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Supplementary information



 $\label{eq:supplementary 1.} HRSEM images of GO and FLG aggregates. Representative images for GO (A) and FLG (B) aggregates taken by HRSEM at 200x and 1000x magnifications on PDMS devices, PTFE and PVC-based tubing. Scale bar 20 and 10 <math display="inline">\mu m.$



Supplementary 2. Elemental analysis of GO particles on PTFE, PVC-based tubing and PDMS devices by EDS. Column graphs show the results obtained for the main elements present in the samples (mean values ± SD, n= 7, p-value: **<0.01, ***<0.001).



Supplementary 3. Effect of GO and FLG on RPTEC/TERT1 cells under static conditions. Immunostaining for α -tubulin (red), ZO-1 (green), and nuclei (blue). Scale bar 20 μ m.

Video 1. Recreating a tubule-like structure inside a microfluidic device. Confocal microscopy reconstruction shows the integrity of the entire RPTEC/TERT1 cell monolayer after perfusing at a high flow of 0.48 dynes/cm2 for 72 hours.