

The nerve regeneration using hydrogel of mussel adhesive protein

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Introduction

Autologous nerve grafting has been applied as the best method of treating peripheral nerve defects but it has problems such as donor site morbidity. If the defect is more than 2 cm, direct suture is difficult and the nerve conduit is used for nerve regeneration. In addition, nerve repair by suture can damage nerve tissue. Therefore, we would like to repair nerve using hydrogel of mussel adhesive protein. We use mussel adhesive protein to induce nerve regeneration without suture of nerve injury site and compare with conventional nerve repair by suture.

Materials and Methods

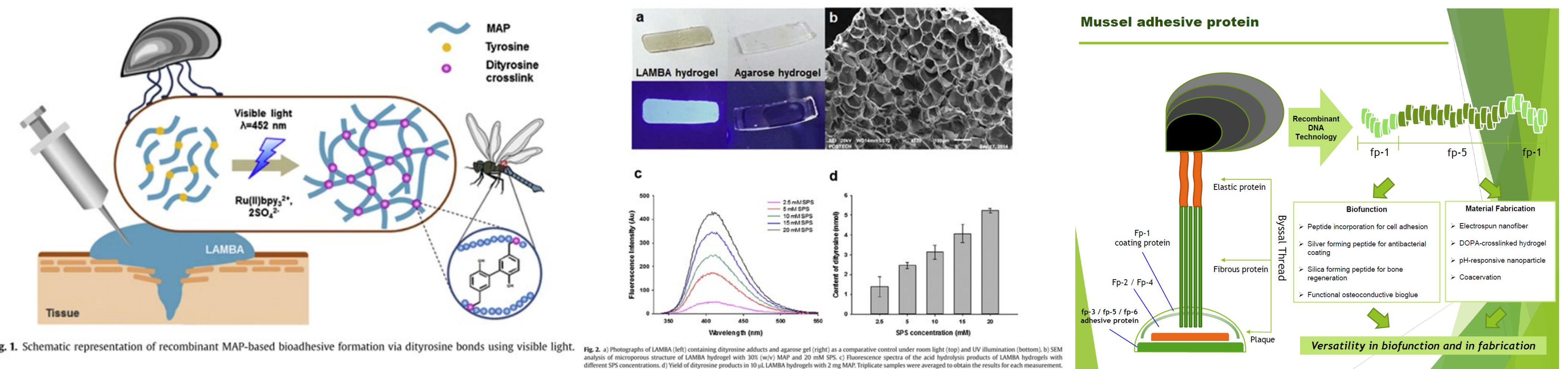
We made a 10mm long defect in the sciatic nerve of 46 rats and divided to subgroups. 1) Normal (positive control), 2) Sham (negative control), 3) Direct anastomosis –suture, 4) Direct anastomosis by fibrin glue, 5) Direct anastomosis by Mussel adhesive protein(MAP), 6) Direct anastomosis by MAP with Substance P, 7) 15 mm gap model with silicon tube by suture, 8) 15 mm gap model with silicon tube by fibrin glue, 9) 15 mm gap model with silicon tube by MAP 10) 15 mm gap model with silicon tube by MAP with substance P. After 6 weeks, nerve conduction velocity(NCV) and histological observations were made.

Conclusion

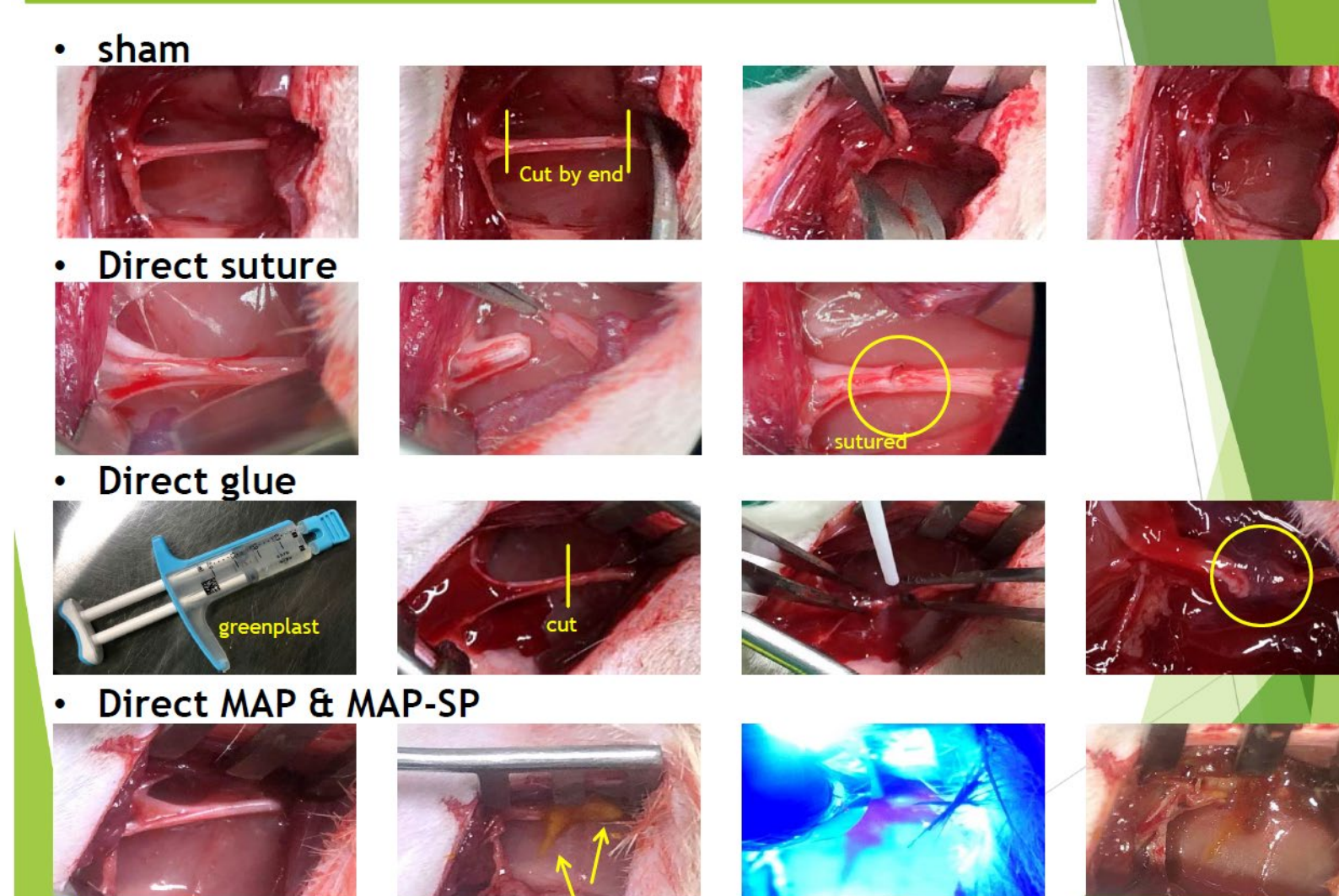
In this study, we propose nerve repair by MAP because of shortening operation time and additional nerve damage by suture, Additionally Mussel adhesive protein with substance P propose to be a good method of promoting nerve regeneration.

Results

In vivo results revealed that the NCV was improved more in the experimental groups after 6 weeks from nerve repairing by MAP than in the control group by suture. Histologic(H&E, Toluidine blue staining) and immunohistochemistry(Nestin, MAP-2, GFAP) staining showed more regenerated nerve findings.



Result I



Result II

