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.

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 βIII-tubulin and density within the bridged gap measured.
- Determine SC viability using transgenic GFP-expressing SCs.

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.