Technology Offer

Biocompatible nerve guidance conduit for neuroregeneration

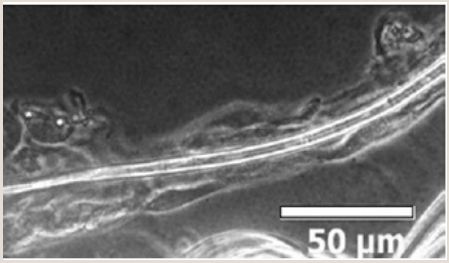
Reference Number: TO 15-00006

ascenion

A Company of the Life-Science Foundation for the Promotion of Science and Research

Challenge

Peripheral nerve damage resulting from accidents or other injuries affects 300 000 people per year in Europe; the long-term consequences range from decreased functionality of the affected extremities to high-grade disability.



Schwann cells adhering to spider silk fibers (24 h after seeding) [1].

Peripheral nerves can regenerate to some extent, but the gaps that axons can bridge are rather small, and complete regeneration is often impaired by scarring and neuroma formation. Autologous transplantation of nerve grafts from a donor site within the body is the state-of-the-art therapy for peripheral nerve damage, but inevitably results in loss of sensation at the donor site; the availability of nerve crafts is therefore limited. Alternative approaches focus on the development of nerve guidance conduits which provide a permissive microenvironment to the growing axon. The conduit material needs to be permeable to allow the influx of nutrients and revascularization and should provide endoneural-like structures to facilitate cell attachment and migration of Schwann cells.

Technology

A new type of fully biocompatible nerve guidance conduit has been constructed by lining decellularized autologous venules with spider silk collected from *Nephila*. Optionally, a matrigel-embedded autologous Swann cell culture can be added. Spider silk is composed of glycine and alanine-rich proteins and does not cause immunological reactions when implanted into mammals. The material is proteolytically degradable, thus making it an ideal biological scaffold. Animal experiments demonstrated that the conduits were well vascularised without any signs of inflammation or foreign body reactions. Axonal growth bridged the gap between the proximal and distal parts of the axon within the conduit at longer distances those reached with conventional techniques.
These results demonstrate great promise for the biocompatible nerve guidance conduits as an alternative to autologous nerve transplantation.

Commercial Opportunity

In-licensing or cooperation for further development is possible.

Developmental Status

Proof-of-concept experiments were conducted in rats and sheep, primate studies are ongoing.

Patent Situation

Applications based on WO 002007028801 are pending in the US, Europe, Canada, China and India.

Further Reading

[1] Allmeling et al.: Use of spider silk fibes as an innovative material in a biocompatible artificial nerve conduit. J Cell Mol Med 2006 Jul-Sep;10(3):770-7.

Berlin
Braunschweig
Hamburg
Hanover
Munich
Neuherberg

Ascenion GmbH
Herzogstraße 64
D-80803 Munich
T +49 (0) 89 31 88 14 - 0
F +49 (0) 89 31 88 14 - 20
info@ascenion.de
www.ascenion.de