Supporting Information

A novel and facile approach to fabricate a conductive and biomimetic fibrous platform with sub-micron and micron features

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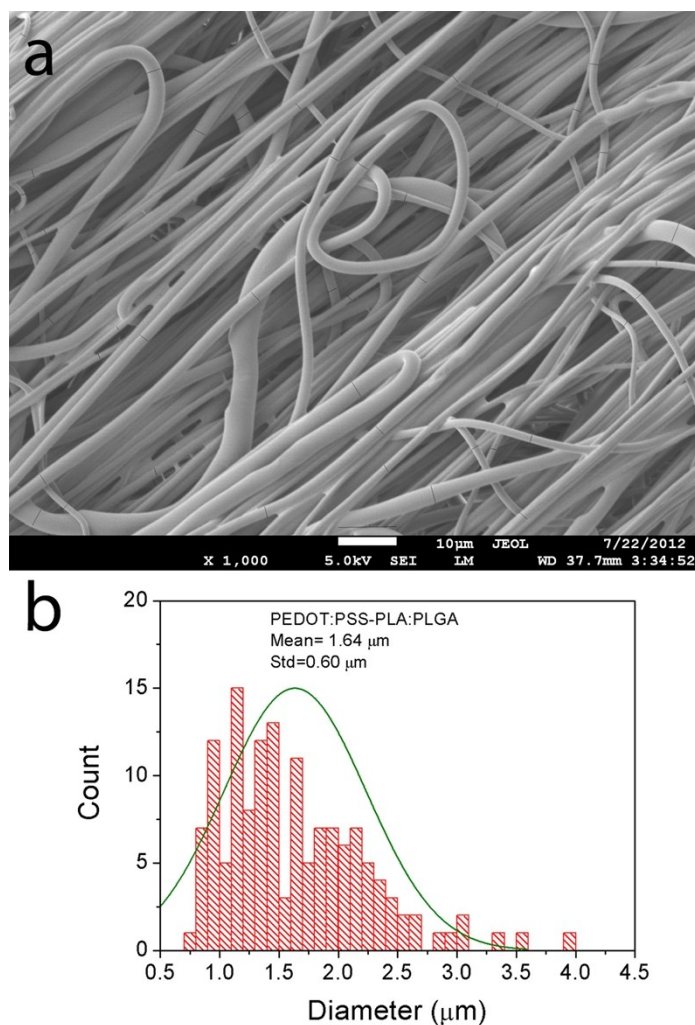

Figure S1. Size distribution of electrospun fibers. a) SEM of the fibers. b) Fibre diameter size distribution.

The diameter of electrospun fibers in the outer layer was determined from SEM images using Image J software and presented in Figure S2b. The mean diameter of the electrospun fibers was found to be 1.64 ± 0.6 μm.
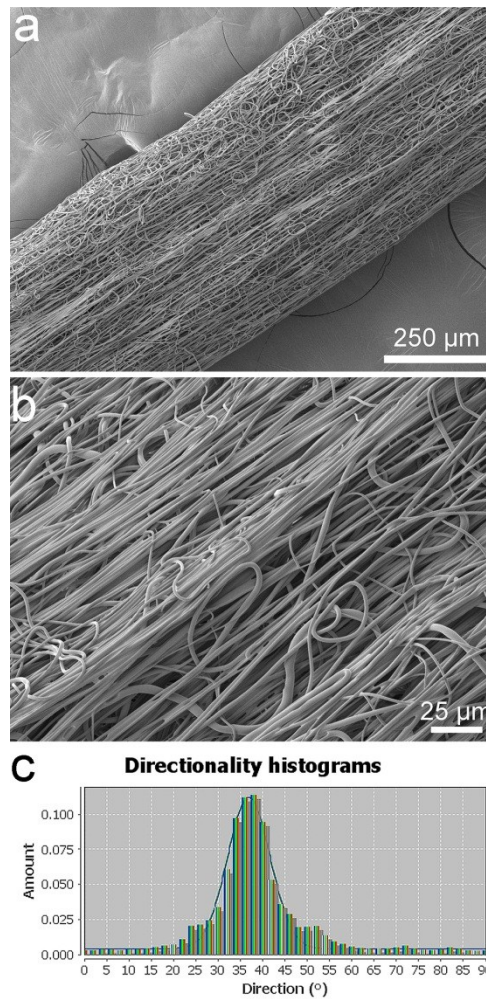
Figure S2. SEM image of PEDOT:PSS-CHI-PLGA fiber, a) low magnification and d) higher magnification. c) Directionality histogram of the SEM image of (b) calculated based on FFT method (Image J software) showing alignment of the majority of electrospun fibers in one direction.

Direction (º) shows the angle of single electrospun fibers in the SEM image.
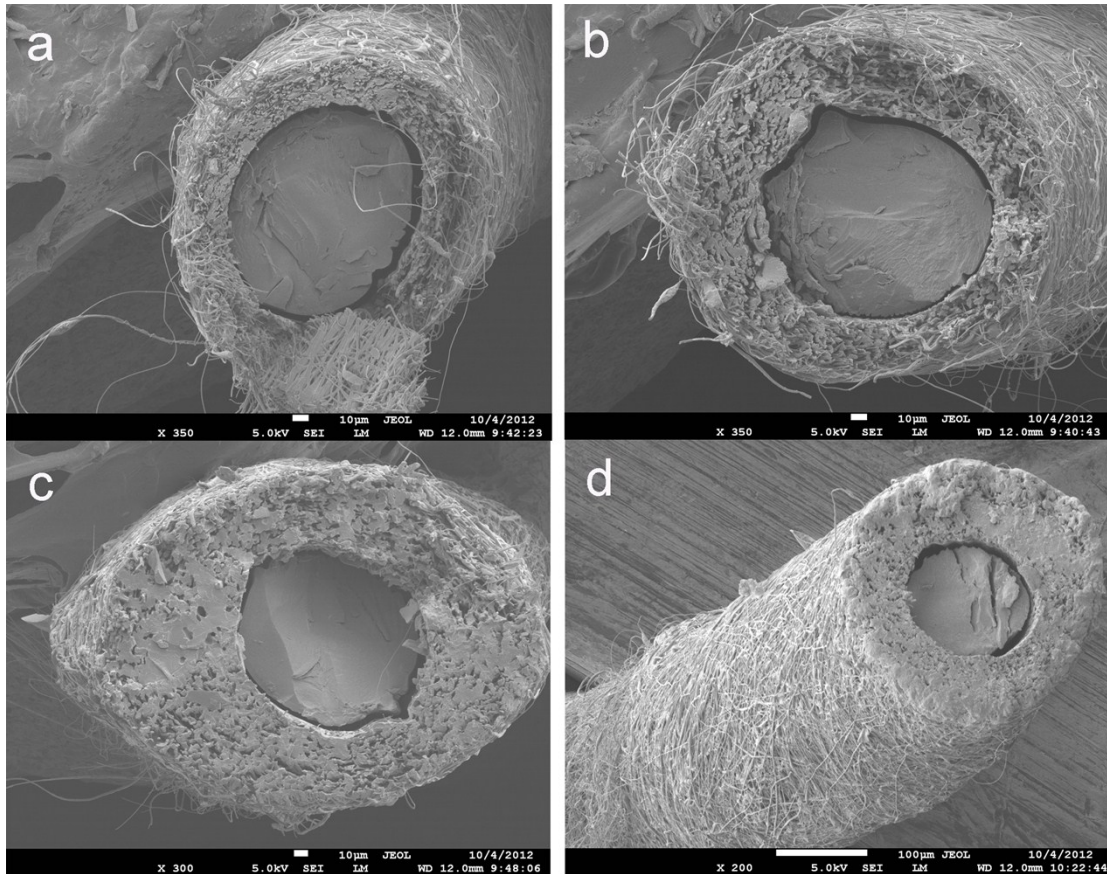
Figure S3. SEM of cross-sections of the PEDOT:PSS-CHI-PLGA fibers at varying electrospinning feed rates. a) 0.5 ml/h, b) 1 ml/h, c) 1.5 ml/h, d) 2.0 ml/h. The scale bars in images a, b and c represent 10 μm, whereas in image d the scale bar represents 100 μm.

In order to control the thickness of the electrospun layer the feed rate of the electrospinning PLGA solution was tuned from 0.5 to 2.0 ml/h. Figure S3 presents SEM images of PEDOT:PSS-CHI-PLGA fibers produced using various feed rates. Increasing the feed rate resulted in thicker coating collected on the top of wet-spun PEDOT:PSS-CHI fibers, with feed rates of 0.5, 1.0, 1.5 and 2.0 ml/h producing sheath thicknesses of 39±6, 57±8, 70±8 and 80±5μm, respectively. The diameter of PEDOT:PSS-CHI core fibers was constant (111 ± 5μm) since the wet-spinning parameters such as feed rate, spinneret diameter and collecting speed were kept constant during the spinning process.
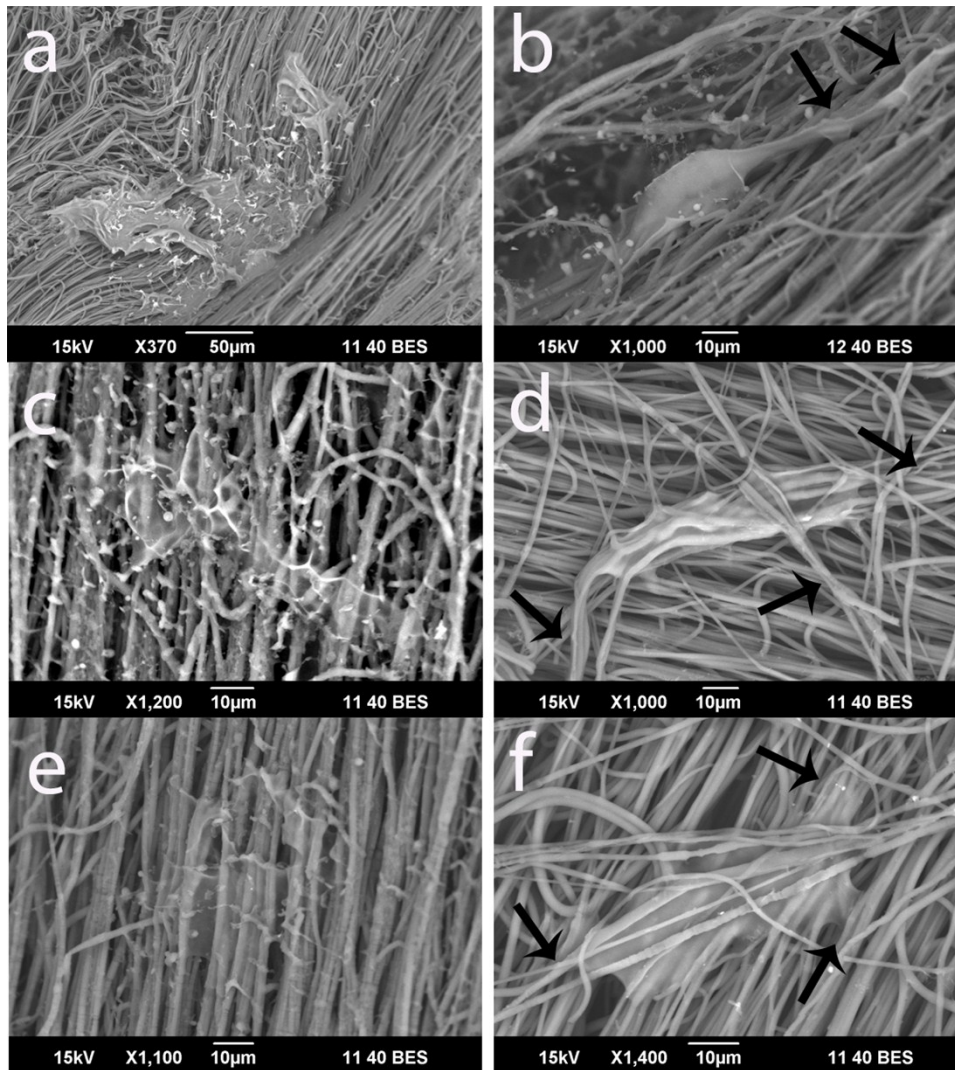
Figure S4. Cryo-SEM images of differentiated B35 neural cells on PEDOT:PSS-CHI-PLGA fibers after 72 h culture (the black arrows show the alignment of axons with the electrospun mat).
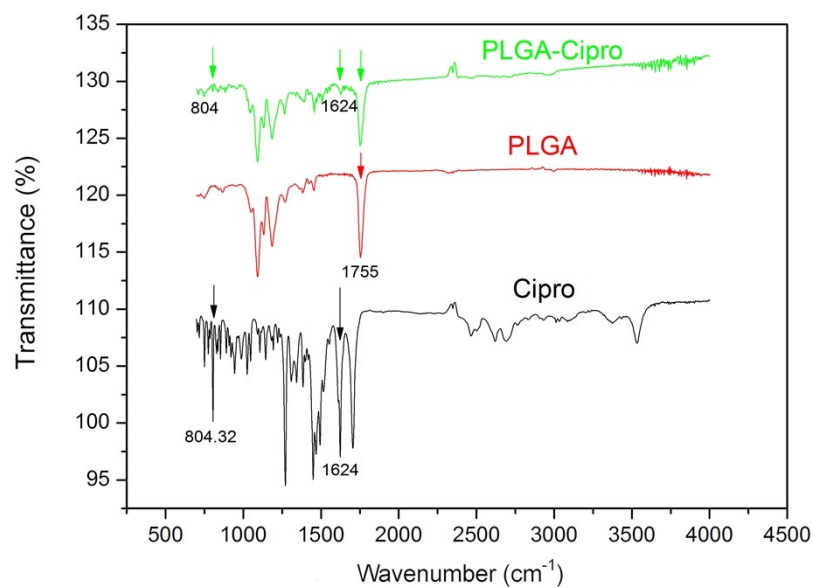
Figure S5. FTIR spectra of PLGA and PLGA-Cipro electrospun fibers and Cipro powder.

The peak at 1755 nm in PLGA represents C=O. The peaks at 1624 and 804.32 nm for Cipro show sigma N-H bending vibration and C–F stretching respectively. The identical peaks were found in the PLGA-Cipro spectrum.
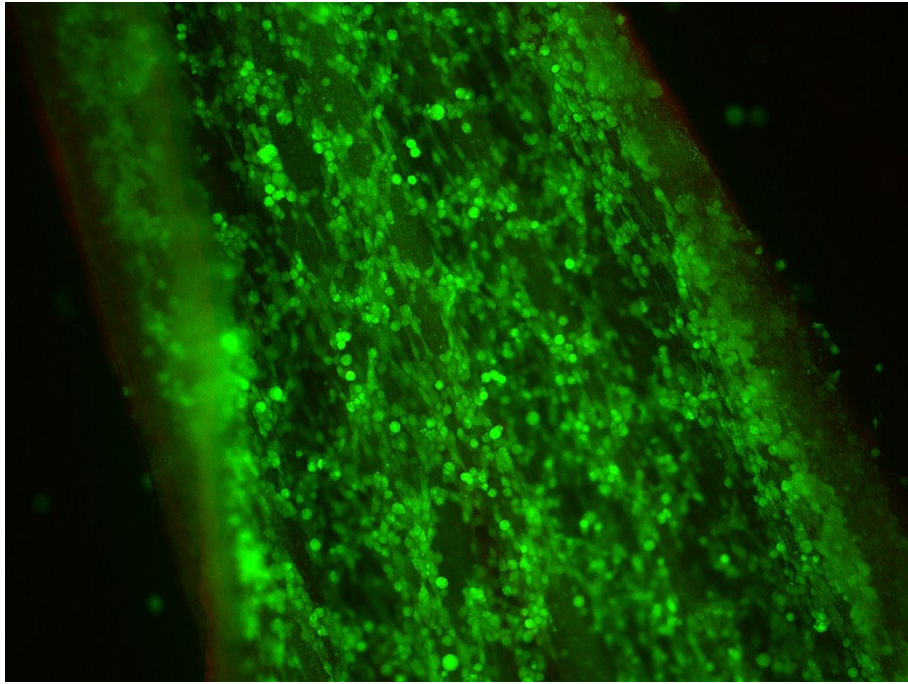
Figure S6. Representative images of B35 neuroblastoma cells on PEDOT:PSS-CHI-PLGA electro- and wet-spun fibers after 72 h culture in growth media. It can be seen that most of the cells are oriented toward the fiber direction and well-attached to the structure.
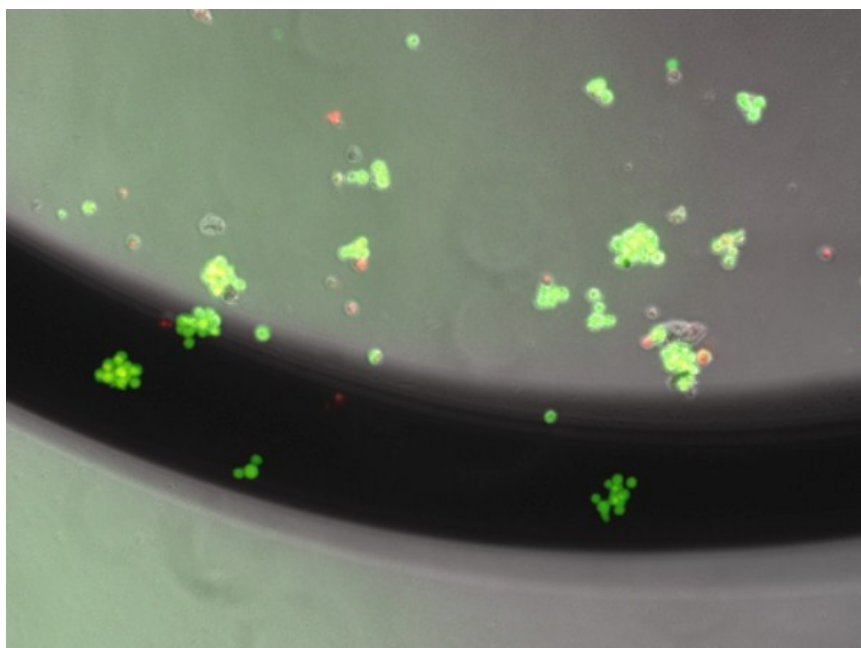
Figure S7. Representative image of B35 neuroblastoma cells in the vicinity of the PEDOT:PSS-CHI fiber. When B35 cells were cultured for 72 h on the PEDOT:PSS-CHI fibers (without the PLGA electrospun layer), the cells were found agglomerated on the underlying tissue culture substrate and there was no observed cell adhesion onto the fibers.

S8. Population Doubling Time Formula:

$$PDT = T \ln2 / \ln(Xe/Xb)$$

T is the incubation time in any units

Xb is the cell number at the beginning of the incubation time

Xe is the cell number at the end of the incubation time