

# Determining the Potential of Fibrin to Facilitate Schwann Cell Transplant to Acellular Nerve Allografts

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## Objectives

- Acellular nerve allografts can be used to repair nerve gaps following peripheral nerve injury.
- Supplementing these grafts with cells could further enhance regeneration.
- Techniques to transplant cells to grafts are underdeveloped.
- This study determined whether fibrin could be used to **promote transplanted SC survival** and **facilitate SC transplantation**.

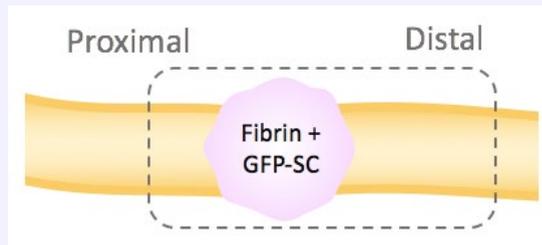
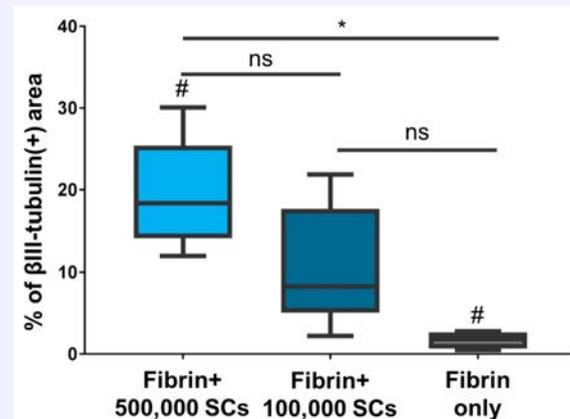


Figure 1 (Above): Rat sciatic nerve transected and repaired using fibrin gel potentially containing Schwann cells (SCs).

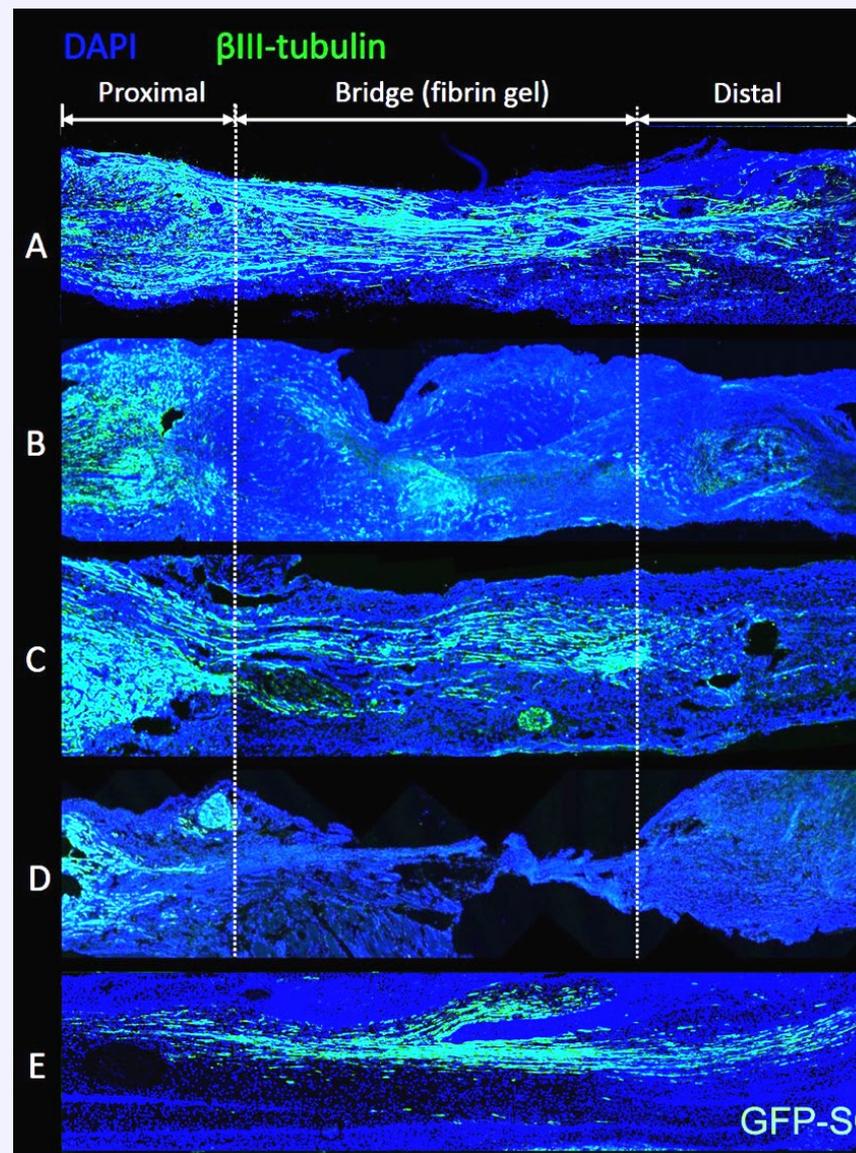
Figure 2 (Right): Density of regenerated axons in fibrin gel (potentially containing SCs) 7 days after transplant to injured nerve.

## Methods

- Adult Lewis rat sciatic nerves were transected, resulting in a 5mm gap.
- Gaps were repaired using fibrin gels with and without SCs.
- Evaluate axons using  $\beta$ III-tubulin and density within the bridged gap measured.
- Determine SC viability using transgenic GFP-expressing SCs.
- In a pilot study, SCs were injected into acellular nerve grafts, with and without fibrin.



## Results



- For fibrin gels without SCs, axons were visualized within the fibrin by 7 days and crossing to the distal nerve by 14 days.
- Transplanted SCs within the fibrin gel enhanced nerve regeneration across the short gap, where axons were visualized crossing the gap by 7 days.
- Acellular nerve grafts supplemented with fibrin containing SCs were able to achieve greater SC survival compared to the nerve grafts supplemented with SCs but no fibrin.

## Conclusion

SCs within fibrin gels can **improve nerve regeneration** and **support SC survival** during transplant to injured nerves. Furthermore, fibrin gels can be used to transplant SCs into acellular nerve grafts.

Figure 3: Axon regeneration of (A) 500,000 Schwann Cells transplanted in fibrin by 7 days (B) Fibrin gel without Schwann Cells by 7 days; (C) Fibrin gel without Schwann Cells by 14 days (D) No fibrin gel by 14 days. (E) GFP SCs are evident in acellular nerve grafts after repaired to injured nerves by 7 days.