

Biomaterial customisation

Combining the ideal qualities for a biomaterial suitable for use in tissue engineering might seem unfeasible, but one company has the solution.

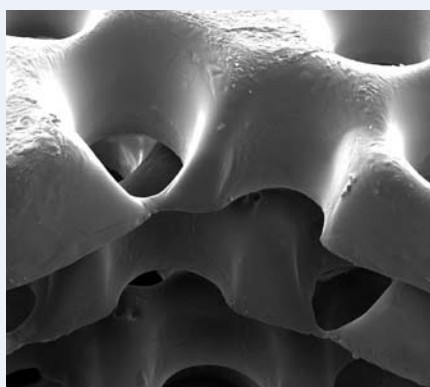
Company Profile

Proxy Biomedical Limited is a leading innovator in the development of next generation medical products using proprietary biomaterials technology. The company has been commercially trading since May 2002.

The company objective is to get products into the clinical setting with partners by providing translational research and development services and working with corporate and institutional partners on applications that leverage its core capabilities.

Further Information

Website: www.proxybiomedical.com



CAD/CAM tools produce a scaffold design that then allows materials to be custom built.

Tissue engineering biomaterials act as three-dimensional scaffolds to guide tissue regeneration, providing an initial support for cells to attach, migrate, proliferate and differentiate. When you think about the ideal tissue engineering biomaterial, what properties come to mind? Interconnectivity, porosity, biocompatibility, optimal mechanical properties and a consistent response are all important considerations, but combining them could seem like an impossible dream.

Peter Gingras, managing director of Proxy Biomedical Limited, a medical device design and development company based in the West of Ireland, explains how a team of engineers have made the impossible possible with MotifMESH™ Tissue Engineering Biomaterial (TEB).

Controlled porosity

Interconnectivity is the number one requirement for successful cell migration and proliferation. The porosity of the material directly

influences the vascularisation of the implant. But can these factors be controlled? 'We've noticed that it's easy to design an interconnected structure using CAD/CAM tools, but many companies have struggled to reproduce the structure in real materials,' says Gingras. That's why Proxy Biomedical, with its proprietary processing methods and micromachining techniques, has generated such interest.

Biocompatible

Biocompatibility is a key requirement in tissue engineering biomaterials. How does the company deal with the limited number of suitable materials in the field? 'We focus on using implant grade synthetic biomaterials, both absorbable and non-absorbable, and mainly those with a history of use in the body,' says Gingras. 'We have concentrated on optimising the processing of these materials so that we are able to provide materials with low levels of residual solvents and processing

agents. In that way we aim to keep the inflammatory response to a minimum.'

Optimal mechanical properties

Tissue engineering biomaterials for regeneration and repair of tissue are required in diverse applications including wound healing, orthopaedic, and cardiovascular repair. As such, the required mechanical properties change depending on the field of use.

How does Proxy Biomedical manage to apply its MotifMESH TEB to multiple applications? 'Manufacturing techniques have an enormous implication on the biomaterials' end mechanical and biological properties,' adds Gingras. 'Through careful material selection, a versatile CAD/CAM design and optimised processing techniques, our team of engineers can customise a biomaterial structure to meet almost any mechanical requirements.'

Versatile and reproducible

An appropriate scaffold for any tissue engineering application must mimic the structure and properties of human tissue as much as possible, enabling the macroscopic process of tissue formation. 'Consistency of response is something that is time and again requested from surgeons and industry partners,' says Gingras. 'Our ultimate aim is to provide consistent, reproducible tissue engineering biomaterials for future generations.' Meeting the needs of clientele, MotifMESH TEB with its CAD/CAM design is versatile, as well as being consistently reproducible. ●