

Introduction

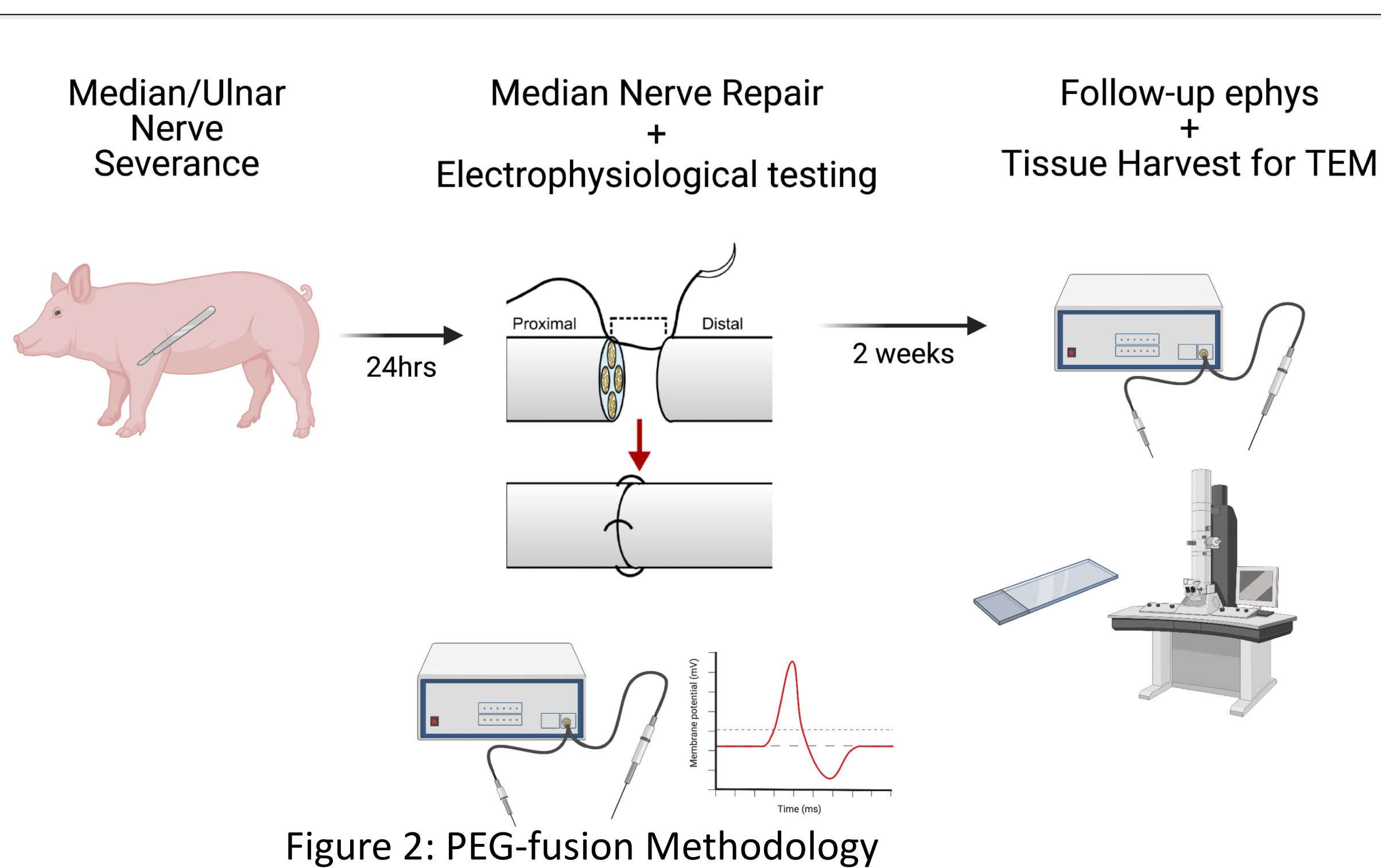
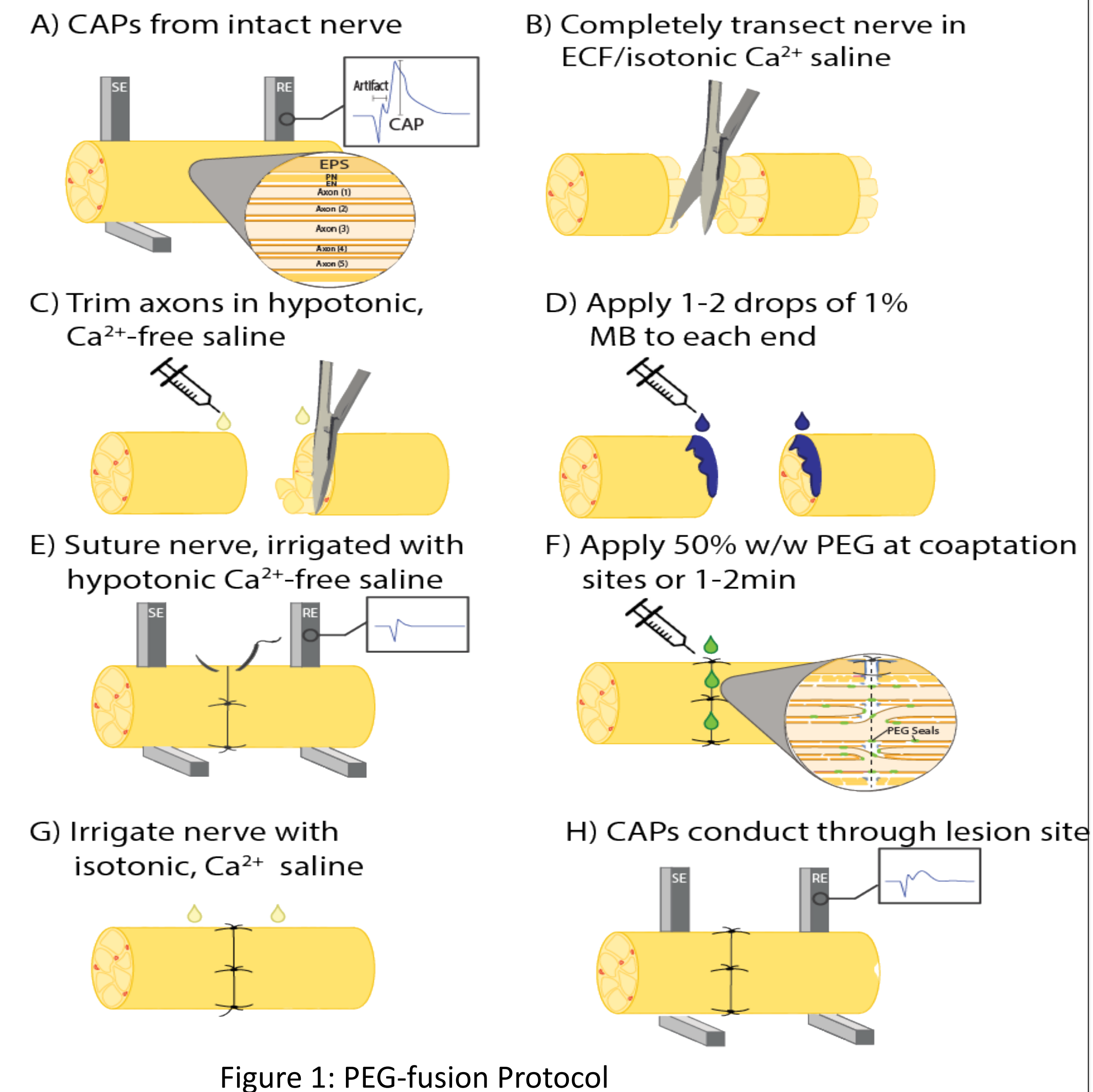
- Polyethylene Glycol (PEG)-fusion of severed peripheral nerves re-establishes axonal and electrophysiological continuity and improves behavioral functions in rodent models
- In this study, we tested whether PEG-fusion could similarly improve post-operative electrophysiological and behavioral function in a large animal (swine) pre-clinical model of peripheral nerve injury

Objective

Evaluate whether PEG-fusion will improve electrophysiological and behavioral function after median nerve transection in swine

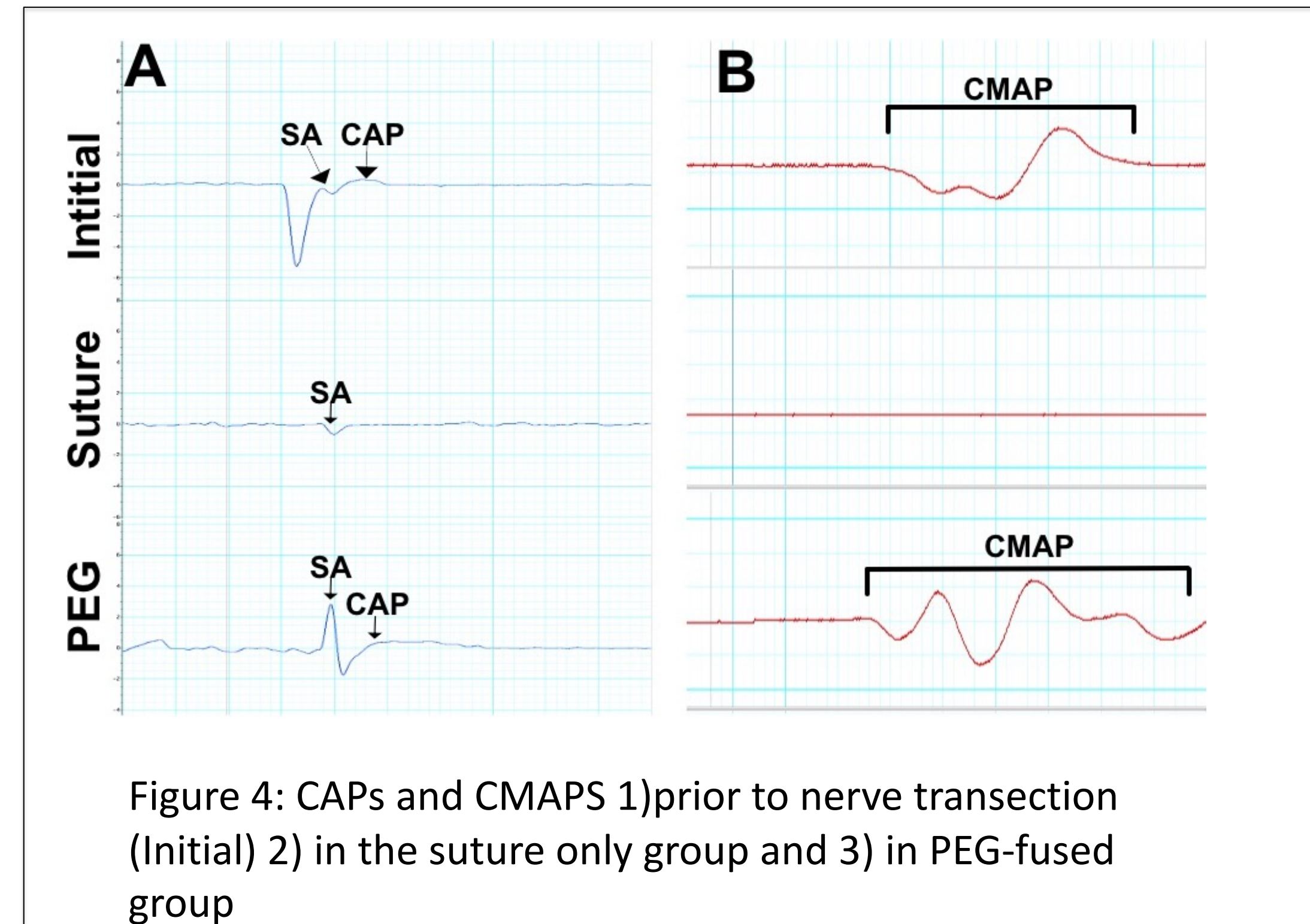
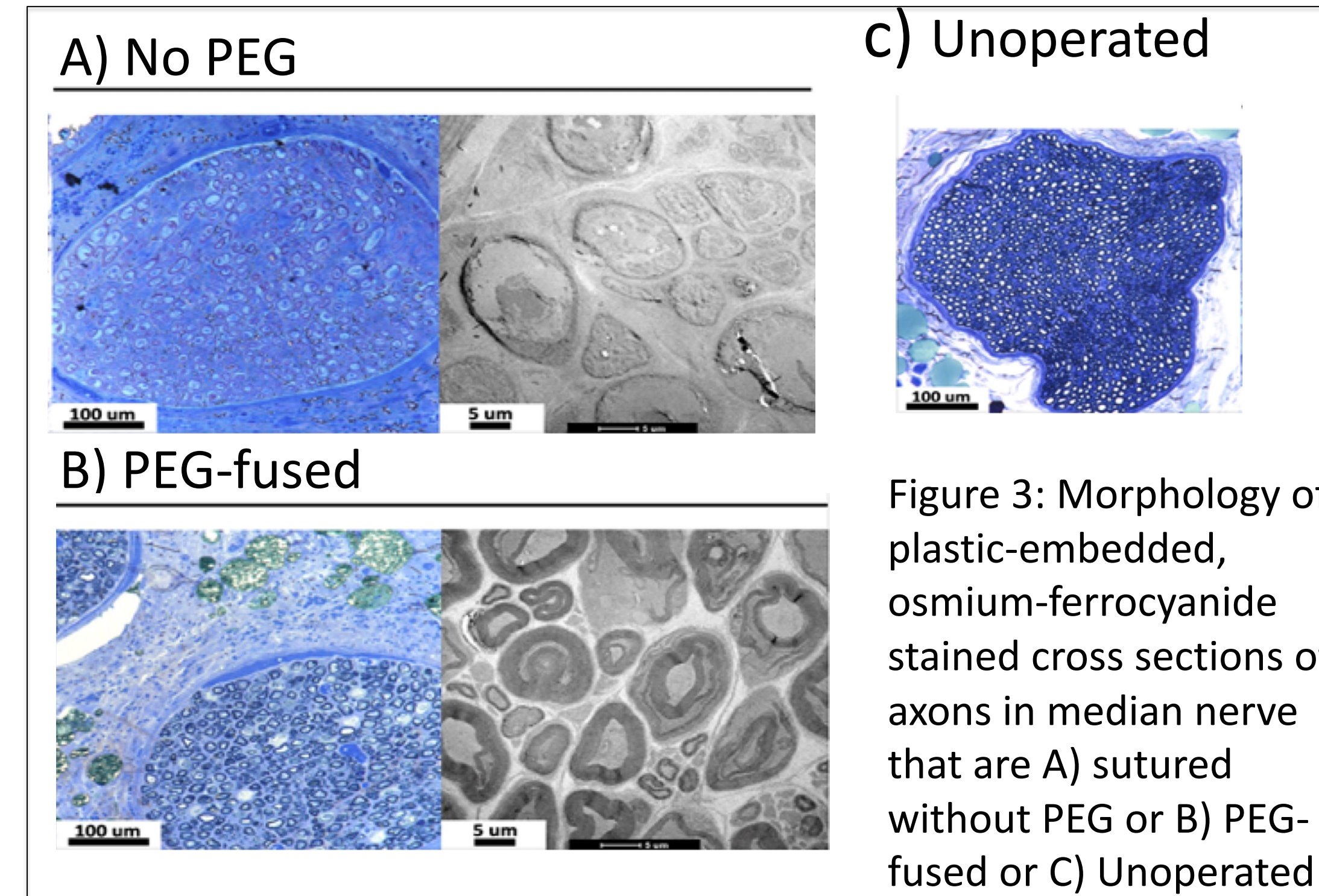
Materials and Methods

- In Swine (n=2), the median was transected above the elbow
- The nerve was sutured with 9-0 nylon in standard fashion and rinsed with hypotonic saline (Figure 1)
- Methylene blue was added
- PEG was applied directly to the coaptation site for 1-2min
- PEG was washed off with isotonic calcium solution
- Compound action potentials and (CAPs) and compound muscle action potentials (CMAPs) were obtained
- Electrophysiological testing occurred (1) prior to injury, (2) after suture repair, and (3) after PEG-fusion
- PEG-fused median nerve harvested for transcription electron microscopy (TEM) on POD 14



Results

- Absence of CAPs and CMAPs after nerve transection repaired with sutures
- Immediate return of CAP and CMAPs after application of PEG
- CAP and CMAPs present on POD 14 in Peg-fused nerves (Figure 4)



Conclusion

- PEG-fusion successfully re-established electrophysiological function and continuity after median nerve transection in swine

References

1. Bittner GD, Mikes M, Ghergherehchi CL. Polyethylene glycol-fusion retards Wallerian degeneration and rapidly restores behaviors lost after nerve severance. *Neural Regen Res.* Feb 2016;11(2):217-9. doi:10.4103/1673-5374.177716
2. Ghergherehchi CL, Shores JT, Alderete J, Weitzel EK, Bittner GD. Methylene blue enhances polyethylene glycol-fusion repair of completely severed rat sciatic nerves. *Neural Regen Res.* Oct 2021;16(10):2056-2063. doi:10.4103/1673-5374.308099
3. Bittner GD, Keating CP, Kane JR, et al. Rapid, effective, and long-lasting behavioral recovery produced by microsutures, methylene blue, and polyethylene glycol after completely cutting rat sciatic nerves. *J Neurosci Res.* May 2012;90(5):967-80. doi:10.1002/jnr.23023

Collaborate with us

