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## Peripheral nerve regeneration using artificial nerve sheets composed of freeze-dried alginate gel

Yoshihisa Suzuki

Shiga University of Medical Science, Japan

Long injury gaps of the peripheral nerve are treated by autologous nerve transplantation, although sequelae, such as pain and numbness, remain at the donor sites of nerves for transplantation. To solve this problem, tubular artificial nerves were developed. However, they have several drawbacks, such as the need for several types of materials with different diameters due to the tube structure, prolonged surgery time because of the need for suture, and inapplicability to the nerve branch and plexus because of the linear structure. Thus, we have initiated the development of products to overcome the above drawbacks, which can produce plant-derived alginate. Our new concept of nerve regeneration materials is to process a freeze-dried sponge into a sheet rather than a tube structure using sodium alginate as a covalently crosslinked gel. Its applicability to defects in the branched nerve was tested using rats. Nerve defect was made in the branched site from the sciatic nerve to the peroneal and the tibial nerves. Eight weeks after operation, regenerated axons were observed in both the peroneal and tibial nerves. The nerve axons were elongated and Schwann cells migrated in low-molecular-weight alginate after biodegradation. It can be considered that alginate gel is a potent material for promoting peripheral nerve regeneration at branched site, and that the non-tubular method is a promising approach for the repair of the peripheral nerve.

### Biography

Yoshihisa Suzuki obtained his MD and PhD degrees from Kyoto University, Faculty of Medicine, Kyoto, Japan during 1980-1986. Later, he joined Kyoto University, Faculty of Medicine, Plastic Surgery Department as a Staff Member in June, 1986. In May 1987, he joined Osaka Red Cross Hospital as a Staff Member. He later held various positions as Staff Member (1990.6-1998.1), Assistant Professor (1998.2-1999.12) and Associate Professor (2000.1-2006.6) at Kyoto University, Faculty of Medicine, Plastic Surgery Department. From July 2006 to present, he is the Director, Department of Plastic Surgery at Kitano Hospital, Osaka. He is also a Visiting Professor, Department of Stem Cell Biology and Regenerative Medicine and Specially Appointed Professor, Department of Plastic Surgery at Shiga University of Medical Science since 2015.

utsubo@kuhp.kyoto-u.ac.jp

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