to PoSciDonDAO is its dual-token model, comprising $PO and $SCI tokens. The $PO token, a non-tradable NFT, is awarded for governance participation and can be exchanged for $SCI tokens and, in the future, other rewards. The $SCI token, the DAO's tradable token, grants voting rights which gives you the opportunity to have a say in PoSciDonDAO's future.

By embracing this innovative model, PoSciDonDAO invites diverse participation from scientists, entrepreneurs, investors, and decentralized science enthusiasts, creating a democratized, and unbiased ecosystem that redefines the funding process of personalized medicine research.

Table of Contents

1 Introduction

Current therapies for life-altering diseases such as cancer often target the whole patient population resulting in high treatment failure and low patient survival (Sun et al., 2022). Although patients can be diagnosed with a similar disease, their differences in genetic makeup have a major impact on treatment effectiveness.

To increase treatment success, therapies need to be developed for smaller patient populations with similar characteristics such as genetic makeup. This treatment approach is often referred to as personalized medicine and aims at giving the right treatment to the right patient group.

For personalized medicine to thrive, extensive research must be performed to identify patient subpopulations based on genetic makeup and to find the right treatment for those patients. This requires effective collaboration between multi-disciplinary researchers and research groups and large amounts of funding.

Unfortunately, the current funding system for scientific research is biased, inefficient and highly centralized (Pew Research Center, 2009). To solve this, we created PoSciDonDAO. PoSciDonDAO is a decentralized autonomous organization (DAO) that leverages Polygon, a network on top of Ethereum's distributed ledger technology, also known as blockchain. This technology gives us the opportunity to redefine the funding of personalized medicine research projects by reducing bias, increasing funding allocation efficiency and allowing anyone to have a say in the DAO's operations. This is facilitated through a decentralized application called PoSciDonDAO Protocol, consisting of a set of smart contracts (instructions for the blockchain) and a user-friendly interface. Further details about the application will be described in this whitepaper.

This whitepaper will help you understand:

1. Why PoSciDonDAO is necessary for the prosperity of personalized medicine research.
2. How the PoSciDonDAO Protocol will change the way people look at funding of personalized medicine research and how it benefits scientists and other DAO members.
3. How PoSciDonDAO could become the first ever decentralized personalized medicine-focused biotech organization governed by smart contracts.

1.1 Scientific Research Focus

When doctors diagnose patients with the same disease, they often give them the same medical care, even though everyone's genes are different. Small changes in our genes can make a big difference in our health. More than 90% of people have genetic differences that affect how they respond to treatments (Schärfe, 2017). Personalized medicine (PM) consists of giving specific and customized treatments for each person, focusing mostly on their genetic background. PM, sometimes referred to as precision medicine, is an approach to research and develop novel therapies that treat patient subpopulations of a target disease. For example, within Pancreatic Ductal Adenocarcinoma (PDAC; simply put: pancreatic cancer) multiple subtypes have been

identified, whereby each subtype consists of patient tumors with similar genetic profiles (Torres, 2018). In this case, a PM approach would consist of creating therapies that only target one subpopulation and not the whole population of PDAC patients. Current treatments targeting the whole PDAC population only results in 9% survival (Siegel, 2018). This indicates that a one-size-fits-all approach is an inaccurate and inefficient method to treat patients. Thus, personalized medicine research is immensely needed.

PM offers several significant benefits that can transform how healthcare is delivered, making treatments more effective and improving patient outcomes. Here are the main benefits:

1. **Improved Diagnostic Accuracy**: PM allows for more accurate diagnoses by considering an individual's genetic makeup. This precision helps in identifying diseases at an earlier stage and in a more specific manner.
2. **Tailored Treatments**: Treatments can be customized to the individual's genetic profile, increasing the effectiveness of the treatment while reducing the risk of side effects. This means that medications and therapies are selected based on how well they are expected to work for that particular patient, which increases treatment efficiency.
3. **Reduction in Trial and Error**: Traditional approaches often involve trying different treatments to see which works best, which can be time-consuming and costly. PM reduces this trial and error by predicting which treatments are most likely to be effective for the patient. This tailored approach reduces the time and resources spent on ineffective treatments, leading to savings in healthcare costs.
4. **Better Outcomes**: By providing targeted treatment plans, PM can lead to better health outcomes, quicker recoveries, and a higher quality of life for patients. PM significantly reduces the likelihood of adverse drug reactions, which are costly to treat and can lead to hospitalizations. Avoiding these adverse reactions saves healthcare systems considerable amounts of money. This approach can be particularly beneficial for managing chronic conditions and diseases that have historically been difficult to treat.
5. **Cost-Effectiveness**: Although the initial costs of genetic testing and developing personalized treatments can be high, personalized medicine has the potential to reduce overall healthcare costs. This is achieved by avoiding ineffective treatments, reducing hospital stays, and preventing disease progression through early intervention.
6. **Prevention and Risk Reduction**: PM not only treats existing conditions but can also identify individuals at high risk for certain diseases, allowing for preventive measures to be taken before the disease develops. This proactive approach can significantly reduce the incidence and impact of many conditions.
7. **Enhanced Drug Development**: Personalized medicine can lead to the development of new drugs designed to target specific genetic mutations or pathways. This can be especially impactful for rare or complex diseases that have not responded well to conventional treatments.
8. **Early Detection and Intervention**: PM allows for the early detection of diseases by identifying genetic predispositions before symptoms arise. This early detection enables healthcare providers to implement preventive measures or treatments to either prevent the disease altogether or to manage it effectively at an early stage, reducing the severity and long-term impacts.

By focusing on the individual's unique genetic makeup, personalized medicine paves the way for more efficient, effective, predictive and patient-centered healthcare.

Here are some of the diseases PoSciDonDAO focuses on where research into personalized medicine approaches is needed:

1. Immunologically cold solid tumors (e.g. colon, pancreas, and brain cancers)
2. Blood cancers (e.g. leukemia and lymphoma)
3. Multiple sclerosis
4. Type 1 diabetes

Several personalized medicine approaches have been developed so far and can be used to attempt to treat some of the aforementioned diseases. These are some of the therapies we focus on:

1. Chimeric Antigen Receptor (CAR) immune cells
2. Viro-immunotherapies/Oncolytic viruses
3. Gene therapies including lentiviral delivery vehicles
4. Nanoparticles including exosomes
5. Monoclonal antibodies
6. (Cancer) vaccines
7. Cytokine/Chemokine treatments

Although the number of PM therapies has been increasing, they are not available for all diseases or genetic variations. This limitation means that more PM research is necessary to identify these genetic differences to create more tailored treatments. PM research requires large amounts of funding, but research funding is a wicked problem.

1.2 Scientific Research Funding Challenges

Funding scientific research is a highly centralized and biased process, so decentralization, democratization and non-discrimination are needed. The challenges in funding scientific research often stem from systemic issues related to economic, political, and institutional factors. The actions of institutions involved in the scientific research funding process do not benefit the scientists nor the scientific research funders. Often, they even hamper the progress of scientific research. Funding scientific research faces several significant challenges, each impacting the pace and direction of scientific advancement. These challenges include:

1. **Political and Economic Influences**: Scientific research funding can be influenced by political priorities, economic conditions, and public opinion. These influences can shift funding away from certain areas of science, regardless of their scientific merit.
2. **Equity and Diversity Issues**: There can be significant disparities in funding allocation across different regions, institutions, and demographic groups. These disparities can limit

diversity in science, which is detrimental because diverse perspectives foster innovation and robust scientific inquiry.

3. **Bias Towards Certain Fields**: Funding can be biased towards certain fields of research that are deemed more immediately profitable or that align with current funding body priorities, leaving other equally important areas underfunded.
4. **Short-termism**: There is a tendency for funding bodies, both public and private, to favor projects with immediate outcomes over fundamental research that might take longer to yield results. This can stifle innovation and discovery in basic science, which forms the foundation for applied research.
5. **Geographic and Institutional Inequality and Bias**: Resources are often concentrated in certain geographic areas or institutions, leading to unequal opportunities for researchers based on their location or the prestige of their institutions. In this way, there is much untapped potential for lesser known researchers that do not get a chance for innovation.
6. **Evaluation and Peer Review Processes**: The criteria and processes used to evaluate funding proposals can introduce biases, such as favoring conventional ideas over innovative or risky research. Peer review, while essential for maintaining quality, can also perpetuate these biases.
7. **Lack of Support for Early Career Researchers**: Early career researchers often face significant challenges in securing funding, as they may not have the same track record as more established researchers. This can hinder the development of the next generation of scientists.

Removing these forces will reduce unfavorable behaviors and can lead to improved scientific efficiency and output with less money wasted. This is where PoSciDonDAO Protocol and PoSciDonDAO come in to mitigate these issues: to foster greater collaboration and communication within the scientific community, to improve the efficiency and transparency of funding allocation processes, and to encourage innovative and risky research that can help reduce redundancy and enhance the overall efficiency and impact of scientific research.

1.3 Solving Personalized Medicine Research Funding Challenges

PoSciDonDAO and its Protocol have been developed to establish a democratized, decentralized and non-discriminatory scientific research funding process. It allows everyone to vote on which science experts will be reviewing and accepting personalized medicine research projects for funding. These funds will be transferred from the DAO's treasury directly to the scientists, creating a tamper-proof funding process which increases the fund allocation efficiency and greatly reduces the presence of personal, political and institutional bias. Overall, PoSciDonDAO aims to make the scientific funding process for personalized medicine research run easier and more smoothly compared to the current funding system. Besides that, the PoSciDonDAO Protocol revolutionizes the incentive system of the scientific funding process benefitting both investors and scientists. Read more about our token-based incentive system in Section 2.2 (PoSciDonDAO's Token Economy).

2 DAO Overview

At PoSciDonDAO, we mainly focus on funding early-stage, pre-patented projects from academic research groups, private labs or early-startup biotech companies that work on bridging the gap between academic research and industrial commercialisation for personalized medicine research. Our team consists of experts in virology, immunology, biotechnology, oncology and epidemiology. With our in-house experience, along with the expertise of our community members, we are able to assess which projects have the potential to impact the personalized medicine field.

These are our guidelines, but we are willing to invest in other types of projects if chosen by the community through a proposal.

On the more technical side, PoSciDonDAO is made up of several key elements:

1. The PoSciDonDAO Protocol to facilitate the dual-token incentive models, governance and funding distribution (see Figure 1).
2. Crews that dedicate their time and effort to further develop the DAO.
3. A business model focussing on monetizing data assets and intellectual property generated by scientific research funded by PoSciDonDAO. These assets will be part of the weDEA IP framework (weDEA, 2024).

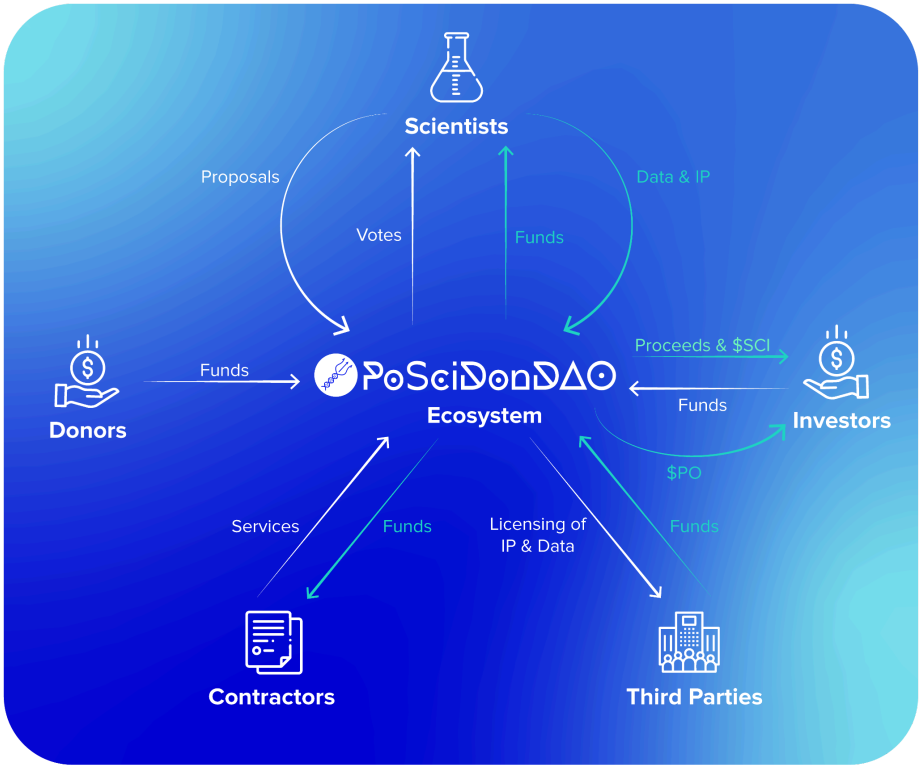

Figure 1 - Overview of the PoSciDonDAO Ecosystem

2.1 The PoSciDonDAO Protocol Infrastructure

The PoSciDonDAO Protocol is built upon Polygon, a sidechain of the Ethereum blockchain. Polygon is designed to improve the scalability and efficiency of the Ethereum network while maintaining compatibility with Ethereum's ecosystem. As a sidechain, Polygon processes transactions independently, enabling faster transaction throughput and very low transaction fees compared to Ethereum.

An important characteristic of the Polygon network includes compatibility with the Ethereum Virtual Machine (EVM), allowing Ethereum-based solidity-written smart contracts to be deployed with limited changes. Polygon offers enhanced performance and lower costs compared to Ethereum by relying on its own group of validators. This makes it an appealing platform for applications requiring high scalability, such as decentralized apps with on-chain governance features such as PoSciDonDAO's Protocol. Polygon's architecture effectively addresses scalability challenges while tapping into Ethereum's infrastructure.

The PoSciDonDAO Protocol will be the first decentralized science project funding personalized medicine research that has been deployed on Polygon. Interactions with Polygon will be done through the PoSciDonDAO Protocol which is a set of smart contracts. A smart contract is immutable code that allows interaction between the member and the blockchain (Wackerow, 2022). The PoSciDonDAO Protocol comprises of several key elements:

1. A dual-token incentive system including $PO and $SCI tokens.
2. Smart contracts that facilitate the locking up of tokens for a limited time.
3. On-chain governance for $SCI tokens. This system follows Open Zeppelin's standards (OpenZeppelin, 2023) and is modeled after MakerDAO (MakerDAO, 2017).

Interaction with the PoSciDonDAO Protocol allows holders of $SCI tokens to participate effortlessly in our dual governance structure. The Protocol allows participants to have a say in the allocation of funds to scientific research projects and the management of the operations, treasury, intellectual property and data assets.

2.2 PoSciDonDAO's Token Economy

At PoSciDonDAO, we researched many incentive models of tokens in decentralized science projects. We found that most of these projects lack incentive models for members to be sufficiently engaged in the ecosystem for long periods of time. This often leads to no incentive to invest, to hold a token or to participate in DAO governance. The PoSciDonDAO Protocol contains the first-ever dual-token incentive model for a decentralized science project on Polygon. To make sure PoSciDonDAO can sustain itself for a long time, its token economy design follows the Web3 sustainability loop system (McConaghy, 2021). Our incentive model consists of two tokens: $SCI and $PO.

2.2.1 $SCI Token

PoSciDonDAO will launch the tradable $SCI token when the DAO expects to offer enough. The $SCI token is obtained by trading on decentralized exchanges and, eventually, centralized

exchanges, by exchanging $PO tokens (see Section 2.2.2 "$PO Token" for more on the $PO token) or by contributing to the DAO. Contributions include, but are not limited to, working for the DAO by joining one of the crews and by providing data and intellectual properties.

Features

Holders of the $SCI token will be able to lock these tokens through our Protocol and receive governance power. In addition, the DAO has a burn mechanism for the $SCI token in the case of revenue. For example, when the DAO generates 100k USD, 30% of that will be bought back by the DAO and that amount of tokens will then be burned (see Figure 2). This will result in a lower token supply while maintaining the market capitalization of the $SCI token.

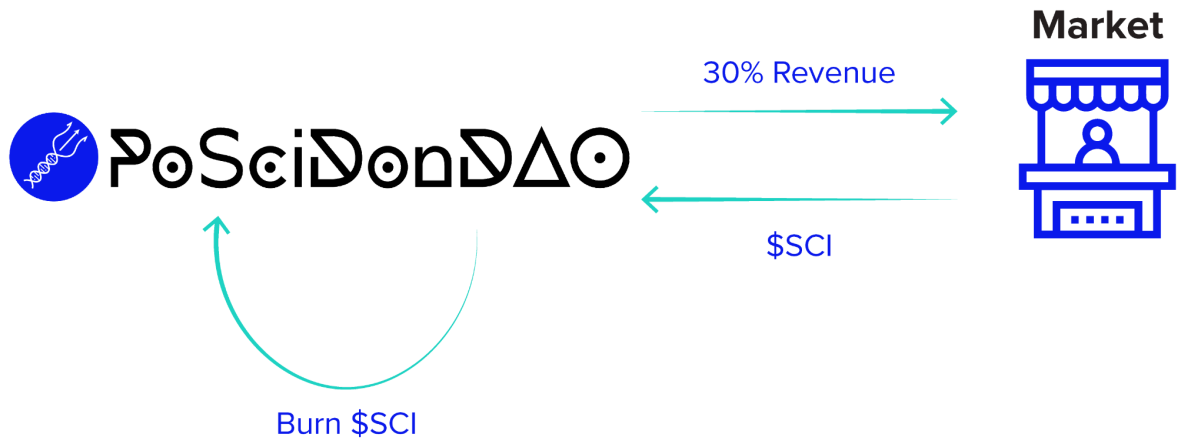

Figure 2 - $SCI Token Burn Mechanism.

Genesis and Token Allocation

During Genesis, 10% of the total supply will be offered to the community through a public sale. When PoSciDonDAO's governance system is live, initially 10% will be allocated to reward $PO holders for participation in governance as they can exchange their $PO tokens for $SCI tokens (see the $PO token section for more information) (Fasco, 2022). Additionally, 5% will be allocated to compensate contractors, and another 5% will be allocated for crew members. The remaining 70% of the $SCI tokens will be held in PoSciDonDAO's treasury (see Figure 3). These numbers are subject to change and can be changed based on the choices made by the DAO.

Token Supply

Immunotherapies are one of the treatment types that are in need of personalized medicine research as most immunotherapies have shown to only work in a subset in patients. In 1891, Dr. William B. Coley was the first ever scientist to use an immunotherapy based on the bacteria *Erysipelas* to treat a patient with a range of advanced stage tumors that were too big to be removed through surgery. After treatment this seemingly untreatable patient was cured of his tumors and resumed his regular life (Coley, 1893). Although Dr. Coley did not receive the credits he deserved during his lifetime for this remarkable finding, he is considered the "Father of Immunotherapy". Therefore, 1891 marks the year that the first patient ever was cured of cancer using immunotherapy. The year 1891 will be a part of PoSciDonDAO forever as the initial total supply of $SCI will be set to 18,910,000 tokens (see Figure 3).

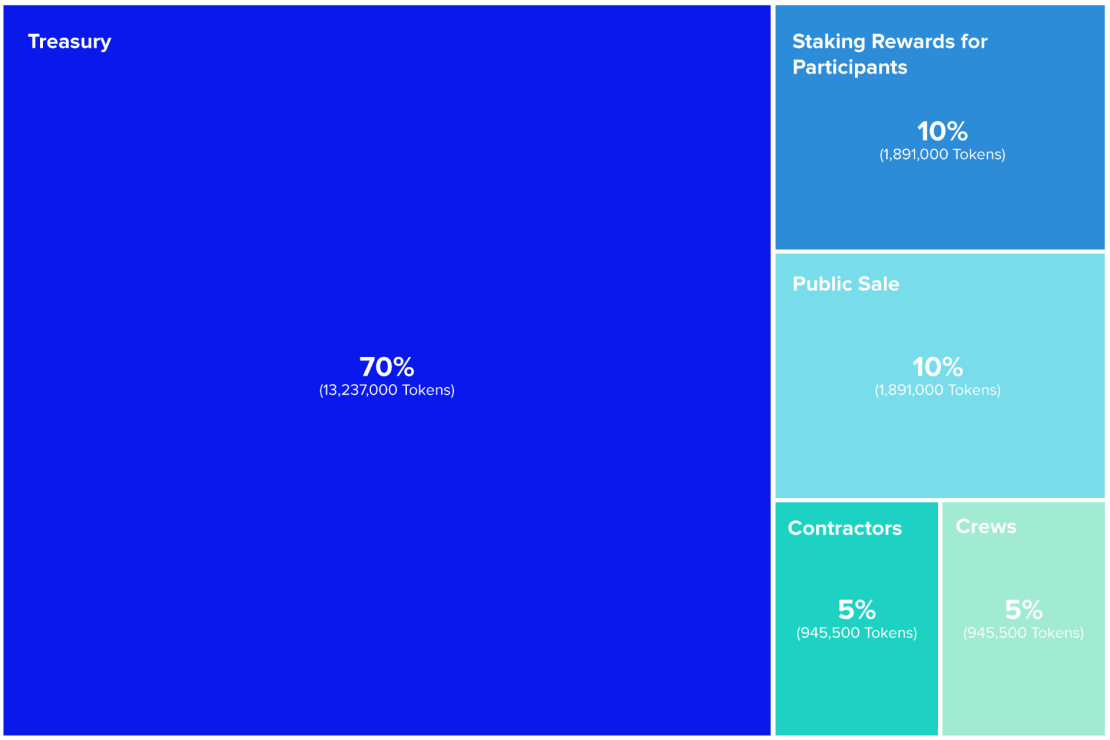

Figure 3 - Allocation of Tokens to Stakeholders.
The initial supply is the sum of all allocated tokens: 18910000 $SCI.

Public Token Sale

The public sale of the $SCI token will be completed in a transparent and non-discriminatory manner. This will be achieved by using a lockdrop + liquidity bootstrapping auction (LLBA) modeled after Delphi Digitals' LLBA (Delphi Digital, 2022). An LLBA ensures that price discovery and distribution of tokens is done in a fair and transparent way. As the name already indicates, an LLBA consists of two phases, the Lockdrop and the Liquidity Bootstrap Auction.

The Lockdrop phase, also known as the distribution phase, is an airdrop of the $SCI token to anyone involved in PoSciDonDAO including, but not limited to, contributors/crew members. The amount of tokens that will be airdropped, depends on how much has been contributed. However, these airdropped tokens are locked until the end of the second phase.

The Liquidity Bootstrap Auction (LBA), also known as the price-discovery phase, is the second phase of this Protocol. The LBA will be done through Fjord Foundry on the Polygon network with the aim to create a $SCI-$USDC liquidity pool and to allow community members to decide the initial $SCI token price (Fjord Foundry, 2023). During this phase, members that were part of the Lockdrop phase can choose to deposit a portion or all of their lockdropped $SCI into one side of the liquidity pool. Additional tokens will be provided by PoSciDonDAO to assure that 10% of the allocated tokens are made available during the LBA. After $SCI tokens have been committed, other members can then provide $USDC to the liquidity pool, effectively buying $SCI tokens from participants of the Lockdrop phase and from PoSciDonDAO. An estimated $3,000,000 is needed to fund the initial research projects, and this number will be set as a requirement for a successful LBA.

Token Use Case Summary
After tokens have been distributed to donors and contributors, the $SCI token can be traded or held. Holders of these tokens have the choice to lock them to vote on the future of the DAO. More information about our governance systems can be found in Section 2.4 "Governance Structure". If scientists were able to generate data and intellectual property and PoSciDonDAO was able to successfully commercialize those assets, a portion of the revenue will be used to buy back $SCI tokens. More information about the distribution of possible proceeds and the token buy back can be found in Section 2.6.3 "Distribution of Proceeds".

2.2.2 $PO Token

In order to incentivize participation in PoSciDonDAO's governance framework, every time a $SCI token holder participates in governance by voting on proposals, they will receive a proof of participation ($PO) token (see Figure 4). Users can obtain the $PO token once the $SCI token has been offered to community members and investors and once the first proposal has been established. The $PO token is an account-bound NFT that can be exchanged for rewards on the PoSciDonDAO Protocol. The more you participate, the more $PO tokens you can exchange for $SCI tokens and in the future other rewards.

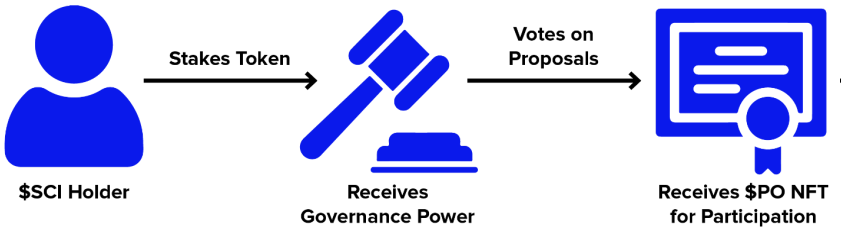

Figure 4 - Earning $PO tokens

2.3 On-chain Donations

Approximately 50-60% of the donations given to fundraisers for charities, actually reach the charities (James, 2022). Furthermore, there are many middlemen between charities and scientists, further decreasing the amount of money reaching the scientists. Therefore, PoSciDonDAO Protocol allows you to donate on-chain using WETH, MATIC or USDC. More than 95% of the funds donated will go directly to the selected scientific research projects. The remaining 5% will be sent to the treasury.

2.4 Governance Structure

Anyone that holds PoSciDonDAO's $SCI tokens or locks them through the PoSciDonDAO Protocol is considered a PoSciDonDAO member. Our members play a crucial role in shaping the future of personalized medicine. By participating in governance, they don't just oversee the allocation of funds but actively contribute to steering the research focus and strategies, directly impacting the potential for scientific breakthroughs and financial returns. All token-based voting

will be done through our Protocol. The governance structure can be split up into two main parts: DAO operations governance and scientific research funding governance.

2.4.1 DAO Operations Governance

This governance architecture is dedicated to proposals not related to the funding of scientific research. These proposals can be created and shared with the community by any member. However, only Due Diligence Crew composition, and funding- and tokenomics-related proposals will require token-based voting through our Protocol. For example, if you think our marketing crew needs to receive more funding to complete their tasks, you can follow these steps:

1. Initiate a discussion on your proposal idea to determine if other community members support it.
2. Members can write a proposal and share the first draft of the proposal by posting it in the "proposal" channel on Discord.
3. The other community members will be able to provide feedback to the proposal and the proposer will refine the proposal until all feedback has been implemented.
4. For token-based voting on the proposal, the final version must be uploaded to our Protocol. The community can then exert their voting power using their $SCI tokens.
5. The proposal will be implemented into PoSciDonDAO once more than 2.5% of the holders support the proposal, otherwise it will be rejected. The quorum of 2.5% is subject to change.

The DAO operations proposals not related to the allocation of funds will follow a more time-efficient approach. These proposals are often held within crews or during the due diligence of scientific research projects. In this scenario, a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis will be made by the proposer and each participant will only have one vote. Crews should limit their amount of votes to 1 to 3 per meeting. To know more about PoSciDonDAO's operations governance process, please visit https://protocol.poscidondao.com/governance/.

2.4.2 Scientific Research Governance

During the funding process of scientific research, we aim to reach 100% transparency. The DAO determines through the operations governance system who becomes part of the Due Diligence Crew. This crew votes through the scientific research governance system which projects are going to receive funding. Each due diligence member has one vote and, at any time, members of the Due Diligence Crew can be added or removed, as long as the DAO votes in favor of that change. To know more about the scientific research funding governance process, please visit https://protocol.poscidondao.com/governance.

2.4.3 Voting

For a user to become a PoSciDonDAO member and to be eligible to vote, the following steps need to be taken:

1. You can buy $SCI tokens through our liquidity bootstrap auction.
2. Go to https://protocol.poscidondao.com/
3. You can log in by connecting an existing account, also known as a wallet, or by creating a new account using your email address.
4. Lock your SCI tokens at https://protocol.poscidondao.com/staking/
5. Visit the governance tab and select the amount of tokens you want to allocate to DAO operations proposals.

2.5 PoSciDonDAO Crews

A crew can be seen as a group of experts that contribute to PoSciDonDAO by completing tasks. Anyone can join a crew based on their experience or expertise in the chosen crew. PoSciDonDAO has several crews:

1. Due Diligence
2. Operations
3. Legal
4. Governance
5. Tokenomics

Initially, PoSciDonDAO will focus on setting up the Operations and Due Diligence Crews. The Operations alliance focuses on awareness and organization of PoSciDonDAO. The Due Diligence alliance is dedicated to finding and reviewing high quality personalized medicine-related research projects that are in need of funding. After the initial $SCI token offering, the Legal and Governance Crews will be initiated, followed by the Tokenomics Crew. Additional crews may arise if needed.

2.6 Business Model

As the scientific research progresses of projects funded by PoSciDonDAO, datasets and intellectual properties will be generated. These assets can then be commercialized through licensing (see Figure 5).

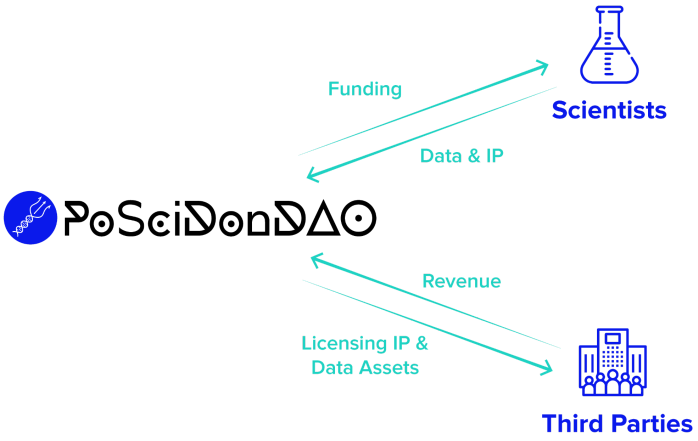

Figure 5 - Business Model Overview

2.6.1 Data Assets and Commercialization

During scientific research, much data and valuable datasets will be created. Research-related data include but are not limited to raw and processed flow cytometry data, dose-response data (e.g. cell viability), sequencing data, protein-related data (e.g. mass spectrometry and western blots), RNA-related data (e.g. single or multiplex RT-qPCR and northern blots) and microscopic data. The term data further includes *in vitro* (e.g. cell culture) and *in vivo* (e.g. mice) models, laboratory reports, half-yearly updates and displayable items such as final figures for publication. There are various stages of data generation:

1. **Preliminary data**: This is data that is often generated on a small scale, which can also be considered early proof-of-concept experiments. This data will be shared with community members to keep them up to date on the ongoing research and to show progress is being made. This data will not be fully disclosed to prevent compromising the potential to turn the preliminary data into intellectual property.
2. **Intellectual property data**: This is data that has been confirmed multiple times on larger scale experiments compared to preliminary data. The exposure of this data to community members will be limited as it will be used to file for patents.
3. **Public data**: This consists of data that are viewable by members and will be monetized through decentralized data marketplaces.

PoSciDonDAO will own all the data assets and results from the funded research. PoSciDonDAO will safekeep the data and make it available to its community depending on the aforementioned stages of data generation. PoSciDonDAO will attempt to monetize the datasets through OceanONDA, a decentralized data marketplace built by Ocean's Protocol (Ocean Protocol, 2022). OceanONDA allows data owners to mint NFTs that represent exclusive licensing rights to their provided data.

2.6.2 Intellectual Property Filing and Commercialization

Prior to submission of research projects, scientists are required to describe their approach to generate intellectual property (IP) and one or more ways to protect the IP during the lifetime of the project and to eventually commercialize it. Although obtaining enough data to support the filing of IP is the primary objective of scientists; and this approach on how to obtain and commercialize IP is tentative, it helps scientists to focus on the economic side of their research. Then it is up to the Due Diligence and Legal Crews to assess the achievability of their proposed approach to IP filing and commercialization. If the shared approach is not feasible, an alternative method will be provided by the same crews.

After the community has voted on a project to obtain funding, PoSciDonDAO will have ownership over the potential IP rights. Depending on the aim and the scientific output of the research project, the patentability of findings can fall into four different categories according to the United States Patent Law: method, machine, article of manufacture or composition of matter. All four categories will be explored by the Due Diligence and Legal Crews to maximize the patentability of scientific research findings.

Once IP has been granted, the IP will be included in weDEA's IP framework (weDEA, 2024). Through weDEA, PoSciDonDAO aims to create an extensive portfolio of intellectual property that can be enforced by weDEA's extensive lawyer network.

The incentive to innovate and generate IP and to maintain the right to health for the general public is a longstanding dilemma (Khachigian, 2020). PoSciDonDAO's IP portfolio and eventually marketable treatments will be governed by a community that can benefit the most from those treatments. Based on the prices set by PoSciDonDAO's community, treatments could become more accessible to the public. Consequently, the right to health will be more widespread and lower prices can possibly make a dent in alleviating the pressure of the high prices governments, insurance companies and patients have to pay for novel treatments.

2.6.3 Distribution of Proceeds

Once PoSciDonDAO's funded projects are able to generate proceeds, they will be distributed to the treasury and to the scientists. Additionally, a portion of the revenue will be used to buy back $SCI tokens as described in Section 2.2.1 "Features" (see Figure 6).

Figure 6 - Distribution of Potential Revenue.

3 Example of the Initial Scientific Research Funding Life Cycle

PoSciDonDAO hopes to fund its first research project through the offering of $SCI tokens. Providing a proof-of-concept of PoSciDonDAO's approach to revolutionizing the scientific research funding process. The life cycle of funding a scientific research project through PoSciDonDAO's Protocol could be as follows:

1. Members acquire $SCI through the liquidity bootstrap auction.
2. $SCI token holders lock their tokens allowing them to gain governance power and determine which scientists will be part of the Due Diligence Crew.
3. PoSciDonDAO provides the initial batch of research projects that are eligible for funding.
4. Due Diligence Crew members can then vote through the PoSciDonDAO Protocol on which projects should receive funding.
5. Once a research project has received the most votes, that project will be eligible for funding.
6. Ownership and profit distribution of potential IP and data assets between PoSciDonDAO and researchers will be determined before funds are distributed.
7. PoSciDonDAO's multi signature treasury wallet will execute the passed proposal by transacting the funds on-chain to the researchers leading the chosen research project.
8. Prior and during the research progress, a range of approaches to file and commercialize intellectual property and to license data will be discussed with the researchers.

9. Upon the generation of the monetizable assets such as intellectual property and datasets, funds will be distributed according to the predetermined terms of ownership and profit distribution.

4 Conclusion

The described efficient funding route for personalized medicine research targeting life-altering diseases can significantly reduce the political, institutional and personal bias that currently affects the research funding process. This novel streamlined funding process will lead to more capital for scientists and, thus, more personalized medicine research can be executed. Together with a dual-token model, PoSciDonDAO reinvents the incentives of the scientific funding process as scientists, investors, entrepreneurs, donors, lawyers and other biotech enthusiasts are incentivized to be a part of PoSciDonDAO's goal to become a decentralized biotech organization. Token stakeholders obtain governance power that can be used to vote on proposals that can be about every aspect of the scientific funding process, the commercialization of data and intellectual property and beyond. As community members can determine the pricing of licenses of IP, data and eventually, approved drugs and treatment regiments, this will significantly increase access and availability of treatments to the patients that need them. Ultimately, this will create a paradigm shift in the current academic and biopharmaceutical system, advancing scientific research and patient care.

5 Glossary

1. **Decentralized Autonomous Organization (DAO):** An organization run through rules encoded as computer programs (smart contracts) on a blockchain. It operates autonomously without centralized control, with decisions made collectively by its members.

2. **Personalized Medicine:** A medical approach focusing on individual patient characteristics, especially genetic makeup, to develop targeted treatments. It aims to ensure the right patient group receives the most effective treatment.

3. **Polygon:** A blockchain platform that enhances the scalability and efficiency of Ethereum. It's a sidechain that processes transactions faster and with lower fees, while still maintaining compatibility with Ethereum's infrastructure.

4. **Smart Contracts:** Programs stored on a blockchain that run when predetermined conditions are met. They automate the execution of agreements, ensuring that all participants know the outcome without an intermediary.

5. **$SCI Token:** A tradable digital token in the PoSciDonDAO ecosystem. It provides governance power. It can be earned or traded and is central to the DAO's ecosystem.

6. **$PO Token:** A non-tradable, non-fungible token (NFT) in PoSciDonDAO, representing proof of participation in governance activities. It can be exchanged for $SCI tokens and other rewards, enhancing engagement in the DAO.

7. **Locking:** The process of holding cryptocurrency in a wallet to support the operations of a blockchain network. In PoSciDonDAO, locking $SCI tokens gives governance rights and potential rewards.

8. **Liquidity Bootstrapping Auction (LBA):** A type of token sale aiming for fair distribution of tokens and price discovery. It consists of an auction (price-discovery phase) to determine the initial token price followed by the creation of a liquidity pool.

9. **Governance:** The system through which decisions are made in a DAO, typically involving proposals and voting by token holders. In PoSciDonDAO, governance includes decisions on scientific research funding and DAO operations.

10. **Due Diligence Crew:** A group within PoSciDonDAO responsible for reviewing and accepting research projects for funding. They ensure the quality and feasibility of the projects proposed for DAO funding.

11. **NFT (Non-Fungible Token):** A type of digital asset representing ownership of a unique item or content, stored on a blockchain.

12. **Data Assets and Commercialization:** The process of monetizing data and intellectual property generated from funded research projects, often through licensing or other means of distribution.

13. **On-Chain Donations:** Contributions made directly on the blockchain, enhancing transparency and efficiency. In PoSciDonDAO, these donations fund scientific research projects with minimal intermediary involvement.

6 References

BitDAO. "Introduction." *BitDAO*, 2023, https://docs.bitdao.io/.

Coley, W B. "The Treatment of Malignant Tumors by Repeated Inoculations of Erysipelas. With a Report of Ten Original Cases." *Clinical orthopedics and related research*, 1893, https://pubmed.ncbi.nlm.nih.gov/1984929/

Delphi Digital. "Introducing Lockdrop + LBA: A Novel Token Launch Mechanism." *Delphi Digital*, 1 Mar. 2023, https://members.delphidigital.io/reports/introducing-lockdrop-lba-a-novel-token-launch-mechanism/.

Fasco, Mason. "Yield Quality in Crypto Markets." *Tokenomics Newsletter*, 12 July 2022, https://tokenomicsdao.substack.com/p/yield-quality-in-crypto-markets/.

Fjord Foundry. "What Is a Liquidity Bootstrapping Pool (LBP) + Features." *What Is a Liquidity Bootstrapping Pool (LBP) + Features - Fjord Foundry Docs*, https://help.fjordfoundry.com/fjord-foundry-docs/welcome-info/what-is-a-liquidity-bootstrapping-pool-lbp-+-features/.

Frazzei, Giulia et al. "Preclinical Autoimmune Disease: a Comparison of Rheumatoid Arthritis, Systemic Lupus Erythematosus, Multiple Sclerosis and Type 1 Diabetes." Frontiers in immunology vol. 13 899372. 30 June. 2022, https://www.frontiersin.org/articles/10.3389/fimmu.2022.899372/full

James, Letitia. "Pennies for Charity." November 2022, https://ag.ny.gov/sites/default/files/2022-pennies-for-charities-report.pdf.

Khachigian, Levon M. "Pharmaceutical Patents: Reconciling the Human Right to Health with the Incentive to Invent." *Drug Discovery Today*, U.S. National Library of Medicine, July 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7169928/.

MakerDAO. "On-Chain Governance." *On-Chain Governance - Maker Operational Manual*, 2017, https://manual.makerdao.com/governance/voting-in-makerdao/on-chain-governance/.

McConaghy, Trent. "The Web3 Sustainability Loop." *Medium*, Ocean Protocol, 2 Oct. 2021, https://blog.oceanProtocol.com/the-web3-sustainability-loop-b2a4097a36e/.

Ocean Protocol."OceanONDA V4 Is Now Live with Data NFTs, Solving Rug Pulls and Better Community Monetization." *Ocean Protocol*, Mar. 2023, https://oceanProtocol.com/press/2022-06-08-ocean-onda-v4-live/.

OpenZeppelin. "Contracts." *OpenZeppelin Docs*, https://docs.openzeppelin.com/contracts/4.x/.

"Section 3: Funding Scientific Research." Pew Research Center - U.S. Politics & Policy, Pew Research Center, 9 July 2009, https://www.pewresearch.org/politics/2009/07/09/section-3-funding-scientific-research/.

Say, Nicholas. "Magic Link: Developer SDK for Easy web3 Onboarding." *Blockonomi*, 9 May 2022, https://blockonomi.com/magic-link/.

Schärfe, Charlotta Pauline, et al. "Genetic variation in human drug-related genes." Genome Medicine, vol. 9, no. 1, 2017, https://doi.org/10.1186/s13073-017-0502-5.

Shekhtman, Louis M., et al. "Mapping Philanthropic Support of Science." ArXiv.org, 8 Dec. 2022, https://doi.org/10.48550/arXiv.2206.10661.

Siegel, Rebecca L., et al. "Cancer Statistics, 2018." *CA: A Cancer Journal for Clinicians*, vol. 68, no. 1, 2018, pp. 7–30, https://doi.org/10.3322/caac.21442.

Sun, Duxin, et al. "Why 90% of clinical drug development fails and how to improve it?" Acta Pharmaceutica Sinica B, vol. 12, no. 7, 2022, pp. 3049–3062, https://doi.org/10.1016/j.apsb.2022.02.002.

Torres, Carolina, and Paul J Grippo. "Pancreatic Cancer Subtypes: A Roadmap for Precision Medicine." *Annals of Medicine*, June 2018, www.ncbi.nlm.nih.gov/pmc/articles/PMC6151873/.

Wackerow, Paul. "Introduction to Smart Contracts." *Ethereum.org*, 2 Sep. 2022, https://ethereum.org/en/developers/docs/smart-contracts/.

WeDea. "Taking the 'I' out of 'Inventor.'" *weDEA*, 2024, www.wedea.org/index.html/.

7 Join our Community