

## Reduced Graphene Oxide-GelMA-PCL Hybrid Nanofibers for Peripheral Nerve

### Regeneration

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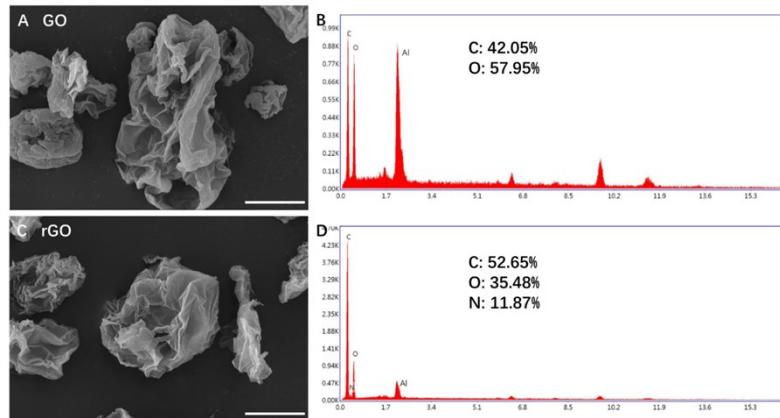


Figure S1. SEM images and EDX of GO (A and B) and rGO (C and D). Scale bar = 7  $\mu\text{m}$ .

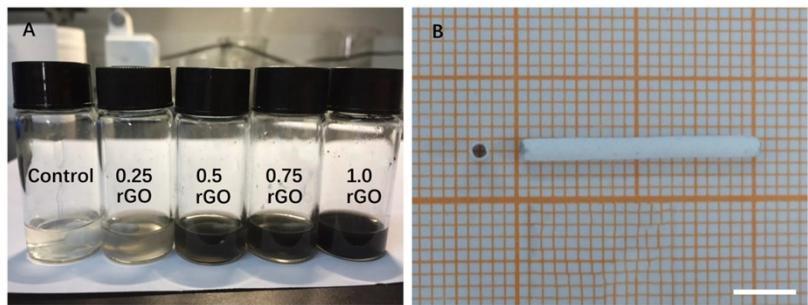


Figure S2. (A) Morphological photographs of rGO/GelMA/PCL hybrid solution with different rGO concentration (Control: 0 wt% rGO, 0.25rGO: 0.25 wt% rGO, 0.5rGO: 0.5 wt% rGO). (B) Image of rGO/GelMA/PCL hybrid nanofibers (0.5 wt% rGO) nerve guidance conduits. Scale bar = 5mm.

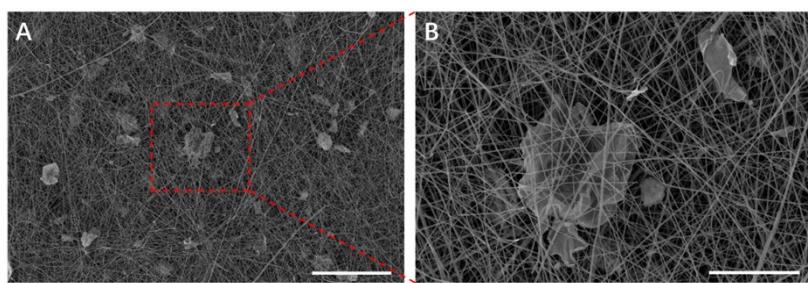


Figure S3. Morphological photographs of rGO/GelMA/PCL hybrid nanofibers (1.0 wt% rGO), Scale bar = 70  $\mu$ m. (B) is a magnified (A) image. Scale bar = 20  $\mu$ m.

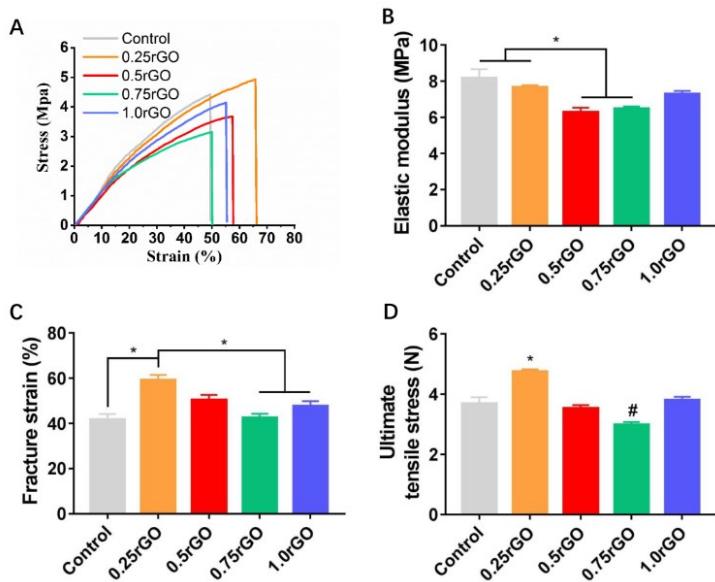


Figure S4. Mechanical properties of rGO/GelMA/PCL hybrid nanofibers with different rGO concentration (Control: 0 wt% rGO, 0.25rGO: 0.25 wt% rGO, 0.5rGO: 0.5 wt% rGO, 0.75rGO: 0.75 wt% rGO, 1.0rGO: 1.0 wt% rGO). Stress-strain curves (A, \*P<0.05, Error bar = s.e.m. n=6), elastic modulus (B, \*P<0.05, Error bar = s.e.m. n=6), fracture strain (C, \*P<0.05, Error bar = s.e.m. n=6), and ultimate tensile stress (D, \*P<0.05 between Control group and 0.25rGO, #P<0.05 between Control group and 0.5rGO group, Error bar = s.e.m. n=6).

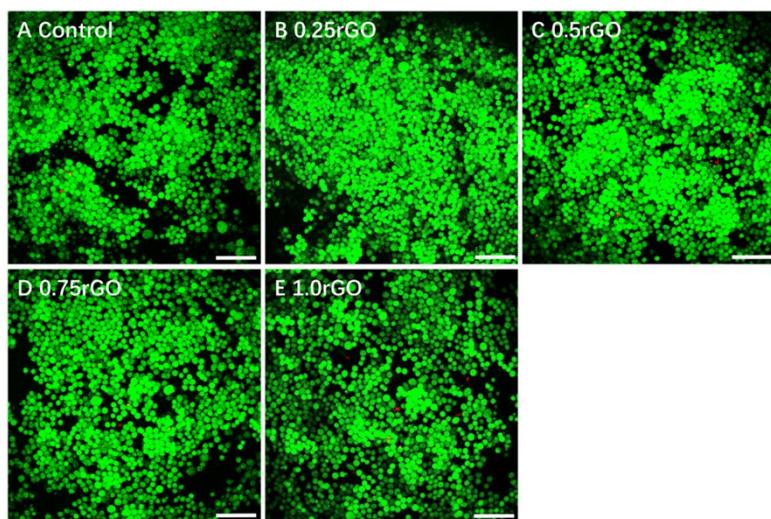


Figure S5. Fluorescence microscopy images of RSC96 stained with LIVE/DEADs,

seeded on rGO/GelMA/PCL hybrid nanofibers with different rGO concentration (Control: 0 wt% rGO, 0.25rGO: 0.25 wt% rGO, 0.5rGO: 0.5 wt% rGO, 0.75rGO: 0.75 wt% rGO, 1.0rGO: 1.0 wt% rGO) at 3 days respectively.

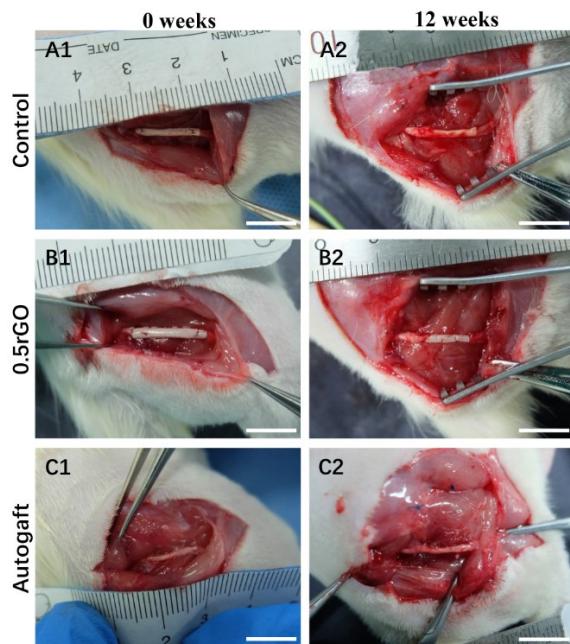


Figure S6. Intraoperative images of rGO/GelMA/PCL hybrid nanofibers (Control and 0.5rGO groups ) nerve guidance conduit bridging a 10mm sciatic nerve defect in the rat after 0 weeks (A1, B1) and 12 weeks (A2、B2). Intraoperative images of autologous nerve bridging a 10mm sciatic nerve defect in the rat after 0 weeks (C1) and 12 weeks (C2).

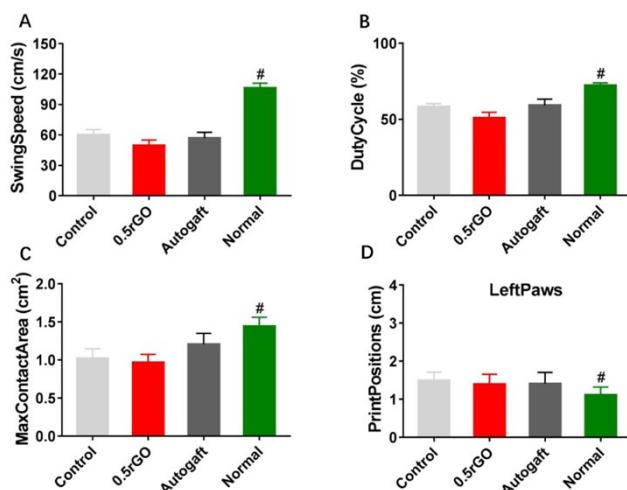


Figure S7. Footprints and footfall patterns of Control group, 0.5rGO group, Autograft

group, and Normal group after 12 weeks of implantation, respectively.  $^{\#}P$  between 0.5rGO group and Normal group,  $^{\#}P < 0.05$ . Error bar = s.e.m. n=8.

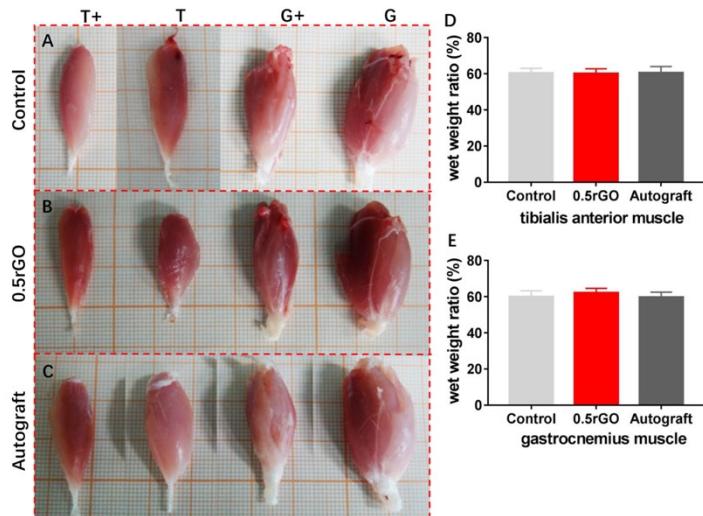


Figure S8. Morphological photographs of muscles and wet muscles ratio. Morphological images of Control group(A), 0.5rGO group (B) and Autograft group (C), experimental side's tibialis anterior muscles (T+), contralateral side's tibialis anterior muscles (T), experimental side's gastrocnemius muscles (G+), contralateral side's gastrocnemius muscles (G). (D) and (E), The tibialis anterior muscles ratio and gastrocnemius muscle ratio. Error bar = s.e.m. n=8.

**Table 1. The primers used for RT-PCR were shown below.**

Gene	Primer sequence (F, forward; R, reverse; 5' to 3')
Foxc1	F: AAGCCTCCCTACAGCTACATCGCTTTAT R: GCCCTTCTCCTCCTTGTCCCTTCACC
Foxc2	F: CTTCTGTAAACGAGTGCGGATTGTAACCAGG

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R: CAATTGGCAGTAACAGTTGGCAAGATGAAA

Snai2      F: CCAAGAAGCCCAACTACAGCGAACT

R: CGTCACTAATGGGACTTCTGAACCAC

Sox2      F: CGCACATGAACGGCTGGAGCA

R: GCCCTGGAGTGGGAGGAAGAGGTAA

Sox10     F: TCGGGCAACGGGAGGAAGAACATAGA

R: GTGACGCTGATGGACTGGAGGGAG

Twist1     F: ATTCCCAGAGGCAACGGCATCACC

R: TGCATTAGACACCGGATCTATTGCATTT

GAPDH     F: CGGCAAGTTCAACGGCACAGTCA

R: CACGCCACAGCTTCCAGAGGG

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