



Biojewellery

Designing Rings with Bioengineered Bone Tissue

Biojewellery aims to create a public debate about bioengineering. A collaborative project, involving Tobie Kerridge and Nikki Stott, design researchers at the Royal College of Art, and Ian Thompson, a bioengineer at Kings College London, aiming to bring the medical and technical processes of bioengineering out of the lab and into the public arena.

The project seeks couples that want to donate their bone cells – for example, a couple having their wisdom teeth removed would be ideal. Their cells will be prepared and seeded onto a bioactive scaffold. This pioneering material encourages the cells to divide and grow rapidly in a laboratory environment, so that the scaffold disappears and is replaced by living bone tissue.

The couple's cells will be grown at Guy's Hospital, and finished bone tissue will be taken to a studio at the Royal College of Art to be used in the design of a pair of rings. Following consultation with the couple, the bone will be combined with traditional precious metals so that each has a ring made with the tissue of their partner.

"For centuries rings have been a symbol of commitment between a couple. Rings are about a relationship, a profound connection with another person," explains Nikki. "Bone is also a powerful symbol, it has magical connotations, and in this project it is from the actual body of your partner."

Rapid prototyping machines will build the shape of the scaffolds on which the cells grow. These transform computer models into real objects using a process similar to printing. A thin layer of resin is exposed to a laser and hardened, so that layer after layer, a solid shape is created.

Casts made of these designs are used to create the bioactive scaffold. The cells then grow over a period of 6–10 weeks in a bioreactor, a sealed chamber similar to a biological environment. The bioreactor takes in nutrients and puts out waste as a part of the cycle of growth. When removed from this chamber, the bone hardens and is suitable for working with in the studio.

"By bringing design and science together, and working with a couple, we hope to create an engaging debate," adds Tobie. "The project is about using technology to realise our desires. Our aim is to raise issues and provoke questions – to ask people what they think, rather than provide simple answers."

Funding totaling approximately £60,000 has been awarded by the Engineering and Physical Science Council as a part of their Partnership for Public Awareness initiative. The project will culminate in September with a live debate at the Dana Centre, a part of London's Science Museum, and an exhibition at Guy's Hospital, part of Guy's and St Thomas NHS Foundation Trust. The exhibition will include the rings, documentary photos of the couple, and time-lapse film of cell growth.

"The eventual use of this technology will be the preparation of bone tissue for implantation, following disease or trauma," Ian concludes. "Our current challenge is growing bone tissue which includes blood vessels. These are needed to keep the engineered tissue healthy once it goes back in the body."

Visit www.biojewellery.com for more information, or email Nikki Stott and Tobie Kerridge at info@biojewellery.com.

The participating institutions

Royal College of Art

The Royal College of Art is the world's only wholly postgraduate university of art and design, specialising in teaching and research and offering the degrees of MA, MPhil and PhD across the disciplines of fine art, applied art, design, communications and humanities. www.rca.ac.uk/pages/research

Kings College London

King's academics pursue and achieve excellence in a wide range of research activities and scholarship. In the 2001 Research Assessment Exercise, twenty four subject areas were rated 5 or 5*, the highest ratings achievable. www.kcl.ac.uk/research

EPSRC

The Engineering and Physical Sciences Research Council (EPSRC) is the main UK government agency for funding research and training in engineering and the physical sciences – from mathematics to materials science, and from information technology to structural engineering. www.epsrc.ac.uk