

## SUPPLEMENT DATA

Supplement Figure 1. Electrospun membrane and tube with nanofibrous structure. Scale bar = 5 mm.

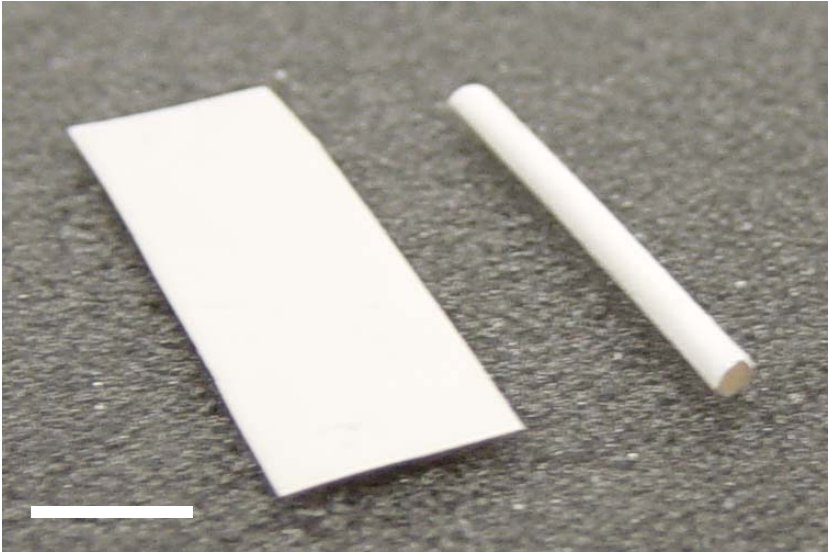
Supplement Figure 2. Neurite outgrowth from DRG tissue on random nanofibers. Immunofluorescent staining of neurofilaments was used to visualize neurite outgrowth from DRG tissue on (A) random nanofibers coated with laminin, (B) random nanofibers coated with laminin and bFGF and (C) random nanofibers coated with laminin in the presence of bFGF in solution after 6 days of *ex vivo* culture. Scale bar = 250  $\mu$ m.

Supplement Figure 3. Neurite outgrowth from DRG tissue on aligned nanofibers. Immunofluorescent staining of neurofilaments was used to visualize neurite outgrowth from DRG tissue on (A) nanofibers coated with laminin and (C) nanofibers coated with laminin in the presence of bFGF in solution after 6 days of *ex vivo* culture. Scale bar = 250  $\mu$ m.

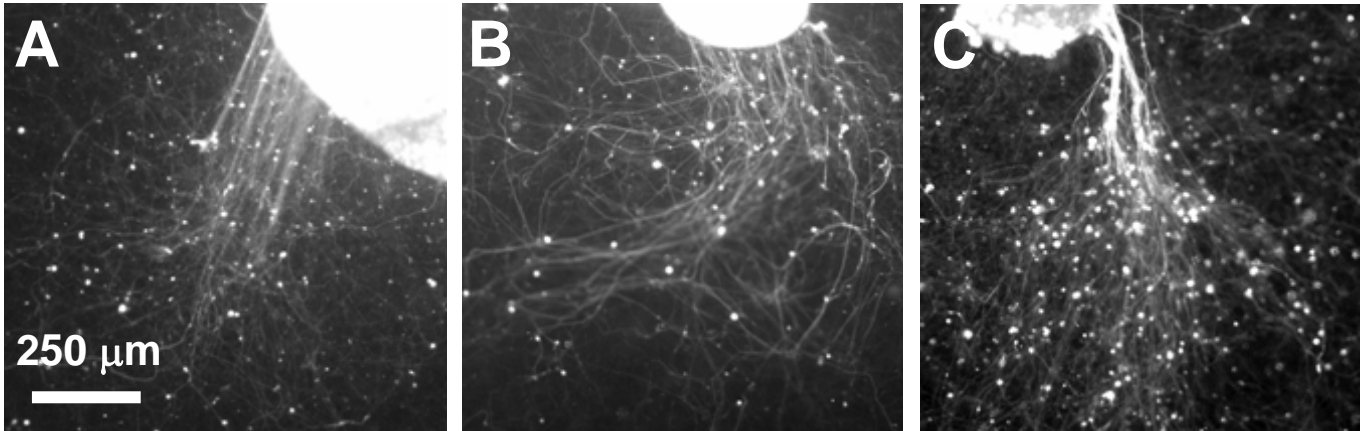
Supplement Figure 4. Preparation of nanofiber samples for *in vitro* wound healing experiments. (A) Nanofibers were created as meshes with random or aligned fibers. The aligned fibers were then oriented as desired for the experiment (either parallel or perpendicular to the long edges of the “wound”). (B) A flattened 18 Gauge syringe needle was placed on the nanofiber meshes to block cell adhesion. (C) Cells were seeded on the nanofiber meshes. (D) After cells adhered to the nanofibers, the needle was removed to allow cell migration into the wound.

Supplement Figure 5. Effects of nanofiber alignment on cell orientation during wound healing. Dermal fibroblasts (labeled with Dil; in red) were cultured on PLLA nanofibers in an *in vitro* wound healing model. After 48 hours, the cells were stained for actin filaments (green) and nuclei (blue) by using FITC phalloidin and DAPI respectively. Nanofibers were either random, aligned perpendicular (left to right), or aligned parallel (top to bottom) to the long edges of the wound.

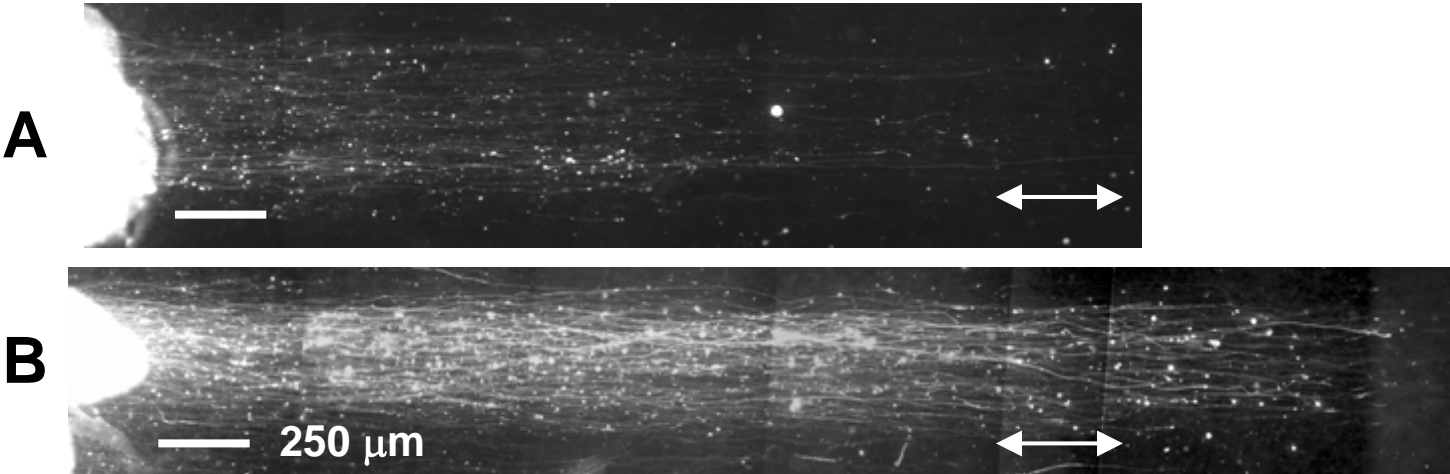
Supplement Figure 1



Supplement Figure 2



Supplement Figure 3



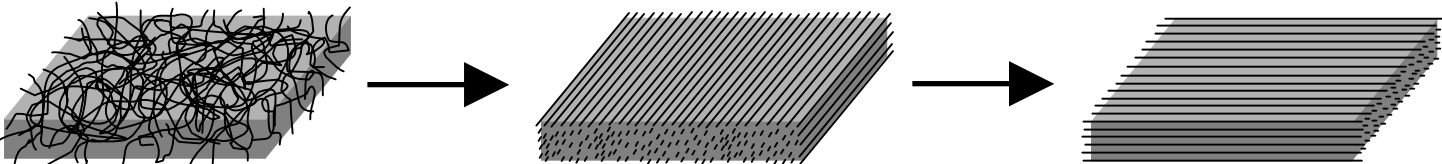
Supplement Figure 4

Random

Parallel

Perpendicular

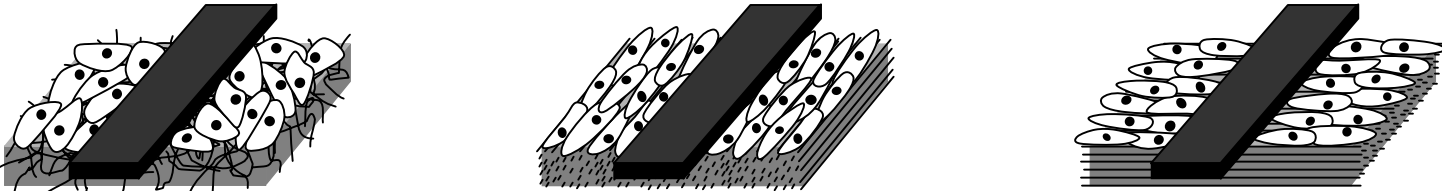
A



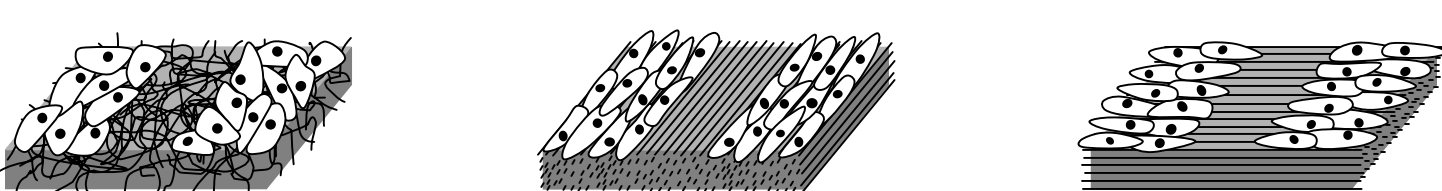
B



C



D



Supplement Figure 5

