

Supporting Information

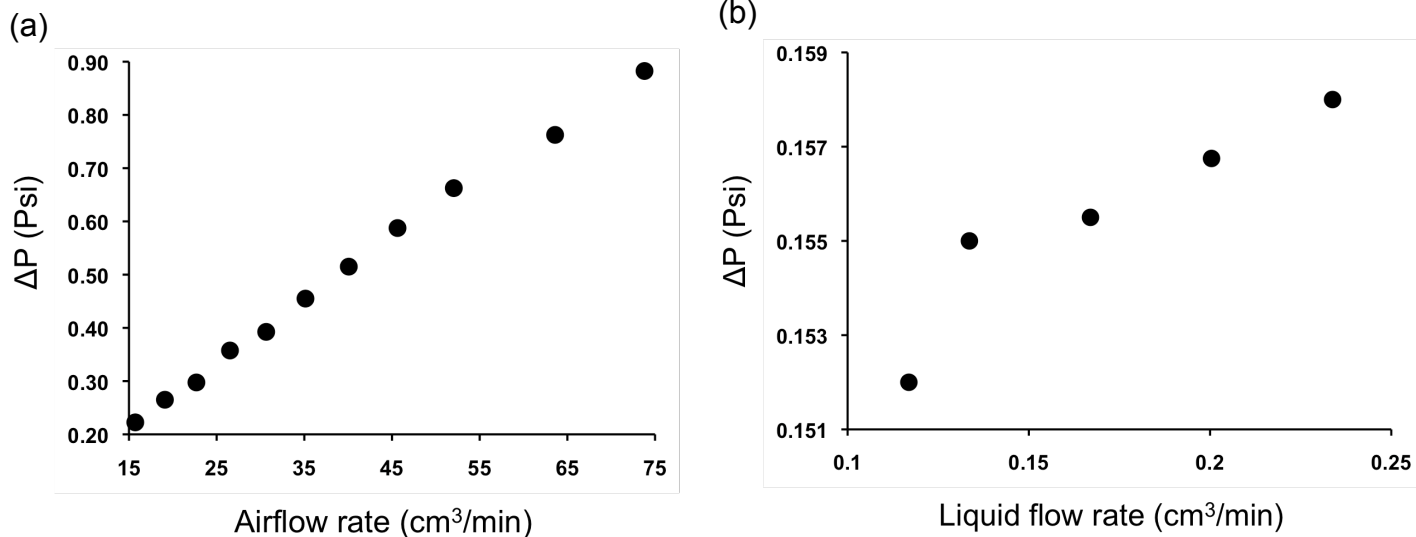


Fig. SI.1. (a) Systematic variation of differential pressure due to changes in airflow rate, (b) liquid flow rate changes the differential pressure only marginally.

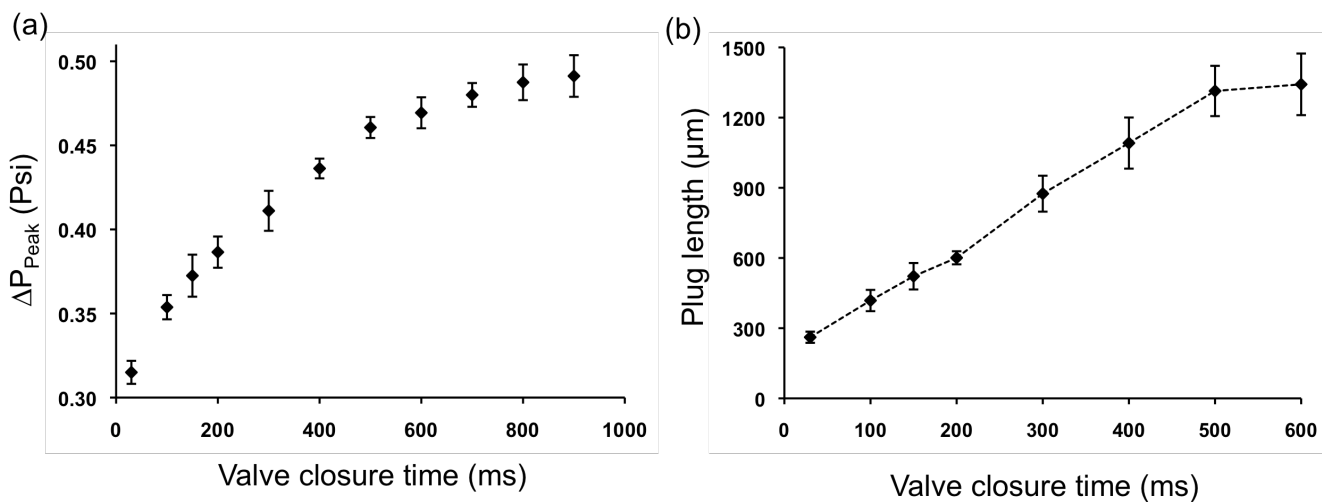


Fig. SI.2. (a) Peak differential pressure variation due to increase in the closure time of the pinch valve and (b) corresponding increase in the liquid plug length.

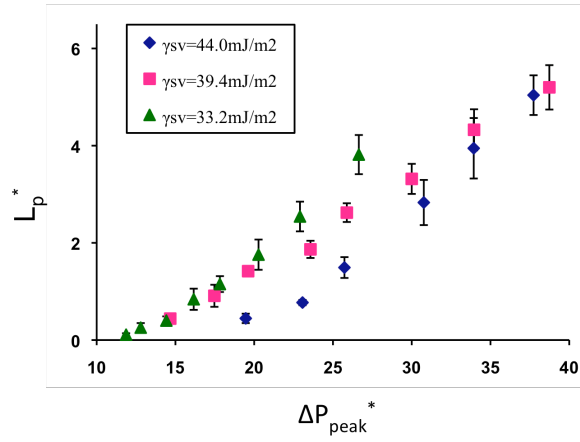


Fig. SI.3. Plug length normalized with respect to half channel width ($w/2$) and plotted versus Peak differential pressure normalized by dividing with $[\gamma_{sl}/(w/2)]$ to eliminate the effect of γ_{sl} on plug length in devices with three different channel wall surface tensions. Data points from all three devices tend to collapse on a narrow band. Variations reflect experimental errors.

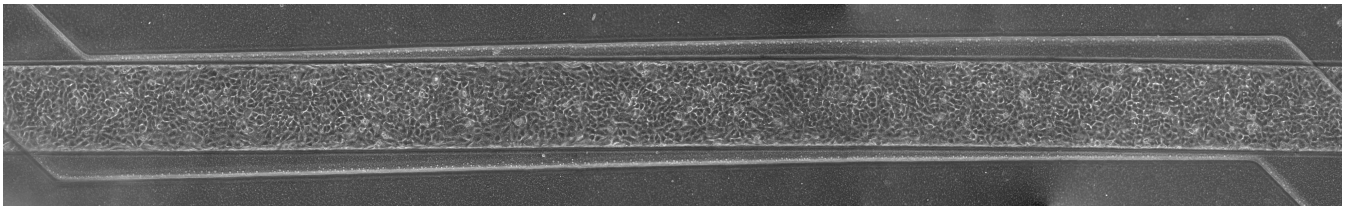


Fig. SI.4. A confluent monolayer of A549 lung epithelial cells grown on the porous membrane of the microfluidic airway platform.