Bio Protocol (BIO)
White paper

In accordance with Title II of Regulation (EU) 2023/1114 (MiCA)

N	Field	Content
0	Table of content	

		Energy consumption sources and methodologies 34
01	Date of notification	2025-06-12
02	Statement in accordance with Article 6(3) of Regulation (EU) 2023/1114	This crypto-asset white paper has not been approved by any competent authority in any Member State of the European Union. The operator of the trading platform of the crypto-asset is solely responsible for the content of this crypto-asset white paper.
03	Compliance statement in accordance with Article 6(6) of Regulation (EU) 2023/1114	This crypto-asset white paper complies with Title II of Regulation (EU) 2023/1114 and, to the best of the knowledge of the management body, the information presented in the crypto-asset white paper is fair, clear and not misleading and the crypto-asset white paper makes no omission likely to affect its import.
04	Statement in accordance with Article 6(5), points (a), (b), (c) of Regulation (EU) 2023/1114	The crypto-asset referred to in this white paper may lose its value in part or in full, may not always be transferable and may not be liquid.
05	Statement in accordance with Article 6(5), point (d) of Regulation (EU) 2023/1114	false
06	Statement in accordance with Article 6(5), points (e) and (f) of Regulation (EU) 2023/1114	The crypto-asset referred to in this white paper is not covered by the investor compensation schemes under Directive 97/9/EC of the European Parliament and of the Council. The crypto-asset referred to in this white paper is not covered by the deposit guarantee schemes under Directive 2014/49/EU of the European Parliament and of the Council.

<table>
<tr><td colspan="3">Summary</td></tr>
<tr><td>07</td><td>Warning in accordance with Article 6(7), second subparagraph of Regulation (EU) 2023/1114</td><td>Warning
This summary should be read as an introduction to the crypto-asset white paper. The prospective holder should base any decision to purchase this crypto-asset on the content of the crypto-asset white paper as a whole and not on the summary alone. The admission to trading of this crypto-asset does not constitute an offer or solicitation to purchase financial instruments and any such offer or solicitation can be made only by means of a prospectus or other offer documents pursuant to the applicable national law. This crypto-asset white paper does not constitute a prospectus as referred to in Regulation (EU) 2017/1129 of the European Parliament and of the Council (36) or any other offer document pursuant to Union or national law.</td></tr>
<tr><td>08</td><td>Characteristics of the crypto-asset</td><td>BIO is a governance token of the Bio Protocol project. BIO holders may use their tokens to propose or vote on decisions (such as which BioDAO projects to support, protocol upgrades, and token distribution programs) and to gain access to certain ecosystem privileges (for example, participation in BioDAO funding rounds or whitelists for early research project investments). BIO token holders have the ability (but not the obligation) to lock or stake tokens for enhanced governance influence (via vBIO voting tokens) and for potential rewards in the network.

BIO’s initial supply was 3 320 000 000 distributed as follows:

<table>
<tr><th>Category</th><th>Allocation</th></tr>
<tr><td>Ecosystem Incentives</td><td>25%</td></tr>
<tr><td>Early Contributors</td><td>21,2%</td></tr>
<tr><td>Community Auction</td><td>20%</td></tr>
<tr><td>Early Backers</td><td>13,6%</td></tr>
<tr><td>Community Airdrop</td><td>6%</td></tr>
<tr><td>Molecule</td><td>5%</td></tr>
<tr><td>Molecule Ecosystem Fund</td><td>5%</td></tr>
<tr><td>Advisors</td><td>4,2%</td></tr>
</table>

BIO tokens are freely transferable, in whole or in part, to third parties, and all associated usage rights and obligations follow the token upon transfer.</td></tr>
</table>

09	Information about the quality and quantity of goods or services to which the utility tokens give access and restrictions on the transferability	N/A
10	Key information about the offer to the public or admission to trading	Kraken seeks admission to trading of the BIO token so as to be compliant with MiCA and in keeping with its mission to make available for trading to its clients a wide range of assets.
Part I – Information on risks		
I.1	Offer-Related Risks	**General Risk Factors Associated with Crypto-Asset Offerings** The admission to trading of crypto-assets, including BIO, is subject to general risks inherent to the broader cryptocurrency market. **Market Volatility** The value of BIO may experience substantial fluctuations driven by investor sentiment, macroeconomic developments, and market conditions. **Regulatory Risks** Changes in legislation, applicable laws, compliance requirements or the implementation of new regulatory frameworks could affect the availability, trading, or use of such assets. **Security Risks** The risk of exploitation, hacking or security vulnerabilities of the underlying protocol and/or contracts of the token leading to a loss. **Reputational Risks** The potential for damage to an organization's credibility or public trust, which can negatively impact stakeholder confidence and overall business viability**.**
I.2	Issuer-Related Risks	**Limited Operating History** Bio.xyz Association is a newly established entity (formed in 2023) and thus lacks a long track record. It may face challenges in effectively managing the Bio Protocol's development, coordinating the community, or handling regulatory compliance due to limited historical data to guide decision-making.

		Key Person Risk and Governance The Bio Protocol project, especially in its early phase, has been driven by a core team of founders and contributors (including those affiliated with Molecule and VitaDAO). The departure of one or more key individuals, for example, project leads or scientists who have been instrumental, could slow down development or disrupt strategic direction. **Financial Sustainability of the Association** The Association's funding for operations comes mainly from token allocations and reserves. If the costs of running the project (for example, funding many BioDAOs, platform maintenance, etc.) outpace these resources, the Association might face financial difficulties. There is a risk that, in extreme scenarios, the Association could become insolvent or unable to continue to support the project's infrastructure, which would severely impact the value and utility of BIO. **Jurisdictional Uncertainty** The issuer's precise jurisdiction and applicable legal obligations have not been fully disclosed; this uncertainty may pose administrative hurdles and affect access to banking or other services.
I.3	Crypto-Assets-related Risks	**Market Volatility** The crypto-asset market is subject to significant price volatility, which may affect the value of BIO. Prices can fluctuate rapidly and unpredictably due to various factors, including market sentiment, economic indicators, technological developments, regulatory news, and macroeconomic trends. This high level of volatility may lead to sudden gains or losses and can impact the liquidity and tradability of the crypto-asset. **Liquidity** Liquidity refers to the ability to buy or sell a crypto-asset without causing significant price impact. BIO may experience periods of low liquidity, meaning that it could be difficult to enter or exit positions at desired prices or volumes. Reduced liquidity may result from limited market participation, exchange restrictions, or broader market conditions. This can lead to increased price volatility, slippage, and difficulty in executing transactions. **Cybersecurity & Technology Risks** Risks arising from vulnerabilities in the blockchain technology used by the project or platforms. Example risks include smart contract exploits, compromise of platforms, forking scenarios, compromise of cryptographic algorithms. **Adoption Risks** The risk associated with the project not achieving its goals leading to lower than

		expected adoption and use within the ecosystem, the impact leading to a reduced utility and value proposition. **Custody & Ownership Risk** The risk related to the inadequate safekeeping and control of crypto-assets e.g. loss of private keys, custodian insolvency leading to a loss. **Bridge and Multi-Chain Risk** Because BIO operates on two blockchains, it relies on a cross-chain bridge (Wormhole) for interoperability. While this expands BIO's usability, it introduces an additional risk: if the Wormhole bridge were to be compromised or fail, BIO tokens could become temporarily non-transferable between Ethereum and Solana, leading to confusion or value discrepancies between the two versions. A severe bridge incident (such as a hack) could undermine confidence in the token and potentially affect its price on either or both networks. **Supply Inflation Risk** BIO's supply is uncapped, so additional tokens can be minted through governance decisions. This could dilute existing holders and put downward pressure on BIO's value.
I.4	Project Implementation-Related Risks	**Development Delays or Shortfalls** There is a risk that some planned features or milestones are delayed or not achieved. Such delays could reduce confidence in the project or limit the token's utility growth, affecting BIO's appeal to holders. **BioDAO Performance Risk** The value of the Bio Protocol network ultimately depends on the success of individual BioDAOs in producing meaningful research and potential IP. If BioDAOs fail to produce notable outcomes (e.g., research that leads to breakthroughs or profitable IP tokens), the broader project could lose momentum. In turn, this would mean BIO holders are governing an ecosystem with limited tangible results, which could negatively impact the token's perceived value. **Scaling and Infrastructure Risk** Rapid growth of the Bio Protocol (if many BioDAOs join and user activity surges) could strain the current platform infrastructure. Challenges may include managing a high volume of governance proposals, on-chain transactions, and coordinating across an increasing number of communities. If the project's technical infrastructure or organizational capacity does not scale adequately, it could lead to inefficiencies or failures (for instance, governance gridlock or technical downtime). This risk can hinder project implementation and in a worst case cause loss of user trust.

		Community and Governance Coordination The Bio Protocol relies on decentralized governance. Achieving consensus on important decisions (such as how to allocate treasury funds or which projects to incubate) can be complex. There is a risk that the community governance process becomes contentious or stagnant. Poor coordination or conflict in governance could slow down or derail project initiatives, meaning certain implementation goals aren't met on time or at all. This, in turn, would reflect on BIO's utility and could diminish its value as the project's progress falters. **External Partnership Risk** The project's implementation partly depends on partnerships (with research institutions, biotech companies, etc.) to provide real-world impact. If anticipated collaborations do not materialize or existing partners withdraw support, the project might struggle to provide value beyond the crypto sphere. This risk implies that without integration into the broader biotech research community, Bio Protocol could face hurdles in implementation, affecting the token's narrative and adoption by a mainstream audience.
I.5	Technology-Related Risks	**Smart contract risks** BIO uses smart contracts to facilitate automated transactions and processes. While these contracts enhance efficiency and decentralization, they also introduce specific technical risks. Vulnerabilities such as coding errors, design flaws, or security loopholes within the smart contract code may be exploited by malicious actors. Such exploits could result in the loss of assets, unauthorized access to sensitive information, or unintended and irreversible execution of transactions. **Blockchain Network Risks** BIO operates on a public blockchain infrastructure, which is maintained by a decentralized network of participants. The functionality and reliability of the crypto-asset are dependent on the performance and security of the underlying blockchain. Risks may include network congestion, high transaction fees, delayed processing times, or, in extreme cases, outages and disruptions. Additionally, vulnerabilities or failures in the consensus mechanism, attacks on the network (e.g., 51% attacks), or protocol-level bugs could impact the operation and availability of BIO. **Risk of Cryptographic Vulnerabilities** Technological advancements, such as quantum computing, could pose potential risks to cryptocurrencies. **Privacy** Transactions involving BIO are recorded on a public blockchain, where

		transaction data is transparent and permanently accessible. While public addresses do not directly reveal personal identities, transaction histories can be analyzed and, in some cases, linked to individuals through data aggregation or external information sources. This transparency may pose privacy concerns for users seeking confidentiality in their financial activity. Participants should be aware that transaction data on public blockchains is not inherently private and could be subject to scrutiny by third parties, including regulators, analytics firms, or malicious actors. **Oracle and Data Risks** Some functionality in Bio Protocol may rely on external data oracles or cross-chain bridges (the Wormhole bridge being an example). If these components fail or are manipulated (e.g., an oracle providing incorrect data about a research milestone, or the Wormhole bridge experiencing an exploit), it can lead to improper system behavior. For instance, a bridge failure might isolate BIO liquidity on one chain, or a faulty oracle might trigger undeserved reward distributions. Such technical failures can erode confidence and cause financial loss to token holders who rely on those systems functioning correctly.
I.6	Mitigation measures	**Use of Established Standard** BIO is implemented using well-tested token standards (SPL on Solana and ERC20 on Ethereum) which have been widely used and vetted. By adhering to standard protocols and not using unproven custom code where unnecessary, the project reduces the likelihood of unknown bugs. **Security Audits** The BIO smart contract and related platform contracts have undergone security auditing by Pashov Audit Group. This audit process helps identify and address potential vulnerabilities, thereby reducing the risk of smart contract failures or exploits. **Community Governance** BIO's governance system enables stakeholders to vote on protocol changes. This decentralized process allows the community to respond to risks (e.g. economic imbalances) by adjusting parameters, funding audits, or implementing emergency upgrades through transparent decision-making. While not a technical safeguard, governance serves as an adaptive mechanism to mitigate long-term systemic and coordination risks.
Part A - Information about the offeror or the person seeking admission to trading		
A.1	Name	N/A

A.2	Legal form	N/A
A.3	Registered address	N/A
A.4	Head office	N/A
A.5	Registration Date	N/A
A.6	Legal entity identifier	N/A
A.7	Another identifier required pursuant to applicable national law	N/A
A.8	Contact telephone number	N/A
A.9	E-mail address	N/A
A.10	Response Time (Days)	N/A
A.11	Parent Company	N/A
A.12	Members of the Management body	N/A
A.13	Business Activity	N/A

A.14	Parent Company Business Activity	N/A
A.15	Newly Established	N/A
A.16	Financial condition for the past three years	N/A
A.17	Financial condition since registration	N/A
Part B - Information about the issuer, if different from the offeror or person seeking admission to trading		
B.1	Issuer different from offeror or person seeking admission to trading	true
B.2	Name	Bio.xyz Association
B.3	Legal form	Unknown
B.4	Registered address	Not publicly available
B.5	Head office	N/A
B.6	Registration Date	Not publicly available
B.7	Legal entity identifier	Not publicly available

B.8	Another identifier required pursuant to applicable national law	Not publicly available
B.9	Parent Company	Not publicly available
B.10	Members of the Management body	Not publicly available
B.11	Business Activity	Not publicly available
B.12	Parent Company Business Activity	Not publicly available
Part C- Information about the operator of the trading platform in cases where it draws up the crypto-asset white paper and information about other persons drawing the crypto-asset white paper pursuant to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114		
C.1	Name	Payward Global Solutions LTD
C.2	Legal form	N/A
C.3	Registered address	N/A
C.4	Head office	N/A
C.5	Registration Date	11-07-2023
C.6	Legal entity identifier of the operator of the trading platform	9845003D98SCC2851458

<table>
<tr><td>C.7</td><td>Another identifier required pursuant to applicable national law</td><td>N/A</td></tr>
<tr><td>C.8</td><td>Parent Company</td><td>N/A</td></tr>
<tr><td>C.9</td><td>Reason for Crypto-Asset White Paper Preparation</td><td>Kraken seeks admission to trading of the BIO token so as to be compliant with MiCA and in keeping with its mission to make available for trading to its clients a wide range of assets.</td></tr>
<tr><td>C.10</td><td>Members of the Management body</td><td>
<table>
<tr><th>Full Name</th><th>Business Address</th><th>Function</th></tr>
<tr><td>Shannon Kurtas</td><td>70 Sir John Rogerson's Quay, Dublin 2, Ireland</td><td>Board Member</td></tr>
<tr><td>Andrew Mulvenny</td><td>70 Sir John Rogerson's Quay, Dublin 2, Ireland</td><td>Board Member</td></tr>
<tr><td>Shane O'Brien</td><td>70 Sir John Rogerson's Quay, Dublin 2, Ireland</td><td>Board Member</td></tr>
<tr><td>Laura Walsh</td><td>70 Sir John Rogerson's Quay, Dublin 2, Ireland</td><td>Board Member</td></tr>
<tr><td>Michael Walsh</td><td>70 Sir John Rogerson's Quay, Dublin 2, Ireland</td><td>Board Member</td></tr>
</table>
</td></tr>
<tr><td>C.11</td><td>Operator Business Activity</td><td>PGSL is the operator of a Trading Platform for Crypto Assets, in accordance with Article 3(1)(18) of Regulation (EU) 2023/1114 (MiCA).</td></tr>
<tr><td>C.12</td><td>Parent Company Business Activity</td><td>Payward, Inc., a Delaware, USA corporation, is the parent company of a worldwide group of subsidiaries (the following paragraphs use the term "Payward" or “Payward Group” to refer to the group) collectively doing business as “Kraken.” Payward’s primary business is the operation of an online virtual asset platform that enables clients to buy and sell virtual assets on a spot basis, including the transfer of crypto-assets to and from external wallets.

Payward, through its various affiliates, offers a number of other services and products, including:</td></tr>
</table>

		* A trading platform for futures contracts on virtual assets (“Kraken Derivatives”); * A platform for buying and selling NFTs; * An over-the-counter (“OTC”) desk; * Extensions of margin to support spot trading of virtual assets; * A benchmark administrator; and * Staking services.
C.13	Other persons drawing up the crypto-asset white paper according to Article 6(1), second subparagraph, of Regulation (EU) 2023/1114	N/A
C.14	Reason for drawing the white paper by persons referred to in Article 6(1), second subparagraph, of Regulation (EU) 2023/1114	N/A
Part D- Information about the crypto-asset project		
D.1	Crypto-asset project name	Bio Protocol
D.2	Crypto-assets name	Bio Protocol
D.3	Abbreviation	BIO
D.4	Crypto-asset project description	Bio Protocol is an open, decentralised platform that lets anyone fund, develop and govern tokenised scientific intellectual-property (IP). Its core mission is to accelerate biotech and life-science R&D by turning research projects into “BioDAOs”, domain-focused DAOs that raise capital on-chain, coordinate researchers, and issue IP-NFTs or BioDAO tokens to represent ownership

		interests. BIO (the governance token) sits above these BioDAOs and serves as the meta-governance and incentive layer for the whole network. Holders stake or lock BIO to curate incoming BioDAO proposals, vote on treasury-spend and protocol upgrades, and gain priority access to new BioDAO token sales. The long-term vision is a “DAO-of-DAOs” that aggregates research deal-flow and liquidity, lowering the cost and increasing the speed of bringing new medicines, tools and data assets to market. Bio Protocol originated from Molecule and VitaDAO’s DeSci workstreams.
D.5	Details of all natural or legal persons involved in the implementation of the crypto-asset project	**Legal persons** Bio.xyz Association: stewards the Bio Protocol treasury and governance processes Molecule AG: Zug, Switzerland, provides the original IP-NFT framework, technical know-how and brand assets transferred to Bio.xyz Association **Core contributors** Paul Kohlhaas: Co-founder and CEO of Molecule & BIO James Sinka: R&D, Community Clemens Ortlepp: CPO
D.6	Utility Token Classification	false
D.7	Key Features of Goods/Services for Utility Token Projects	N/A
D.8	Plans for the token	Since its inception, the Bio Protocol project has achieved the deployment of its core smart contracts on Ethereum and Solana, the launch of the BIO token (January 2025), and the rollout of the BioDAO Launchpad platform for incubating new “BioDAOs”. Early success includes multiple BioDAOs (e.g., Curetopia, Nootropics DAO, SpineDAO) joining the network. Please refer to the project team website for any further information regarding future milestones.
D.9	Resource Allocation	Bio Protocol raised ~$30M in 2024 and ~$64M in a public sale. In addition to this, the project also has the following token allocations: 5% Molecule Ecosystem Fund 25% Ecosystem Initiatives

D.10	Planned Use of Collected Funds or Crypto-Assets	The 25% for the Ecosystem Initiatives will be distributed according to governance proposals. The 5% Molecule Ecosystem Fund will be used for research and development of IP tokenization and AI research infrastructure.
Part E - Information about the offer to the public of crypto-assets or their admission to trading		
E.1	Public Offering or Admission to trading	ATTR
E.2	Reasons for Public Offer or Admission to trading	Making secondary trading available to the consumers on the Kraken Trading platform in compliance with the MiCA regulatory framework
E.3	Fundraising Target	N/A
E.4	Minimum Subscription Goals	N/A
E.5	Maximum Subscription Goal	N/A
E.6	Oversubscription Acceptance	N/A
E.7	Oversubscription Allocation	N/A
E.8	Issue Price	N/A

E.9	Official currency or other crypto-assets determining the issue price	N/A
E.10	Subscription fee	N/A
E.11	Offer Price Determination Method	N/A
E.12	Total Number of Offered/Traded crypto-assets	3 320 000 000 total supply with no maximum supply
E.13	Targeted Holders	ALL
E.14	Holder restrictions	N/A
E.15	Reimbursement Notice	N/A
E.16	Refund Mechanism	N/A
E.17	Refund Timeline	N/A
E.18	Offer Phases	N/A
E.19	Early Purchase Discount	N/A

E.20	time-limited offer	N/A
E.21	Subscription period beginning	N/A
E.22	Subscription period end	N/A
E.23	Safeguarding Arrangements for Offered Funds/crypto-assets	N/A
E.24	Payment Methods for crypto-asset Purchase	N/A
E.25	Value Transfer Methods for Reimbursement	N/A
E.26	Right of Withdrawal	N/A
E.27	Transfer of Purchased crypto-assets	N/A
E.28	Transfer Time Schedule	N/A
E.29	Purchaser's Technical Requirements	N/A

E.30	crypto-asset service provider (CASP) name	N/A
E.31	CASP identifier	N/A
E.32	Placement form	NTAV
E.33	Trading Platforms name	N/A
E.34	Trading Platforms Market Identifier Code (MIC)	N/A
E.35	Trading Platforms Access	N/A
E.36	Involved costs	N/A
E.37	Offer Expenses	N/A
E.38	Conflicts of Interest	All listings decisions made by Payward Global Solution Ltd are made independently by staff of the entity in line with internal policies. PGSL publishes a conflicts of interest disclosure on its website advising of potential conflicts that may arise.
E.39	Applicable law	Any dispute relating to this white paper shall be governed by and construed and enforced in accordance with the laws of Ireland without regard to conflict of law rules or principles (whether of Ireland or any other jurisdiction) that would cause the application of the laws of any other jurisdiction, irrespective of whether BIO tokens qualify as right or property under the applicable law.
E.40	Competent court	Any disputes or claims arising out of this white paper will be subject to the exclusive jurisdiction of the Irish courts.

Part F - Information about the crypto-assets		
F.1	Crypto-Asset Type	BIO is classified as a crypto-asset other than an asset referenced token or e-money token under MiCA, (EU) 2023/1114.
F.2	Crypto-Asset Functionality	BIO's primary function is to enable holders to participate in the governance of the Bio Protocol network and its constituent BioDAOs. By holding BIO, individuals can vote on proposals that influence allocation of funding to specific research projects, the onboarding of new BioDAOs, and other protocol upgrades. In addition to that, the Bio Protocol uses BIO as an incentive instrument. Contributors to BioDAOs (for instance, scientists who share data or community members who achieve certain milestones) can earn BIO rewards, aligning their success with the wider network.
F.3	Planned Application of Functionalities	All core functionalities are active.
A description of the characteristics of the crypto-asset, including the data necessary for classification of the crypto-asset white paper in the register referred to in Article 109 of Regulation (EU) 2023/1114, as specified in accordance with paragraph 8 of that Article		
F.4	Type of white paper	OTHR
F.5	The type of submission	NEWT
F.6	Crypto-Asset Characteristics	BIO allows holders to participate in governance, is used for incentives and holders can transfer their tokens freely.
F.7	Commercial name or trading name	Bio Protocol
F.8	Website of the issuer	https://www.bio.xyz/

F.9	Starting date of offer to the public or admission to trading	2025-01-03
F.10	Publication date	2025-07-10
F.11	Any other services provided by the issuer	N/A
F.12	Identifier of operator of the trading platform	PGSL
F.13	Language or languages of the white paper	English
F.14	Digital Token Identifier	TBR0XDRN8
F.15	Functionally Fungible Group Digital Token Identifier	N/A
F.16	Voluntary data flag	Mandatory
F.17	Personal data flag	true
F.18	LEI eligibility	N/A
F.19	Home Member State	Ireland

F.20	Host Member States	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden
Part G - Information on the rights and obligations attached to the crypto-assets		
G.1	Purchaser Rights and Obligations	**Governance** BIO holders may propose and vote on Bio Protocol governance matters (e.g., onboarding new BioDAOs, spending treasury, protocol upgrades). **Obligations of BIO Holders:** There are no mandatory obligations imposed on BIO purchasers beyond the general terms of use of the platform. **Transferability and Trading:** Holders have the ability to transfer their BIO tokens to others (on-chain) or to trade them on available markets at will. Ownership of BIO carries with it the aforementioned access rights, and when a token is transferred, those rights pass to the new holder. The previous holder loses access once they no longer hold the token. This means all rights (which are usage rights) are fully transferable with the token.
G.2	Exercise of Rights and obligations	**Governance** Holders connect a compatible wallet to Snapshot and sign off-chain. **Transfer / Trading** To transfer BIO, a holder signs an ERC-20 (Ethereum) or SPL (Solana) token transaction; settlement typically finalises in ≤ 12 s on Ethereum PoS or sub-second on Solana. Exchange trading follows the venue's standard order-book / AMM rules.
G.3	Conditions for modifications of rights and obligations	The rights and obligations attached to BIO as described in this white paper reflect information available at the time of issuance. This white paper is issued by Kraken and does not constitute a commitment or guarantee by Bio Protocol or any other party regarding future modifications. No promises, warranties, or assurances are made herein regarding future token functionality, and this section is provided solely for informational purposes.
G.4	Future Public Offers	No future public offerings have been announced.
G.5	Issuer Retained Crypto-Assets	The early contributors (team) were allocated 703 840 000 BIO or 21,2%. The Molecule entity received 166 000 000 BIO or 5%.

		Advisors were allocated 139 440 000 BIO or 4,2%
G.6	Utility Token Classification	false
G.7	Key Features of Goods/Services of Utility Tokens	N/A
G.8	Utility Tokens Redemption	N/A
G.9	Non-Trading request	This white paper reflects a request to admit the token to trading.
G.10	Crypto-Assets purchase or sale modalities	N/A
G.11	Crypto-Assets Transfer Restrictions	Kraken may, in accordance with applicable laws and internal policies and terms, impose restrictions on buyers and sellers of these tokens.
G.12	Supply Adjustment Protocols	false
G.13	Supply Adjustment Mechanisms	N/A
G.14	Token Value Protection Schemes	false

G.15	Token Value Protection Schemes Description	N/A
G.16	Compensation Schemes	false
G.17	Compensation Schemes Description	N/A
G.18	Applicable law	Any dispute relating to this white paper shall be governed by and construed and enforced in accordance with the laws of Ireland without regard to conflict of law rules or principles (whether of Ireland or any other jurisdiction) that would cause the application of the laws of any other jurisdiction, irrespective of whether BIO tokens qualify as right or property under the applicable law.
G.19	Competent court	Any disputes or claims arising out of this white paper will be subject to the exclusive jurisdiction of the Irish courts.
Part H – information on the underlying technology		
H.1	Distributed ledger technology	BIO is implemented on Solana and Ethereum. Solana is a public blockchain that uses a combination of Proof-of-Stake (PoS) and Proof-of-History (PoH) for consensus. Ethereum is a public, open-access blockchain that reaches consensus through Proof-of-Stake (PoS). These technologies ensure that BIO transactions can be recorded, validated, and secured in a decentralized manner.
H.2	Protocols and technical standards	The BIO token is based on the Ethereum and Solana protocols, which utilize decentralized Distributed-Ledger Technology. These protocols provide the foundation for secure transactions and smart contracts. ERC20 Token Standard: The ERC20 standard is a technical protocol for issuing and managing tokens, ensuring that the BIO token is compatible with most wallets, exchanges, and decentralized applications (DApps).

		The SPL standard is a technical protocol for issuing and managing tokens, ensuring that the BIO token is compatible with most wallets, exchanges, and decentralized applications (DApps).
H.3	Technology Used	The BIO token uses the existing SPL token standard on Solana and the existing ERC20 standard on Ethereum.
H.4	Consensus Mechanism	Solana uses Proof-of-Stake with Tower BFT and Proof-of-History, where leaders are pre-selected by stake and transactions, including BIO transfers, receive sub-second confirmation and high throughput. Ethereum uses a Proof-of-Stake (PoS) consensus mechanism, where validators are selected based on ETH stake to propose and attest to new blocks. Transactions on Ethereum typically take 12 seconds, with strong decentralization and security guarantees.
H.5	Incentive Mechanisms and Applicable Fees	BIO relies on the existing incentive mechanisms and fee structures of the Ethereum and Solana blockchains.
H.6	Use of Distributed Ledger Technology	false
H.7	DLT Functionality Description	N/A
H.8	Audit	true
H.9	Audit outcome	*V0.1 Audit (Vesting Contracts (EVM)) by Pashov; April 2023* 0 Critical severity issues 0 High severity issues 4 Medium severity issues (3 fixed, 1 acknowledged) 2 Low severity issues (both fixed) *V0.1 Audit (Genesis Swap Auction Contracts (EVM)) by Pashov; June 2024* 0 Critical severity issues 0 High severity issues 1 Medium severity issue (fixed) 6 Low severity issues (4 fixed, 2 acknowledged)

		V0.2 Audit (Auction Program (Solana)) by Pashov; February 2025 1 Critical severity issue (fixed) 2 High severity issues (both fixed) 1 Medium severity issue (fixed) 8 Low severity issues (6 fixed, 2 acknowledged) *V0.3 Audit (Launchpad Curation Program (Solana)) by FYEO; February 2025* 0 Critical severity issues 0 High severity issues 0 Medium severity issues 1 Low severity issue 3 Informational severity issue All issues are still open as per the report *V0.3 Audit (Launchpad Curation Contracts (EVM)) by Pashov; March 2025* 1 Critical severity issue (fixed) 2 High severity issues (both fixed) 2 Medium severity issues (fixed) 3 Low severity issues (all fixed)
Part J - Information on the suitability indicators in relation to adverse impact on the climate and other environment-related adverse impacts		
S.1	Name	Payward Global Solutions Limited
S.2	Relevant legal entity identifier	9845003D98SCC2851458
S.3	Name of the crypto-asset	BIO
S.4	Consensus Mechanism	BIO is present on the following networks: Base, Ethereum, Solana. Base is a Layer-2 (L2) solution on Ethereum that was introduced by Coinbase and developed using Optimism's OP Stack. L2 transactions do not have their own consensus mechanism and are only validated by the execution clients. The so-called sequencer regularly bundles stacks of L2 transactions and publishes them on the L1 network, i.e. Ethereum. Ethereum's consensus mechanism (Proof-of-stake) thus indirectly secures all L2 transactions as soon as they are written to L1. The crypto-asset's Proof-of-Stake (PoS) consensus mechanism, introduced with The Merge in 2022, replaces mining with validator staking. Validators must stake at least 32 ETH every block a validator is randomly chosen to propose the next block. Once proposed the other validators verify the blocks integrity. The network operates on a slot and epoch system, where a new block is proposed every 12 seconds, and finalization occurs after two epochs (~12.8

		minutes) using Casper-FFG. The Beacon Chain coordinates validators, while the fork-choice rule (LMD-GHOST) ensures the chain follows the heaviest accumulated validator votes. Validators earn rewards for proposing and verifying blocks, but face slashing for malicious behavior or inactivity. PoS aims to improve energy efficiency, security, and scalability, with future upgrades like Proto-Danksharding enhancing transaction efficiency. Solana uses a unique combination of Proof of History (PoH) and Proof of Stake (PoS) to achieve high throughput, low latency, and robust security. Core Concepts: 1. Proof of History (PoH): - Time-Stamped Transactions: PoH is a cryptographic technique that timestamps transactions, creating a historical record that proves that an event has occurred at a specific moment in time. - Verifiable Delay Function: PoH uses a Verifiable Delay Function (VDF) to generate a unique hash that includes the transaction and the time it was processed. This sequence of hashes provides a verifiable order of events, enabling the network to efficiently agree on the sequence of transactions. 2. Proof of Stake (PoS): - Validator Selection: Validators are chosen to produce new blocks based on the number of SOL tokens they have staked. The more tokens staked, the higher the chance of being selected to validate transactions and produce new blocks. - Delegation: Token holders can delegate their SOL tokens to validators, earning rewards proportional to their stake while enhancing the network's security. Consensus Process: 1. Transaction Validation: Transactions are broadcast to the network and collected by validators. Each transaction is validated to ensure it meets the network’s criteria, such as having correct signatures and sufficient funds. 2. PoH Sequence Generation: A validator generates a sequence of hashes using PoH, each containing a timestamp and the previous hash. This process creates a historical record of transactions, establishing a cryptographic clock for the network. 3. Block Production:

		The network uses PoS to select a leader validator based on their stake. The leader is responsible for bundling the validated transactions into a block. The leader validator uses the PoH sequence to order transactions within the block, ensuring that all transactions are processed in the correct order. 4. Consensus and Finalization: Other validators verify the block produced by the leader validator. They check the correctness of the PoH sequence and validate the transactions within the block. Once the block is verified, it is added to the blockchain. Validators sign off on the block, and it is considered finalized. Security and Economic Incentives: 1. Incentives for Validators: - Block Rewards: Validators earn rewards for producing and validating blocks. These rewards are distributed in SOL tokens and are proportional to the validator's stake and performance. - Transaction Fees: Validators also earn transaction fees from the transactions included in the blocks they produce. These fees provide an additional incentive for validators to process transactions efficiently. 2. Security: - Staking: Validators must stake SOL tokens to participate in the consensus process. This staking acts as collateral, incentivizing validators to act honestly. If a validator behaves maliciously or fails to perform, they risk losing their staked tokens. - Delegated Staking: Token holders can delegate their SOL tokens to validators, enhancing network security and decentralization. Delegators share in the rewards and are incentivized to choose reliable validators. 3. Economic Penalties: Slashing: Validators can be penalized for malicious behavior, such as double-signing or producing invalid blocks. This penalty, known as slashing, results in the loss of a portion of the staked tokens, discouraging dishonest actions.
S.5	Incentive Mechanisms and Applicable Fees	BIO is present on the following networks: Base, Ethereum, Solana. Base is a Layer-2 (L2) solution on Ethereum that uses optimistic rollups provided by the OP Stack on which it was developed. Transaction on base are bundled by a, so called, sequencer and the result is regularly submitted as an Layer-1 (L1) transactions. This way many L2 transactions get combined into a single L1 transaction. This lowers the average transaction cost per transaction, because many L2 transactions together fund the transaction cost for the single L1 transaction. This creates incentives to use base rather than the L1, i.e. Ethereum, itself.

		To get crypto-assets in and out of base, a special smart contract on Ethereum is used. Since there is no consensus mechanism on L2 an additional mechanism ensures that only existing funds can be withdrawn from L2. When a user wants to withdraw funds, that user needs to submit a withdrawal request on L1. If this request remains unchallenged for a period of time the funds can be withdrawn. During this time period any other user can submit a fault proof, which will start a dispute resolution process. This process is designed with economic incentives for correct behaviour. The crypto-asset's PoS system secures transactions through validator incentives and economic penalties. Validators stake at least 32 ETH and earn rewards for proposing blocks, attesting to valid ones, and participating in sync committees. Rewards are paid in newly issued ETH and transaction fees. Under EIP-1559, transaction fees consist of a base fee, which is burned to reduce supply, and an optional priority fee (tip) paid to validators. Validators face slashing if they act maliciously and incur penalties for inactivity. This system aims to increase security by aligning incentives while making the crypto-asset's fee structure more predictable and deflationary during high network activity. Solana uses a combination of Proof of History (PoH) and Proof of Stake (PoS) to secure its network and validate transactions. Incentive Mechanisms: 1. Validators: - Staking Rewards: Validators are chosen based on the number of SOL tokens they have staked. They earn rewards for producing and validating blocks, which are distributed in SOL. The more tokens staked, the higher the chances of being selected to validate transactions and produce new blocks. - Transaction Fees: Validators earn a portion of the transaction fees paid by users for the transactions they include in the blocks. This provides an additional financial incentive for validators to process transactions efficiently and maintain the network's integrity. 2. Delegators: - Delegated Staking: Token holders who do not wish to run a validator node can delegate their SOL tokens to a validator. In return, delegators share in the rewards earned by the validators. This encourages widespread participation in securing the network and ensures decentralization. 3. Economic Security:

		- Slashing: Validators can be penalized for malicious behavior, such as producing invalid blocks or being frequently offline. This penalty, known as slashing, involves the loss of a portion of their staked tokens. Slashing deters dishonest actions and ensures that validators act in the best interest of the network. - Opportunity Cost: By staking SOL tokens, validators and delegators lock up their tokens, which could otherwise be used or sold. This opportunity cost incentivizes participants to act honestly to earn rewards and avoid penalties. Fees Applicable on the Solana Blockchain Transaction Fees: 1. Low and Predictable Fees: Solana is designed to handle a high throughput of transactions, which helps keep fees low and predictable. The average transaction fee on Solana is significantly lower compared to other blockchains like Ethereum. 2. Fee Structure: Fees are paid in SOL and are used to compensate validators for the resources they expend to process transactions. This includes computational power and network bandwidth. 3. Rent Fees: State Storage: Solana charges rent fees for storing data on the blockchain. These fees are designed to discourage inefficient use of state storage and encourage developers to clean up unused state. Rent fees help maintain the efficiency and performance of the network. 4. Smart Contract Fees: Execution Costs: Similar to transaction fees, fees for deploying and interacting with smart contracts on Solana are based on the computational resources required. This ensures that users are charged proportionally for the resources they consume.
S.6	Beginning of the period to which the disclosure relates	2024-05-28
S.7	End of the period to which the disclosure relates	2025-05-28
S.8	Energy consumption	637.53087 kWh/a
S.9	Energy consumption sources and methodologies	The energy consumption of this asset is aggregated across multiple components:

		To determine the energy consumption of a token, the energy consumption of the network(s) base, ethereum, solana is calculated first. For the energy consumption of the token, a fraction of the energy consumption of the network is attributed to the token, which is determined based on the activity of the crypto-asset within the network. When calculating the energy consumption, the Functionally Fungible Group Digital Token Identifier (FFG DTI) is used - if available - to determine all implementations of the asset in scope. The mappings are updated regularly, based on data of the Digital Token Identifier Foundation. The information regarding the hardware used and the number of participants in the network is based on assumptions that are verified with best effort using empirical data. In general, participants are assumed to be largely economically rational. As a precautionary principle, we make assumptions on the conservative side when in doubt, i.e. making higher estimates for the adverse impacts.