Electronic Supplementary Material (ESI) for Analyst.

Real-time measurement of trans-epithelial electrical resistance in organ-on-a-chip during cell proliferation

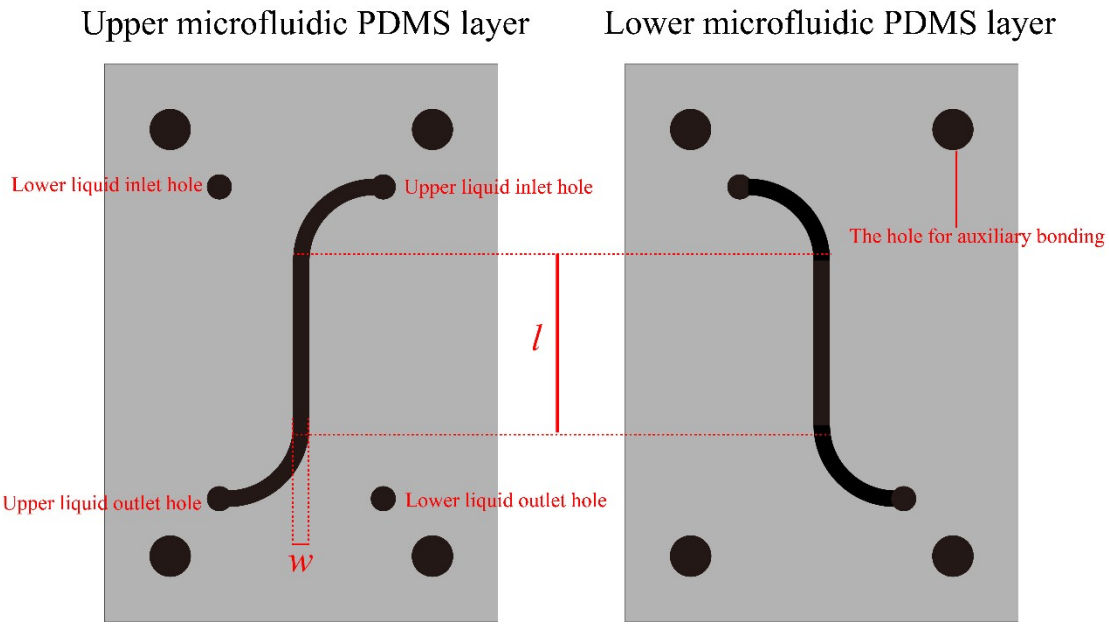

Fig. S1 The design drawings of upper microfluidic PDMS layer and lower microfluidic PDMS layer.

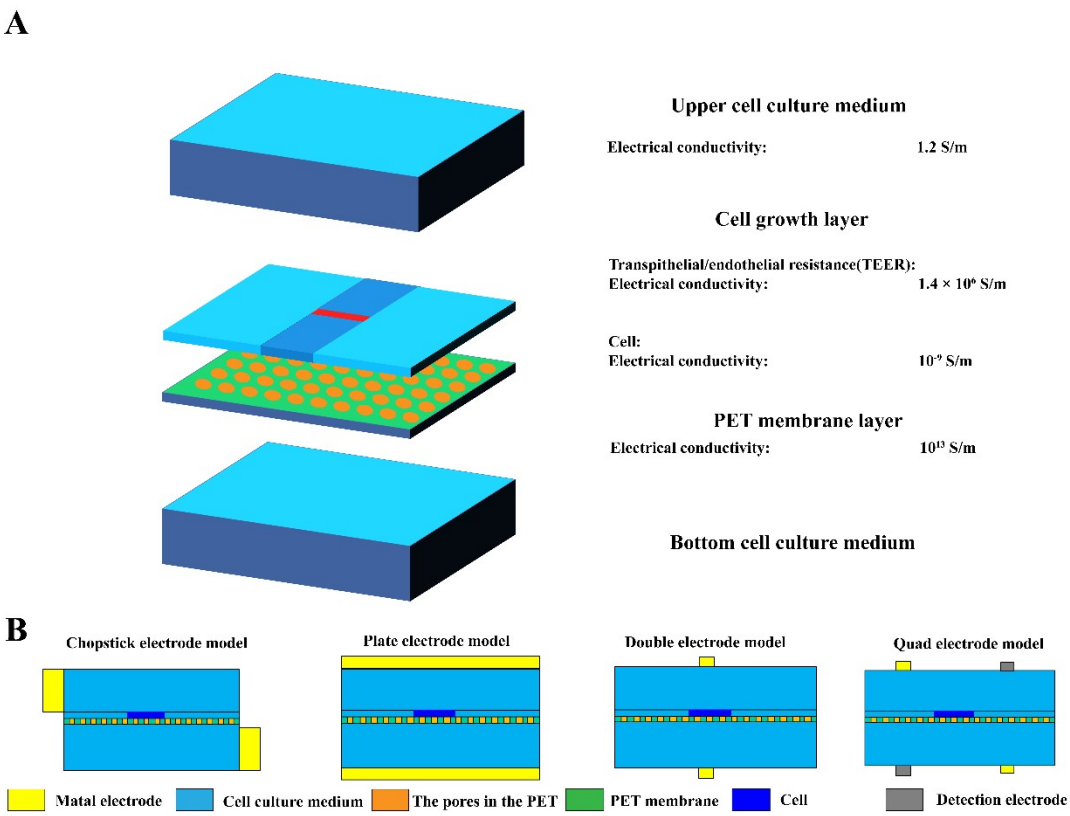

Fig. S2 Simulation models and electrode placement for the four circuit models. (A)3D structure and material parameters of the organ-on-a-chip simulation model. (B) Schematic diagram of the placement of four conventional electrodes on the organ chip. The location of cells and tight junctions were used as variables to explore the stability of the electrode model.

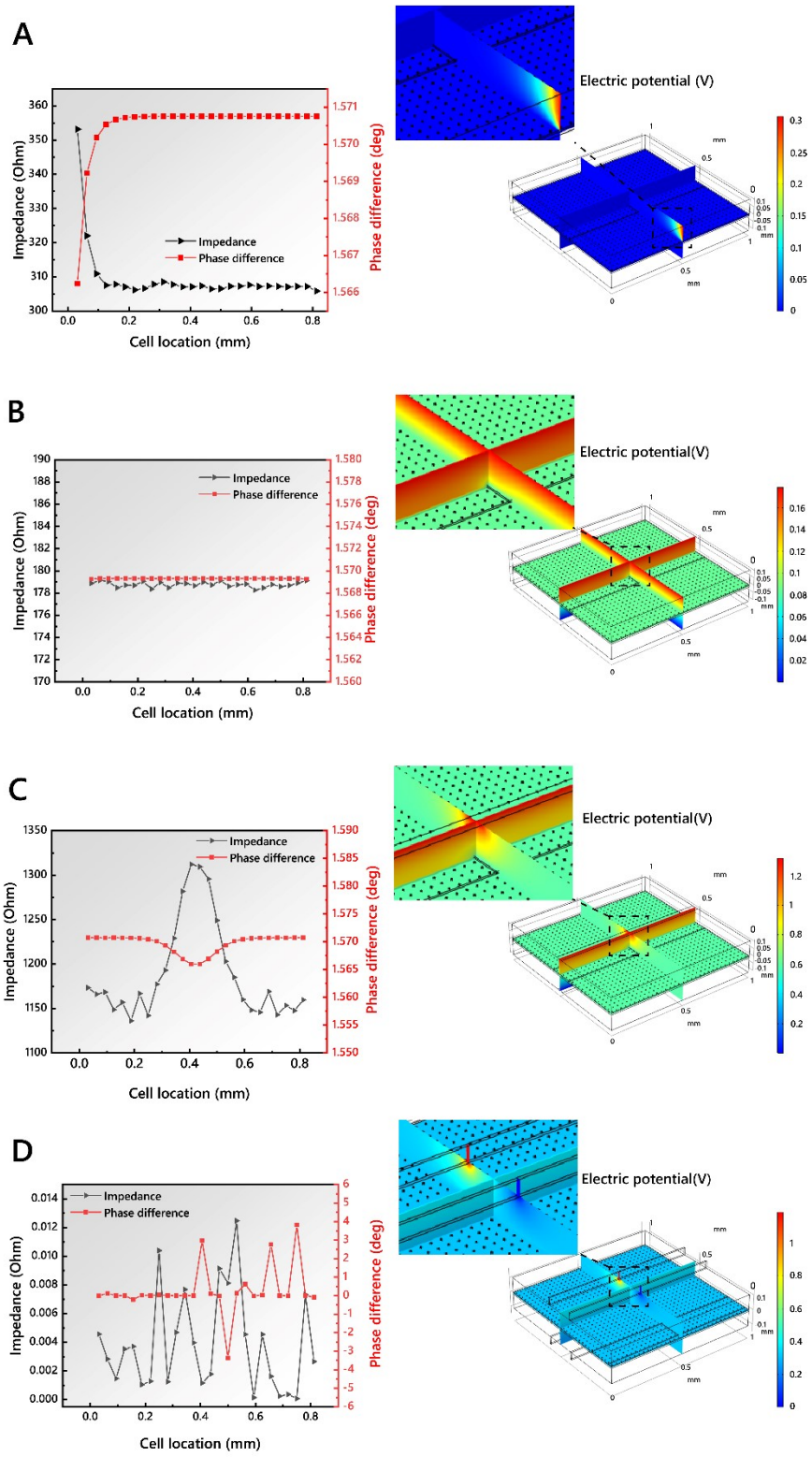

Fig. S3 (A) The impedance variation of the chopstick electrode model when the cell position is changed and the potential diagram when the cell is in the middle. (B) The impedance variation of the plate electrode model when the cell position is changed and the potential diagram when the cell is in the middle. (C) The impedance variation of the double electrode model when the cell position is changed and the potential diagram when the cell is in the middle. (D) The impedance variation of the quad electrode model when the cell position is changed and the potential diagram when the cell is in the middle.

Table SI1†. Parameters in chip design

Symbol	Value	Unit
h	10	μm
D	0.44	μm
n	10^5	cm^2
l	10	mm
w	1	mm

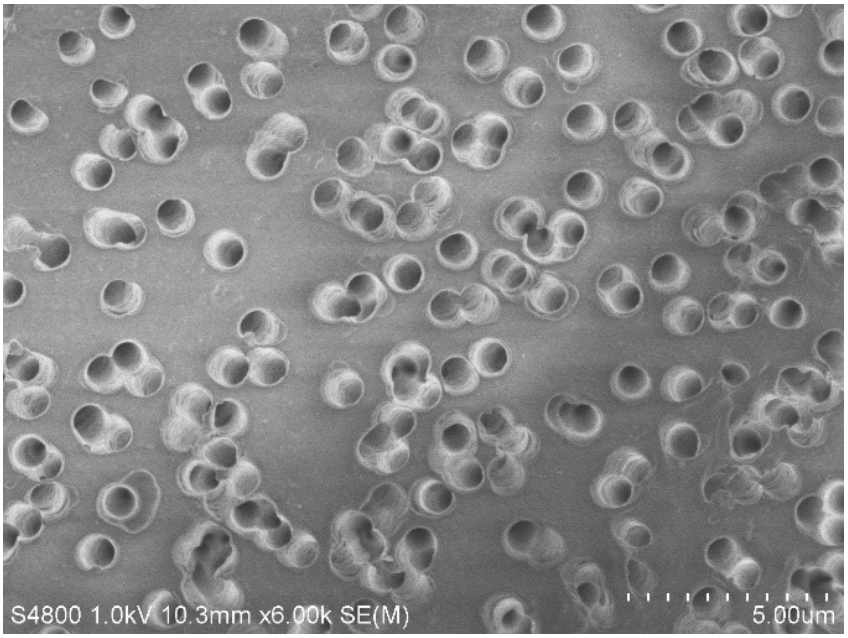

Fig. S4 Electron microscope photo of PET porous membrane.

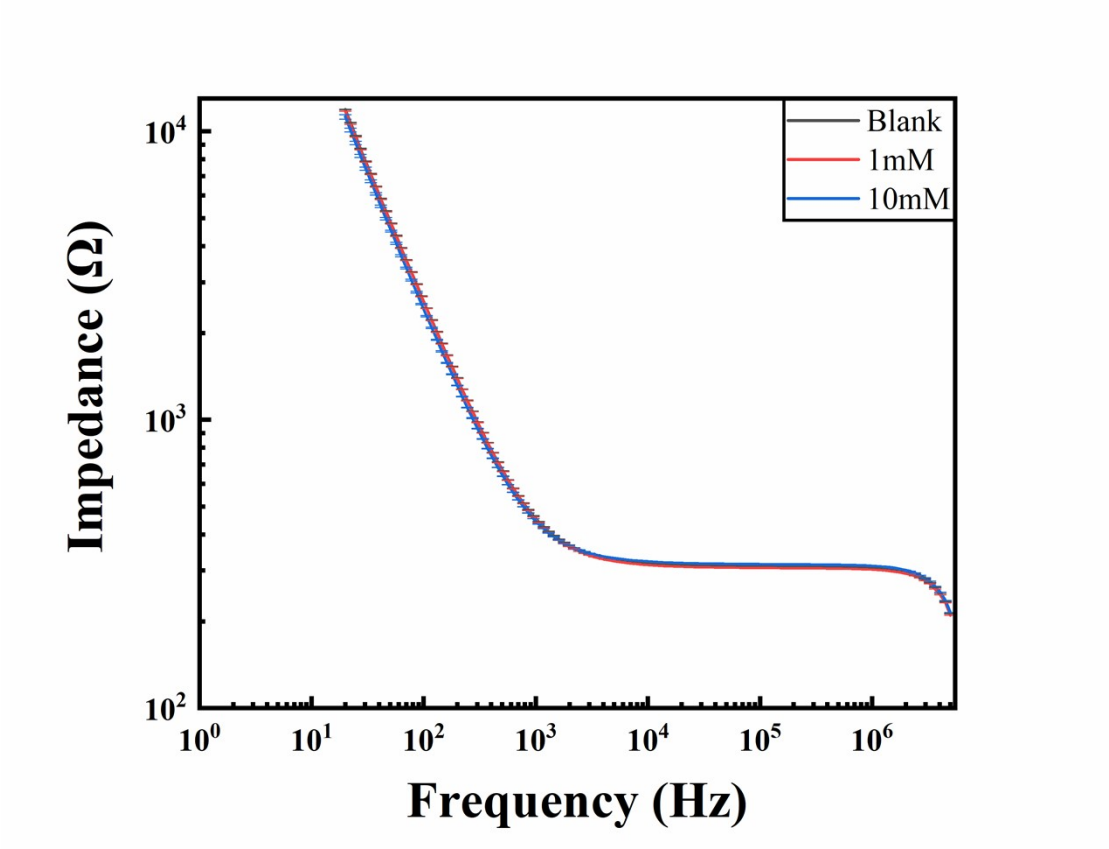

Fig. S5 Impedance spectra of different concentrations of EGTA medium.