Electronic Supplementary Information (ESI)

Enhanced podocyte differentiation and changing drug toxicity sensitivity through pressure controlled mechanical filtrating stress on a glomerulus-on-a-chip

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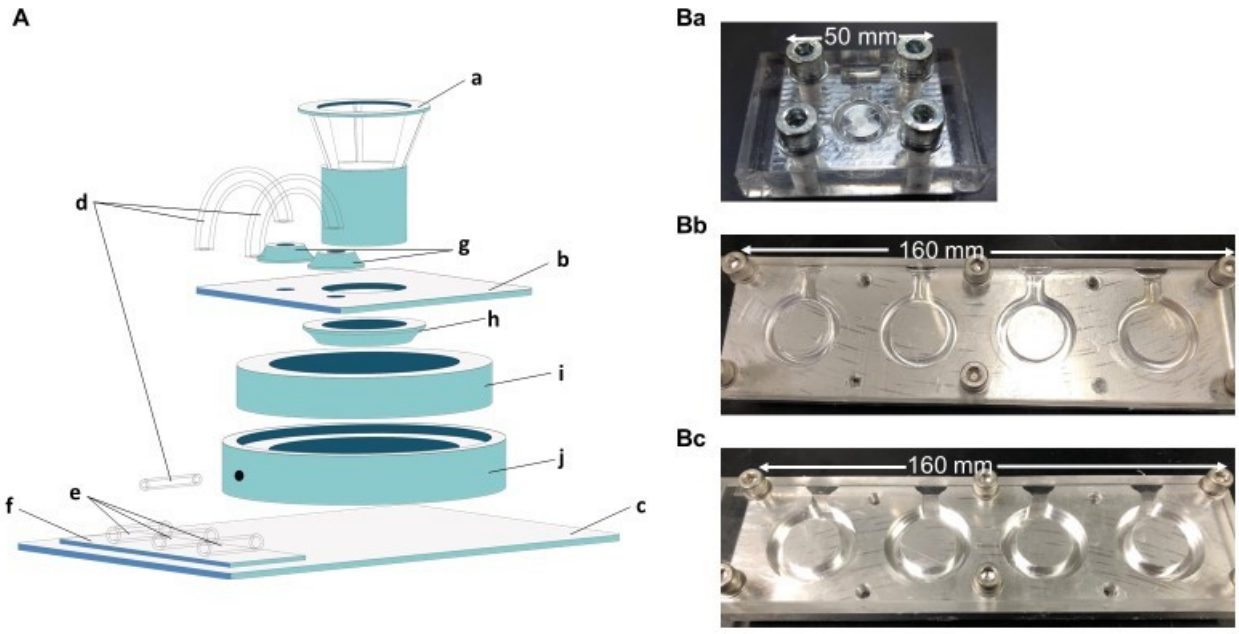
Supplementary Information List

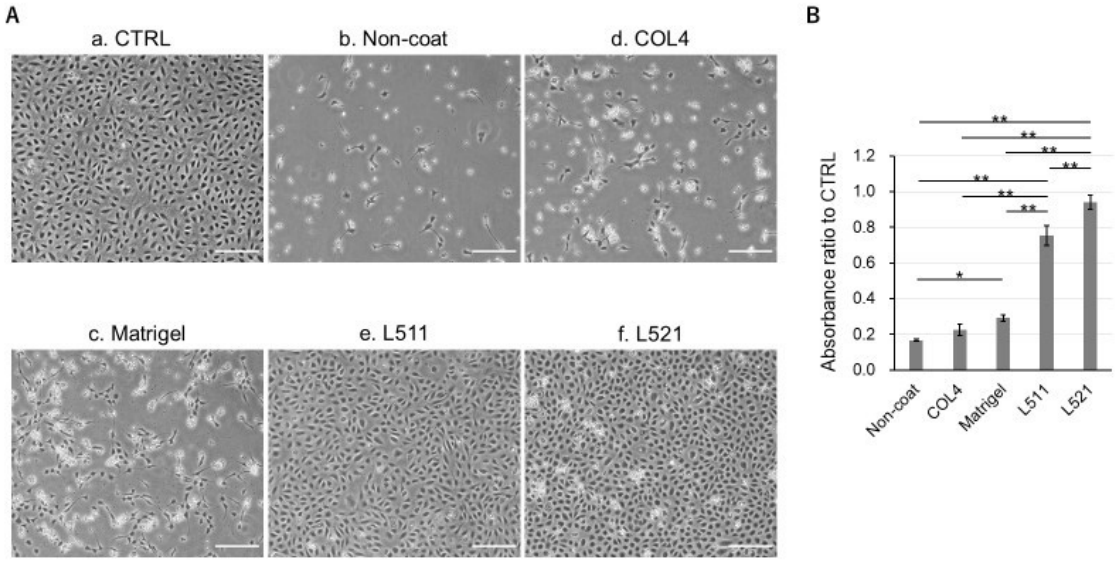
1. Supplementary Figures



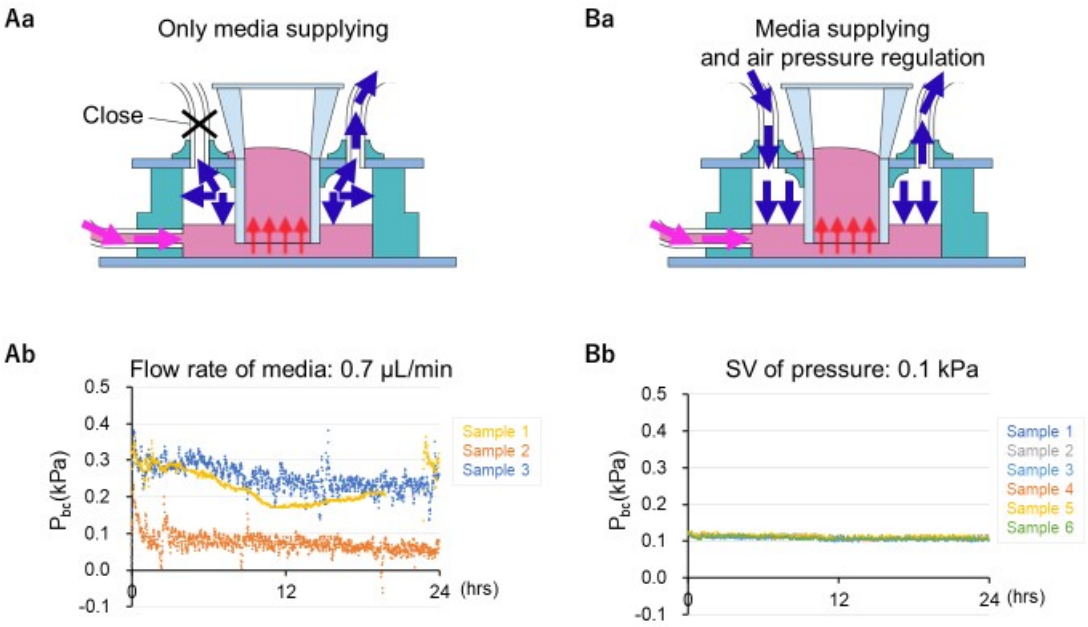
Supplementary Figure 1 Fabrication of filtrating fluidic device:

(A) Components and assembly of filtrating fluidic device (a) culture insert, (b) upper glass plate, (c) bottom glass plate, (d) silicone tubing 1 mm inner diameter × 2 mm outer diameter, (e) silicone tubing 2 mm inner diameter × 3mm outer diameter, (f) thin PDMS plate, (g) silicone tubing stabilizer, (h) elastic sealing ring, (i) upper holder ring, (j) bottom holder ring

(B) Molds used to PDMS parts: mold for elastic sealing ring (Ba), mold for upper well ring (Bb), and mold for bottom ring (Bc).



Supplement Figure 2 ECM validation for podocyte culture
(A) Phase contrast images of HSMP at day 4 under the culture conditions of each extracellular matrix: (a) Basal media without ECM (control: CTRL) (b) F0 media without ECM (Non-coat) (c) F0 media with mouse type IV collagen (COL4) (d) F0 with Matrigel (e) F0 with recombinant human laminin α5β1ɤ1 (L511) (f) F0 with recombinant human laminin α5β2 ɤ 1 (L521), Scale bars: 200 μm.
(B) Comparison of absorbance ratio to basal media condition among each culture condition of ECM by WST-8 assay: ANOVA with Tukey HSD test was performed to determine significant difference. Error bars represent standard deviation. n = 4,
* ＜0.005, ** ＜ 0.0001



Supplement figure 3 Higher repeatability of basal compartment pressure for filtration flow in air pressure control:

(A) Scheme and basal compartment pressure under the condition of volume control. In this condition, only media supplying was performed for filtration flow (Aa), where measured pressure of each sample was varied (Ab).

(B) Scheme and basal compartment pressure under the condition of air pressure control. In this condition, both of media supplying and air pressure regulation were performed for generating filtration flow (Ba), where the measured basal compartment pressure was completely consistent among all samples (Bb). Pink, blue and red arrows represent media, pressure and filtrating flow, respectively.