# Micropatterned neurovascular interface to mimic the blood-brain barrier neurophysiology and micromechanical function

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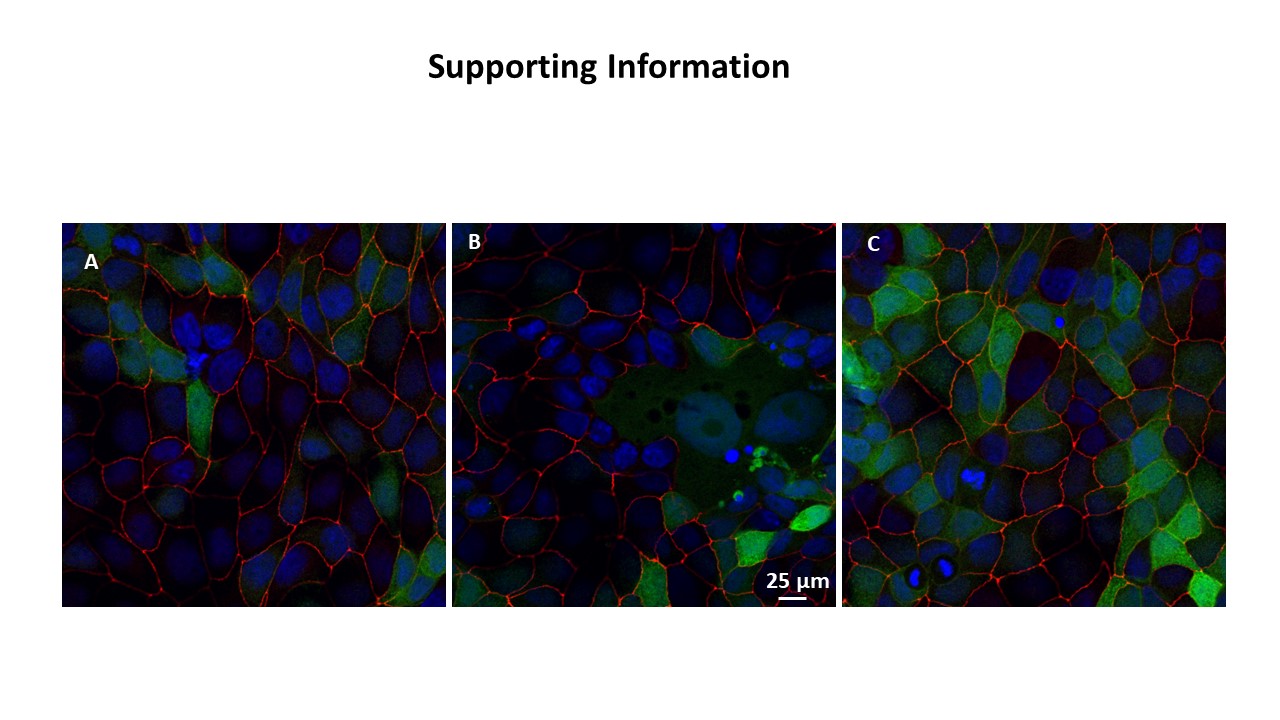
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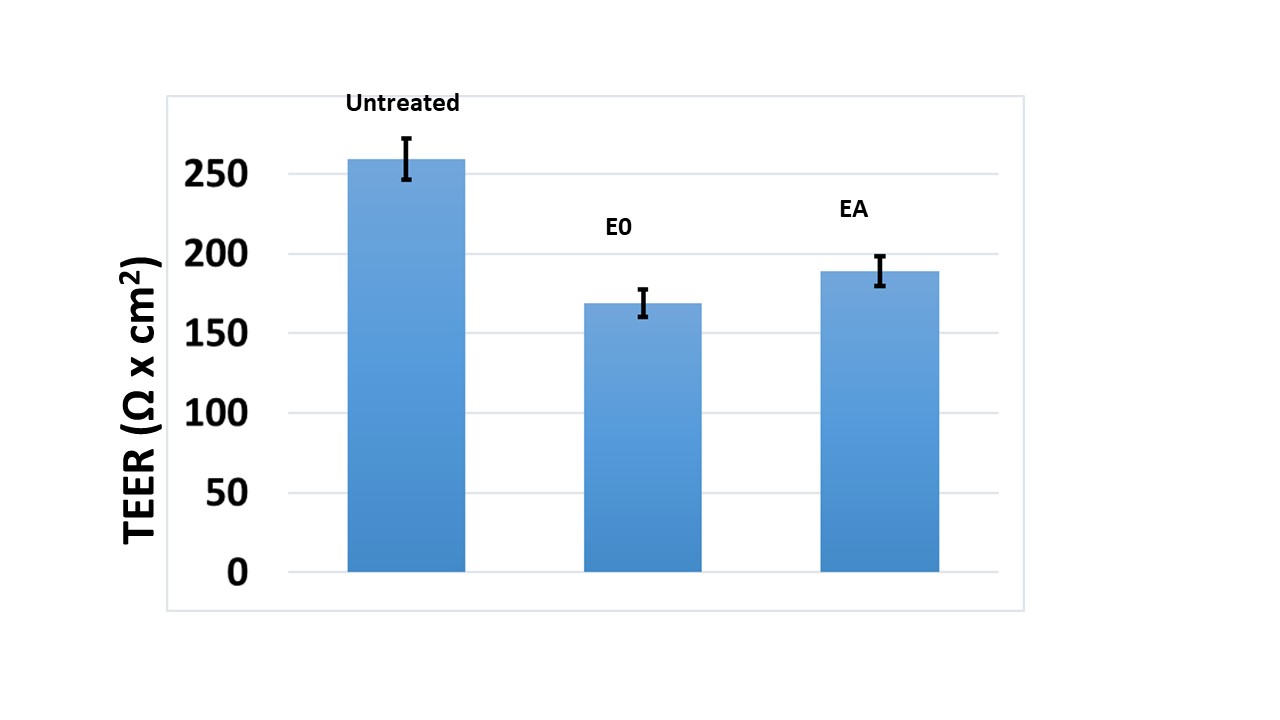
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**Supporting Figure/movie captions**



**Figure S1.** **Perspective of modelling proof of principle neurodegenerative disease pathophysiology on blood brain barrier on chip exhibiting** tight junction zona occludens-1 (red), glucose transporter 1 (green ) and nuclei stained with DAPI (blue) in untreated control (A), monoculture endothelial E0 (B) and co-culture astrocyte-endothelial EA (C). Qualitatively tight junction are well expressed in healthy unexposed endothelial cells in left panel, while they are severely compromised in middle panel with monoculture and moderately expressed in coculture exposed with SPIONs but less than healthy cells in left panel.



**Figure S2.** Quantitative impedance measurement in cell exposed to SPIONs to compare with healthy control cells for TEER evaluation.

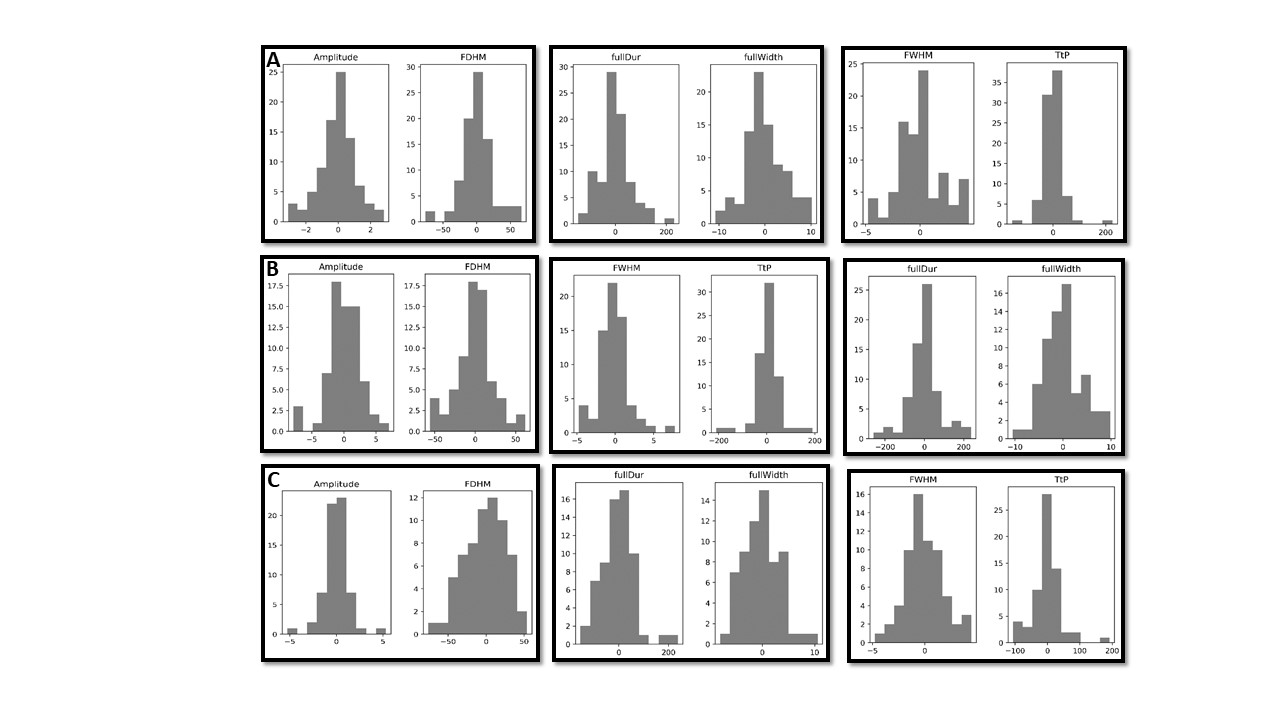


Figure S3. Analysis of Ca sparks in endothelia controls with and without astrocyte exposed to SPIONs. The histograms of individual spark properties such Amplitude, FDHM, FWHM, TtP, full duration and full width analysis are shown in upper panel (A) control without SPIONs exposure, middle panel (B) SPIONs exposure in monoculture (E0), lower panel (C) Coculture exposed with SPIONs (EA). Histograms analysis is based on 2070 events recorded in 75 images using a *Criteria* of 3.8 explained in reference1. Plots of calcium *sparks were* averaged over 5pixels.

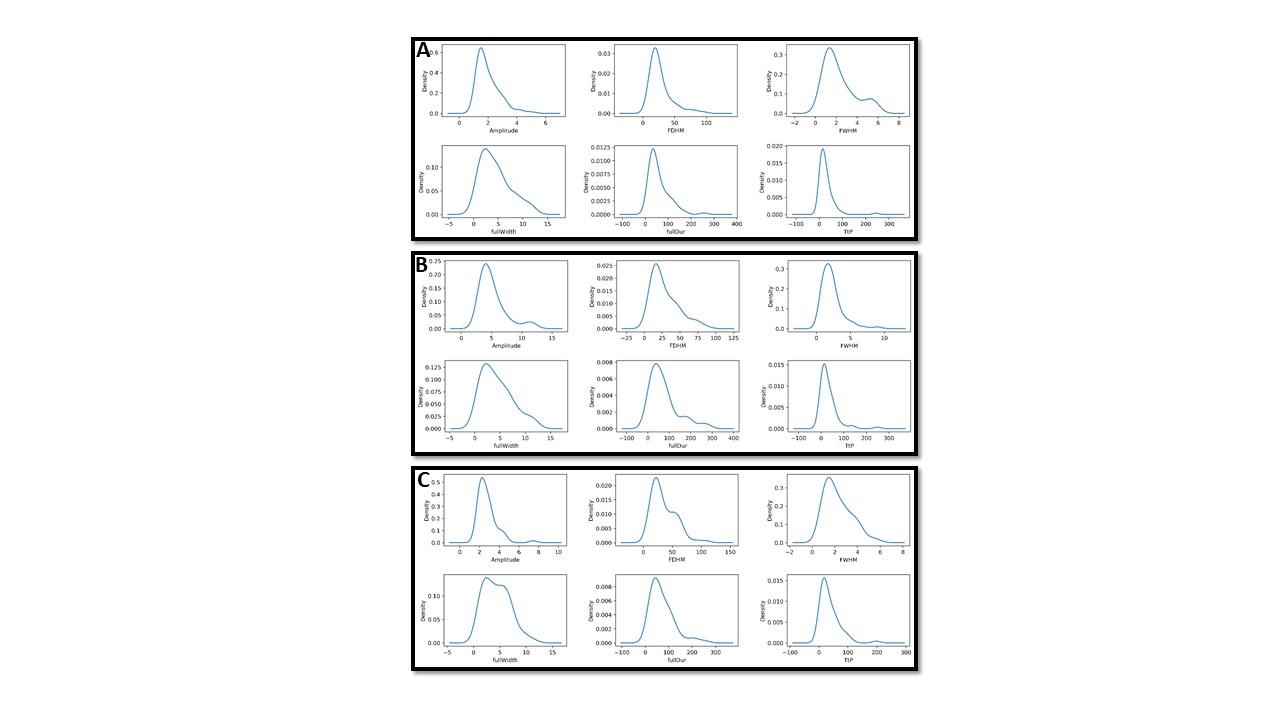


Figure S4. Spatiotemporal density analysis of Ca sparks in endothelia controls with and without astrocyte exposed to SPIONs. The histograms of individual spark properties such Amplitude, FDHM, FWHM, TtP, full duration and full width analysis are shown in upper panel (A) control without SPIONs exposure, middle panel (B) SPIONs exposure in monoculture (E0), lower panel (C) Coculture exposed with SPIONs (EA). Histograms analysis is based on 2070 events recorded in 75 images using a *Criteria* of 3.8 explained in reference1. Plots of calcium *sparks were* averaged over 5pixels.

**Supporting movie SM1.** Calcium releasing events of the endothelial cells immediately after seeded onto unpatterned (left panel), patterned ring ECM protein (middle panel) and patterned line ECM protein on transwell bottom. The time lapse video was taken at a rate of 3 seconds per frame (FpS).

**Reference**

1 Picht, E., Zima, A. V., Blatter, L. A. & Bers, D. M. SparkMaster: automated calcium spark analysis with ImageJ. *American Journal of Physiology-Cell Physiology* **293**, C1073-C1081, doi:10.1152/ajpcell.00586.2006 (2007).