Electronic Supplementary Material (ESI) for Lab on a Chip.

Electronic Supplementary Information

Paper-based in-vitro model for on-chip investigation of the human respiratory system

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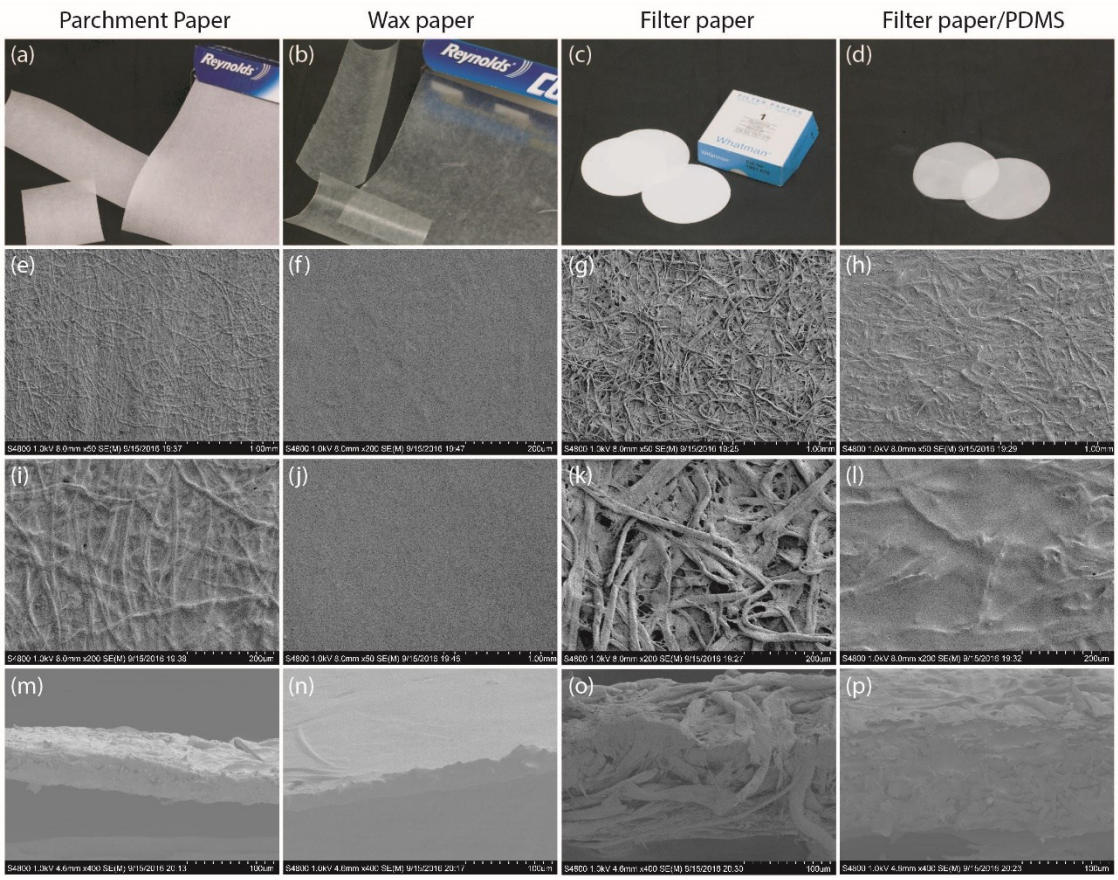

Fig. S1. Basic structural characterization of different papers. (a-d) optical image of different papers: parchment paper, wax paper, filter paper, filter paper coated with PDMS, (e-l) low and high magnification SEM images of surface properties of different papers, (m-p) cross-sectional SEM image of different papers.

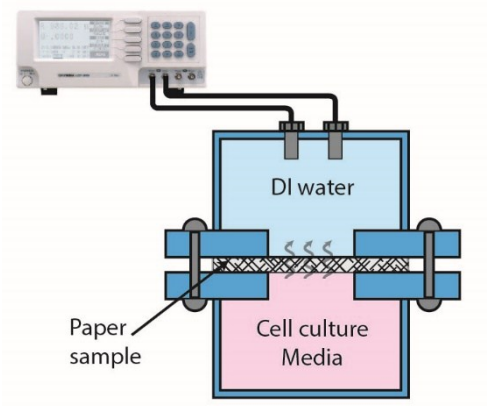

Fig. S2. Schematic of setup used for characterizing diffusion of media across various papers

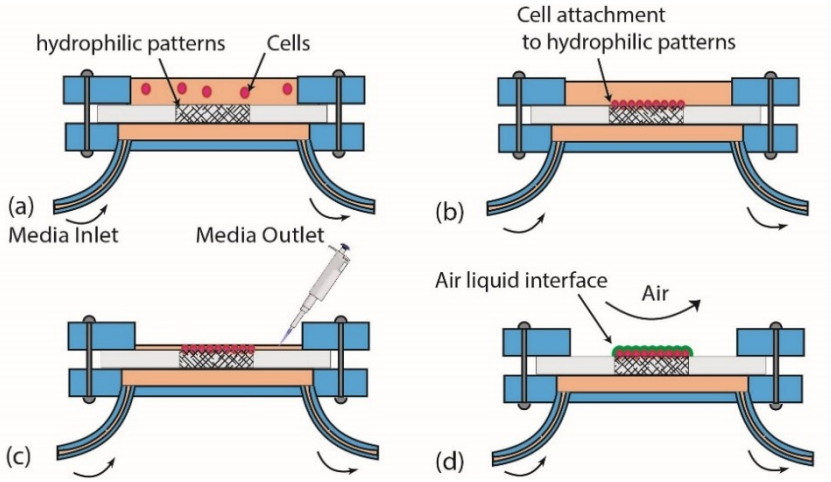

Fig. S3. The procedure for airway cell culturing on the paper based platform; (a) cell seeding on the upper open chamber, (b) on day 3 the cells exhibit a confluent monolayer coverage on the laser ablated hydrophilic region on the parchment paper, (c) air-liquid interface is established by removing the medium from the top chamber while maintaining a constant flow of medium in the lower chamber for 7 days, (d) observation of ZO1 expression around the whole cell membrane that resembles the functional airway epithelium.

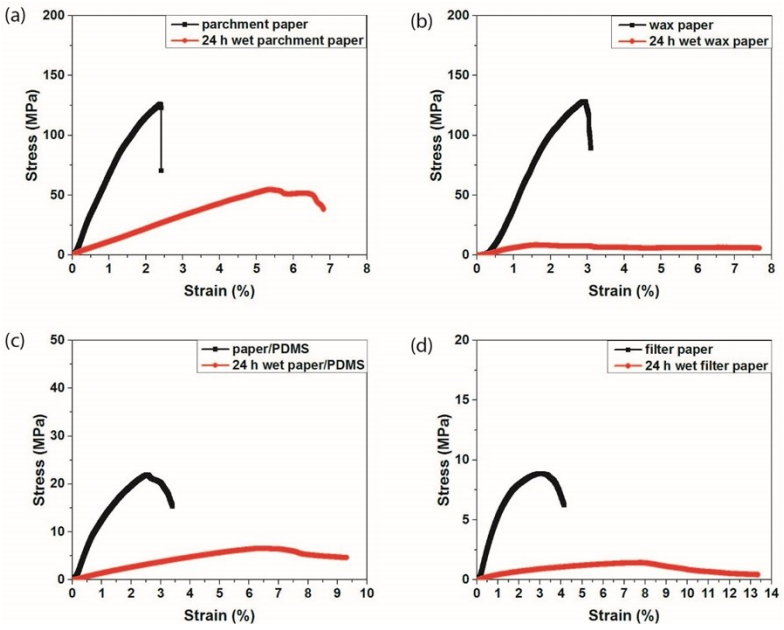

Fig. S4. Stress vs. strain of dry and wet paper films after 24 hours of PBS immersion (a) parchment paper, (b) wax paper, (c) paper-PDMS, and (d) filter paper

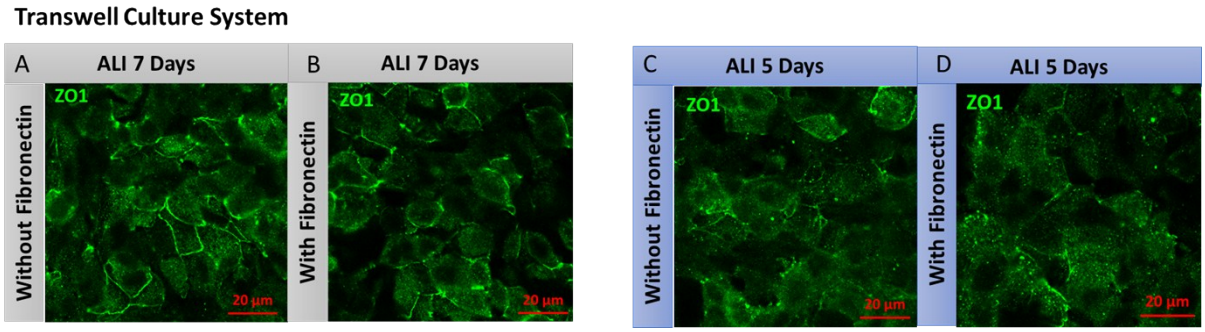

Fig. S5. Comparison of airway epithelium integrity between with (B, D) and without fibronectin coating (A, C) on conventional Transwell ALI culture. Tight junctional marker - ZO1 expression (green colour) was compared at Day 5 and Day7. (Scale bar = 20µm).

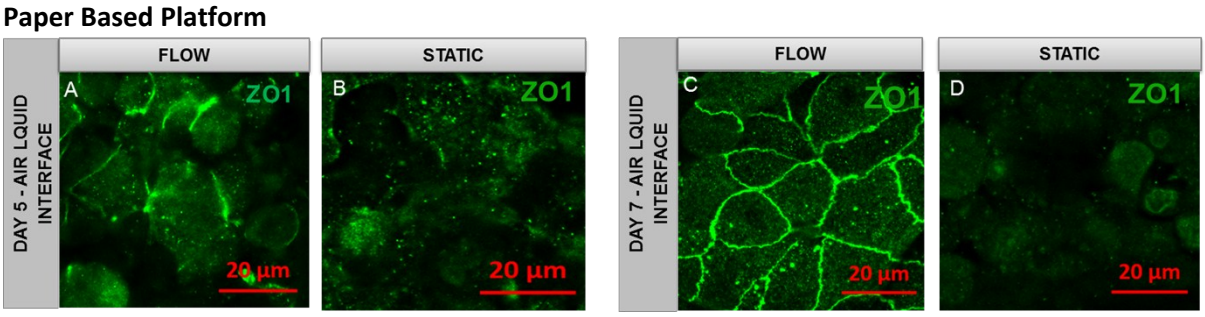

Fig. S6. Comparison of ZO1 expression on differentiated CALU3 cells at Air Liquid Interface under flow and static condition of new ALI platform for 5days (A,B) and for 7 days (C,D). The CALU3 cells were fixed and stained with tight junction marker ZO1 (Zona Occluden1 –green) (scale bar = 20 um)