A UK Centre of Excellence for Precision Therapeutic Implants (UKCEPTI)

To accelerate and scale the process for organ repair and support healthy ageing

UKCEPTI is an R&D-centric venture of National and Global significance built around a core team with significant scientific, financial, and operational success in turning science into businesses**.** UKCEPTI provides a compelling opportunity to accelerate and scale R&D towards clinical and commercial use of 3D Engineered Tissues targeting a wide variety of applications, including organ repair and drug development. UKCEPTI's patented and proven technology platform is the brainchild of Professor Hagan Bayley – founder of Oxford Nanopore Technologies, one of the UK's most successful spinout companies, which floated on the London Stock Exchange for $4Bn 2021.

Why Now?

By 2050, the ageing population is expected to be more than 2 billion. Ageing is a complex phenomenon; significant changes occur in our cells and tissues, resulting in diseased and damaged organs, often resulting in organ failure. Organ transplantation is a convoluted process; many people die waiting for an organ due to the lack of suitable donors. UKCEPTI's vision is to build a future where through early intervention we can repair soft organs such as the Heart, Brain, Eye, Liver, Pancreas, etc., and avoid the need for an organ transplant. By using our engineered tissues incorporating cells derived from human stem cells we will increase healthy lifespans in a novel and affordable way.

Market Opportunity

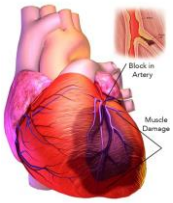
UKCEPTI aims to disrupt the tissue engineering applications market, which is expected to be worth more than $150 billion by 2030 and is growing at 20% annually. The rapid growth is propelled by the demand to restore, maintain, or improve damaged organs, and the application of advanced 3D tissue models to enable new drug discovery paradigms. Tissue engineering has gathered significant interest globally, but commercialisation is still in its infancy. Conventional 3D-engineered tissue structures have significant issues with uniformity, reproducibility, scalability, affordability, and yield.

Our Approach

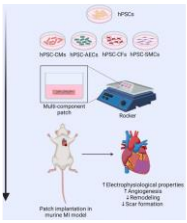
UKCEPTI benefits from Professor Bayley's precision 3D-engineered tissues, which offer unparalleled uniformity and quality while maintaining affordability. The high-resolution printing of living cells (using our propriety technology) yields 3D tissues that have high cell viability. The cells can be pre-patterned; they are functional and can differentiate and migrate, allowing Ox3DBio to produce complex structures replicating native human tissues.

Mending Broken Hearts

Our platform technology is organ-agnostic and will initially be applied to repair the damaged heart with printed living tissues derived from human induced pluripotent stem cells (hiPSCs). Current bovine patches have issues with durability, absorption, and contractility.



After a heart attack, scar tissue forms from fibroblasts, which replace necrotic cardiomyocytes.



Encouraging evidence: Lou, X., et al. Cardiac muscle patches improve recovery from cardiac injury in mice. Cardiovascular Research 119, 1062 (2023)

Dr Vivek Srivastava (consultant cardiac surgeon John Radcliffe Hospital, Oxford, United Kingdom) says:

"The concept of using Cardiac Patches for heart muscle repair holds significant promise with such patches showing good performance in pre-clinical studies. At current tissue sizes, **the therapeutic implants developed by OXFORD 3D BIO seem to have properties that align for various heart repair applications** and appear to be an excellent candidate warranting further investigation."

DR Srivastava has over 20 years of experience in adult cardiac surgery including coronary artery bypass grafting (CABG) and aortic valve replacement (AVR), which are the most common heart operations.

Key Achievements

A beating human heart tissue has been demonstrated. The functional structures (synchronous beating) with retention of morphology have survived for more than 3 months. Notable achievements have been published in leading journals, including Nature, include (a) the loading of synthetic tissues with small molecules for patterned drug release; and (b) the integration of 3D-printed cerebral cortical tissue into a lesioned brain slice.

Passionate Founders - The team provides 65 years of combined professional experience in developing integrated technologies and growing multidisciplinary ventures:

- Professor Hagan Bayley FRS (CSO) - Professor of Chemical Biology at the University of Oxford. Has developed scalable techniques for the fabrication of 3D tissues, both living and synthetic.
- Dr Rakesh Roshan (CEO) - an entrepreneur with more than 20 years of Senior Management and Board experience in building tech start-ups from inception through exit.
- Dr Adrian Howd (CFO) - Life Science professional and experienced board member (Immunocore, Kymab, Poseida Therapeutics) - has led equity capital and debt raises totalling $500m alongside multiple $bn exits.

Fundraising & Use of Proceeds

UKCEPTI provides a unique opportunity for co-investors to participate in the development of its best-in-class therapeutic implants, and build a strong ecosystem through judicious collaborations with professionals, experts, and companies in the domain. The funds will be used to secure key value inflection points including maturing the technology platform and generating viable pre-clinical data confirming our approach to alleviating organ damage in a well-validated model before First-in-Human usage. With a world-class multidisciplinary team, global partnerships, and growing IP and product portfolios, supported by cutting-edge R&D, UKCEPTI is on a pathway to advance the readiness level of our technology and increase the healthy life span of the aging population.

Dr Rakesh Roshan, Email – rakeshroshan@oxford3dbio.com, https://www.bayleygroup.co.uk/team/professor-hagan-bayley