Liquid Regenerative Medicine Coin

Whitepaper

Medicine blockchain platform with unique capabilities

Privacy. Security. Transparency.

PREAMBLE

Liquid Regenerative Medicine (LRM) has set its main objective to create of a unified blockchain base to facilitate an instant search resource to match donors and organs created via 3D printing. This technology is already moving toward saving millions of lives every day around the world**.**

The Liquid Regenerative Medicine field is a branch of translational research in tissue engineering and molecular biology which deals with the process of replacing, engineering or regenerating human cells, tissues or organs to restore or establish normal function.

Blockchain technology (a secure digital transaction ledger managed by a network of computers) provides a permanent record regarding the transactions of its users. Each transaction or "block" is written sequentially in the register and forms a "chain" when strung together. Each block of transactions is cryptographically secure, which makes it impossible to change the information. This technology creates a permanent and transparent report on transactions, and has huge potential for solving several current issues in the medical field.

The healthcare sector has long been in need of change, and today there are many opportunities for blockchain technology to lead that transformation. Although the technology has existed for 10 years, applications have been limited to the financial services sector. Interest in blockchain technology has been building in the medical field, especially during 2017. A study was conducted by the Black Book team in October 2018 in which 88 consumers of the health care system (among them,

representatives of insurance companies, consumers of medical services) and 276 health care providers (process managers, managers and IT specialists) were surveyed about the utilisation of blockchain technologies. The results revealed that 19% of managers of medical organisations and 76% of representatives paying for medical services, both are considering utilising blockchain based technologies. In addition it also revealed that up to 70% of various organisations that pay for medical services expect blockchain integration into existing systems as early as 2019.

Thus, an increased focus on blockchain technology has led to an increased understanding of the potential application of technology in the health care system.
These conditions provided fertile ground for teams and organisations wishing to integrate blockchain technology into existing projects or develop new ones that meet the requirements of high technology and work with a large amount of data.

USAGE OF LIQUID REGENERATIVE MEDICINE PLATFORM

LRM provides many different innovative methods of treatment related to the facilitation of autologous tissue regeneration. This treatment modality differs significantly from traditional reconstructive surgery. Regenerative medicine includes not only cell and gene therapy, but also the use of innovative biomaterials and novel growth factors. Regenerative medicine also has many potentially beneficial applications if used in combination with reconstructive surgery. These new technologies offer many opportunities to maintain and improve the regenerative processes of the human body. We wish to enable their use in the field of aesthetics, for skin repair and bone defects, chronic wounds, blood circulation disorders, arthritis and soft tissue defects.

Further, the LRM platform facilitates the additive manufacturing of complex structures using fluid gels — soft hydrogels and various thermoset resins that are otherwise impossible to additively manufacture using alternative approaches. These

structures are built by embedding the printed material within a temporary, thermo-reversible, and biocompatible support fluid. This process, termed 'freeform reversible embedding of suspended hydrogels' (FRESH), enables additive manufacturing of hydrated materials with an elastic modulus less than 500 kPa such as FDA-approved collagen type I hydrogel. It also allows for fabrication of thermoset and composite resins such as epoxies, acrylates, and siloxanes — many of which have better strength/weight performance characteristics than machined aluminium. FRESH can host a range of polymerization mechanisms depending on the printed material, including ionic cross-linking, enzymes, pH change, heat/light exposure, and time-sensitive gelation approaches. Traditional file formats such as parametric CAD and medical imaging data can be 3D printed at a resolution of 100 μm and at low cost (<$1500) by leveraging open-source hardware and software tools. Prints happen at speeds identical to modern FDM technologies on a variety of consumer-level desktop 3D printers retrofitted with syringe-pump extruders.

Prints of medical imaging data include scale models of bones, arteries, adult brain scans, and even an entire human heart imaged using MRI. These highly complex prints recreate 3D internal and external anatomical architectures while simultaneously using gold-standard tissue engineering materials that were, until now, nearly impossible to additively manufacture. Parametric CAD and truss structure prints consisting of epoxies and siloxane rubbers are mechanically robust and provide a path forward for fabrication of high performance composites using industry standard resins such as Sylgard and Epon. Finally, we work to circumvent the limitations of our fluid printing approach – the volume of material printable at a given time and the working build volume of the printers used. We show that volumes of ink equivalent to 60 g or 17.5 m of FDM filaments are possible at a given time, and prints can exceed 150 mm in diameter.

BLOCKCHAIN TECHNOLOGY

DNA is defined as an encoded sequence of data that forms an encrypted chain. DNA at its nature, is very similar to the structure of the blockchain. The blockchain and DNA forms have much in common. Security, integrity and transparency, each aspects of the blockchain, provide a secure environment for secure storage and access management of genome data within a decentralised framework. Within this decentralised environment, data is distributed throughout the network. Encrypted medical data cannot be read, modified (including backdating) or stolen by third parties: unauthorised transactions are excluded. Only the patient and his providers are able to access the data and do so without intermediaries. The faster the blockchain network grows, the safer and more transparent the health care system becomes.

In medicine, the blockchain opens up new possibilities. First of all, it can be used to store personal data of patients. Blockchain technology works on a decentralised basis — it is not stored in one place, but rather on hundreds or thousands of computers. There is a duplication of the entire chain of information and storage in encrypted form for each participant, effectively acting as a backup. This eliminates the possibility of DDoS attacks. Hackers simply can not destroy or spoof the data. If the transaction was conducted with the participation of 10 people, then this chain will always remain available, even when a majority of the computers fail. Each link becomes a full backup for all transactions. The high level of encryption based on personal keys eliminates the possibility of information theft.

In an era when any information can be hacked and compromised, the confidentiality and protection of the patient's personal data, medical history and DNA are the main concerns of medical institutions throughout the world. The LRM Platform provides solutions for secure management.

WORLD DNA MARKET AND LIQUID REGENERATIVE MEDICINE COIN

Today, the medical industry is beginning to understand the technology of Blockchain and to recognise its growing potential. With this potential in mind, the LRM platform began active implementation of Blockchain-based medical solutions and is working toward the ability to transfer sequenced genomes using blockchain technology. The platform will allow users to monetise their personal information, bypassing DNA testing companies. Users that provide access to their medical data by medical institutions will be compensated in LRM Coin which can be traded for other digital coins on cryptocurrency exchanges or exchanged for fiat currency. As there are various type of medical information, the value or 'worth' of the data also varies. Our tool uses algorithms to identify the current market value of each type of medical information to ensure the owner is getting the best available fee for providing access. For example, the genetic data of people with rare diseases will be very valuable to certain drug companies and researchers. These same companies would not place a high value on such information as data from older patients, babies, or people of certain ethnicities or regions. The LRM platform provides a solution to help the owner monetize their DNA data and take advantage of this market.

Origin Tracking

The use of a distributed registry for the regulation of pharmaceutical supplies and tracking of medicines is not just relevant but is now crucial. We have developed a platform that allows service providers and regulatory agencies both to have safe and secure access establish to transparent partnerships formed to eliminate fraud.

Data storage and management

In the health sector, the issue of information management is incredibly important. On a daily basis, medical workers interact with data that requires careful handling, anonymity, and the secure transmission. This also requires special rules regarding the

provisioning of access to medical data, use of special rights management algorithms, and the development of uniform standards when entering and working with a large amount of information.

LRM will be used to store personal medical data, integrate EHR (electronic medical records) and PHR (personal health records) standards. By capturing other, regular measurements of medical indicators (such as blood pressure and blood glucose levels and providing this data to medical institutions) recommendations for improved patient care can be provided.

SOLUTIONS FOR THE MEDICAL INDUSTRY

The LRM Platform has several features which allow integration with a number of devices and applications that each of perform a specialised function. These include the capability to allow patients to test various health parameters such as pulse rate, blood pressure, temperature and can serve as an ECG, blood glucometer and many others devices.

Those that use the LRM mobile application can gain access to the full platform and utilize a single access point for securely viewing and updating various aspects of an individual's health condition. The application allows the user to record information about their diet and receive analytical reviews and recommendations from the platform. The application records daily activities, such as walking and running, and allows the user to enter other related information about the physical activities performed during the day. Access to the application is paid in LRM coins. Users can earn coins for sharing tips with each other, posting messages, or distributing research publications within a social service platform.

CONCLUSION

Health care is changing. Two revolutionary technologies, genomics, and blockchain, are ready to significantly improve health and well-being through improved care delivery. Genomic medicine can improve the understanding and treatment of as many as 7000 rare diseases, along with cancer, complex and long-term diseases such as cardiovascular and neurodegenerative diseases and infections. In addition, the blockchain technology transforms the future of healthcare and the global economy: it is ready to usher in the biggest transformation in innovation since the advent of the Internet. The LRM platform seeks to align with this development, combining these technologies to create a revolutionary ecosystem of medical genomics, which will open up health care for everyone.

LRM platform offers the first comprehensive solution for patients and genome data donors, where everyone can have their own genome safely stored. This ecosystem will provide an open web market for other suppliers such as pharmaceuticals, research organisations, governments, patient support groups and insurance companies to add their applications and services, along with genomic data analytics and personalised medicine.

The LRM platform uses blockchain technology to create a disruptive genomics ecosystem and enable direct consumers to participate in a more open, fair and profitable ecosystem. The end goal is to ensure that the data belongs to the users themselves. It provides a transparent and secure bridge for organisations interested in using this data for research and the development of new treatment modalities. Donors receive LRM coin for sharing genomic data stored on the blockchain and granting access rights directly to a third party institutions like pharmaceutical companies. Even when third parties have access to the data, LRM users maintain complete and accurate control of who can access records.

Blockchain technology helps users transfer genomic data or quantitative lifestyle information to other interested parties. At the same time, the patient may keep sensitive information such hidden from unwanted interest. As a result, the results of research and initiatives in precision medicine can be better supported. In addition, this structure allows stakeholders to stimulate customer lifestyle changes. For example, an insurer may offer a customer to make sequencing of its genome.

The LRM development team prepared this document in order to provide detailed information about the platform and LRM coin. We are very confident that the platform and mobile applications will be used around the world to provide increased protection of customers data shared with world medical organisations.