POLYNERVE

Helping to improve the repair of severed nerves

BACKGROUND

Peripheral nerve injury (PNI) is a common outcome of physical trauma, such as cuts and lacerations, civil/industrial accidents and military injuries. At a conservative estimate, a million PNI procedures are performed each year in the United States alone (*Source: Frost & Sullivan*). The potential US market for repair of peripheral nerves in the extremities is greater than $1.6bn/year (*Magellen analysis*).
The major clinical problem is the presence of a nerve gap that prevents the surgeon from performing end-to-end repair of the nerve. The current gold standard for treatment of this is an autologous nerve graft (a healthy nerve from the injured patient is sacrificed); however, outcomes for patients remain poor. Furthermore, significant problems arise, such as donor site morbidity, limited availability of nerve graft, nerve mismatch, tissue scarring, and occasionally formation of neuromas. Current commercially available nerve conduit devices have demonstrated effectiveness for bridging small nerve gaps up to 20 mm in length; however, none of these products specifically address the biology of a regenerating nerve.

Polynerve aims to overcome such complications and provide improved outcomes for patients.

THE TECHNOLOGY

A University of Manchester research group has developed Polynerve – a specifically engineered conduit for peripheral nerve repair. Polynerve consists of an ultra-thin polycaprolactone (PCL) and polylactic acid (PLA) blended film, manufactured in diameters up to 4 mm, is biocompatible and degrades in a clinically relevant timeframe making it applicable to a wide range of nerve injuries. The inner lumen of Polynerve consists of tailored pits and grooves that improve Schwann cell interaction and therefore offer the possibility of guided regeneration and repair of peripheral nerves over longer distances. Furthermore, with increasing experimental evidence for stem cell technology in nerve injury, Polynerve has been designed to permit the incorporation of stem cells in anticipation of this future treatment. This would herald a step-change in the clinical management of a cohort of patients that deserve better outcomes and a return to productivity.

KEY BENEFITS

- Polynerve has been engineered to address the biology of the regenerative nerve, particularly to aid Schwann cells in their regenerative role.
- *In vitro* and *in vivo* studies have refined and validated the cellular response.

- Polynerve is biocompatible, degrades in a clinically relevant timeframe and has demonstrated no complications in experimental models.

To the surgeon –

- Off-the-shelf product
- Saves surgical time in theatre
- Biomechanical properties provide a conduit designed to be sutured and maintain integrity through nerve regeneration timeframe
- No surgical training required for use.

To the patient –

- No need to sacrifice a patient's healthy nerve for reconstructive graft surgery
- Specifically designed to promote the biology of nerve regeneration; good nerve recovery
- Absorbable device so no long-term problems.

To the manufacturer –

- Very simple manufacturing process using solvent casting
- Easily up-scalable
- Inexpensive raw materials
- Specifically designed to enable the next generation product to include stem cell therapy.

APPLICATIONS

Polynerve is applicable for peripheral nerve injury surgery.

INTELLECTUAL PROPERTY

The conduit is protected by 3 University of Manchester owned patent families, please see WO2010029295,WO2012038691 and WO2015097473.

OPPORTUNITY

Polynerve provides an excellent collaboration, development and license opportunity for medical device companies active in reconstruction and soft tissue repair.

CONTACT

Dr. Leanne Burgin, Team Leader – IP Development and Partnering, Core Technology Facility, 46 Grafton Street, Manchester M13 9NT ✉: Leanne.burgin@umip.com ☎: +44 (0)161 3068514