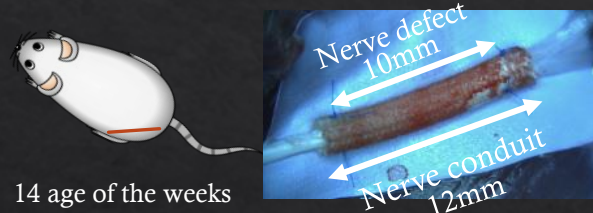


Introduction

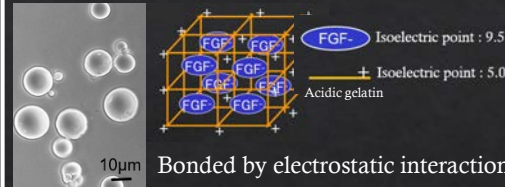
Nerve conduits made of biodegradable materials have yet to approach the level of therapeutic success currently achieved with autologous nerve grafting. To investigate a novel approach, a basic fibroblast growth factor (bFGF) slow-release system was combined with a biodegradable nerve conduit for its capacity to achieve nerve regeneration.

Methods

Nerve defect model and Nerve conduit



Slow release system which made from gelatin micro sphere



Study Groups



Harvest : 2, 4, 8, 20 wks

Immunohistochemistry (IHC)

- Anti-CD31 antibody (Endothelial Cell)
- Anti-S100 antibody (Schwann cell)
- Anti-neurofilament antibody (Schwann cell)

TEM

- Numbers of myelinated nerve fibers
- Myelinated nerve fiber area

Results

From the ELISA quantification of bFGF slow-release system, continuous release of bFGF was found at a concentration of 5 $\mu\text{g}/\text{day}$ during the observation period of 2 weeks. When this system was combined with nerve conduit, the migration distance of vascular endothelial cell extended, and the number of blood vessels increased. (Figure 1) Moreover, both the subsequent migration distance of Schwann cell and the growth distance of axon extended.(Table 1) From the result of image analysis of the number and distribution of myelinated nerve fiber, it was found that the maturity of nerve also increased with time.(Figure 2)

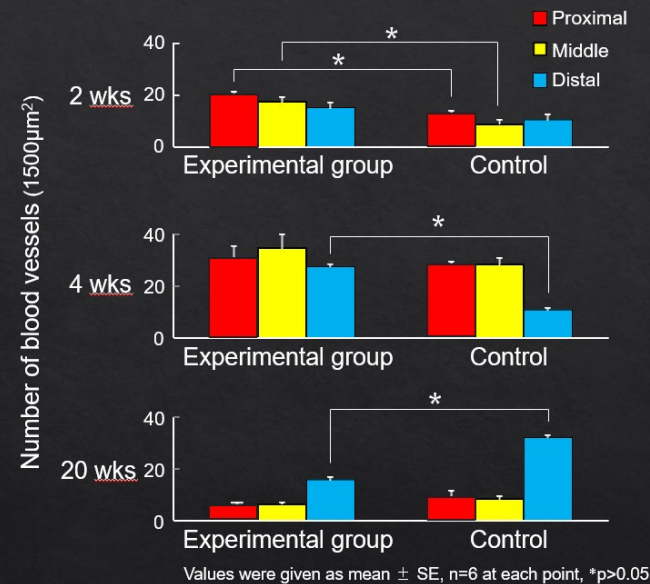
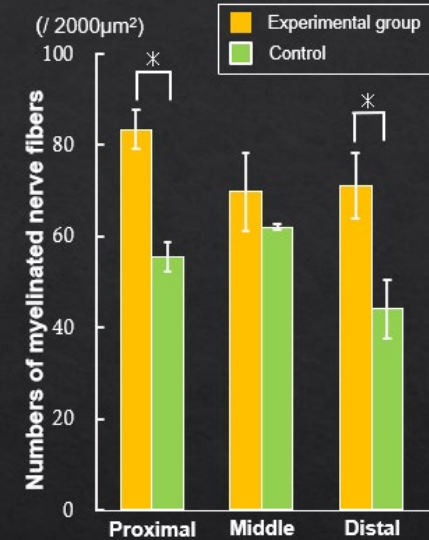


Figure 1

		Schwann cell (mm)	Axon (mm)
2 wk	Experimental	3.6 \pm 0.3	1.4 \pm 0.3
	Control	2.5 \pm 0.2	1.1 \pm 0.1
	Ratio*	1.4	1.3
4 wk	Experimental	9.5 \pm 0.9	4.9 \pm 0.6
	Control	7.3 \pm 0.9	2.8 \pm 0.9
	Ratio*	1.3	1.7
8 wk	Experimental	10.0 \pm 0.0	7.7 \pm 0.3
	Control	10.0 \pm 0.0	6.8 \pm 0.8
	Ratio*	1.0	1.1
20 wk	Experimental	—	10.0 \pm 0.0
	Control	—	10.0 \pm 0.0
	Ratio*	—	1.0

*Ratio = Experimental / Control

Table 1



Values were given as mean \pm SE, n=6 at each area, *p>0.05

Figure 2

Conclusions

It was suggested that the bFGF slow-release system acted on both cell groups of endothelial cells and Schwann cells and improved the nerve regeneration of the biodegradable nerve conduit.