

Supplementary information

Dielectric passivation layer as a substratum on localized single cell electroporation

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Resistive heat

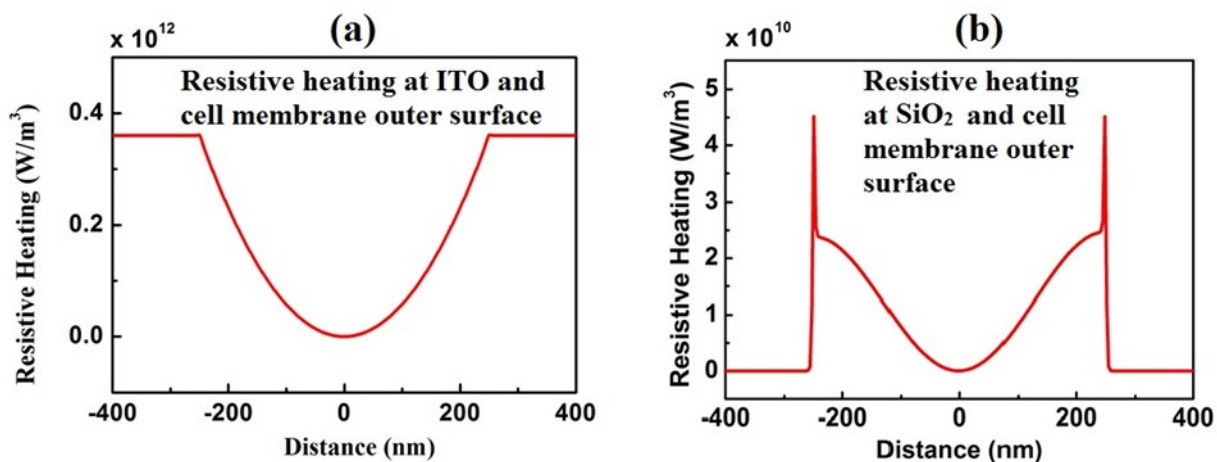


Figure S1 Resistive heat distribution for without and with passivation layer consideration (a) resistive heating at ITO and cell membrane outer surface without passivation layer (b) resistive heating at passivation layer and cell membrane outer surface.

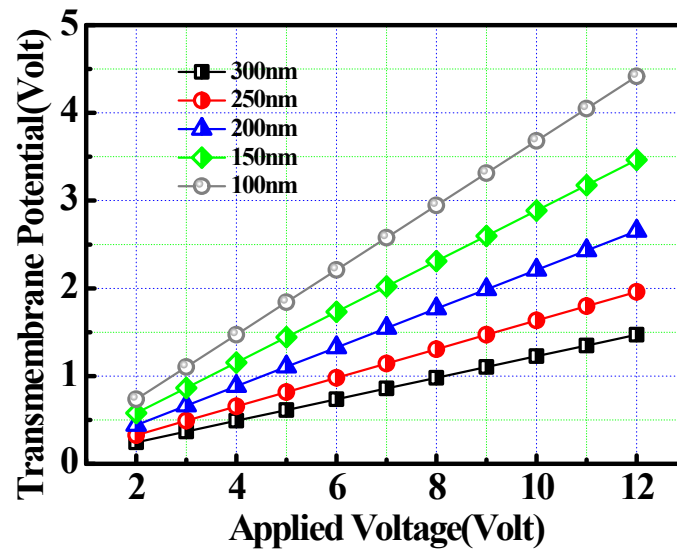


Figure S2 Transmembrane potential distribution for different applied voltage with consideration of different dielectric passivation layer thickness.

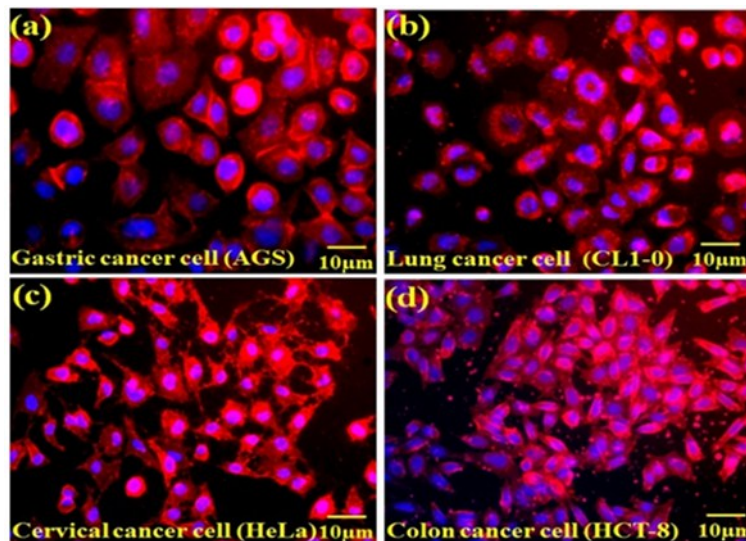


Figure S3 Different cells adhesion into the chip surface after 6-8 hours incubation (a) Caucasian Gastric Adenocarcinoma (AGS) cells (b) lung cancer cells (CL1-0) (c) cervical cancer cells (HeLa) (d) colon cancer cells (HCT-8).

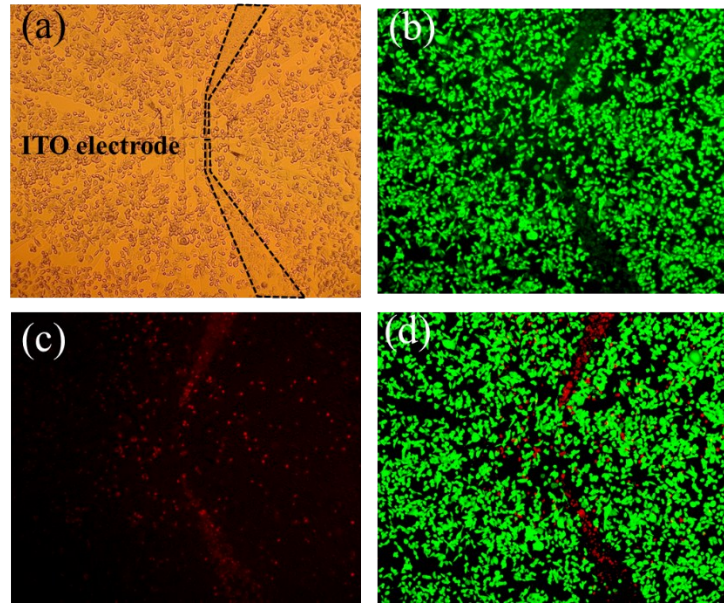


Figure S4 Electroporation experiment without SiO₂ layer at 2Vpp applied voltage of lung cancer (CL1-0) cells (a) optical microscopy image of CL1-0 cells with targeted ITO electrode (b) calcein staining cell image after 2Vpp applied electric field, where some cells are live indicating that cells are affected or might be not affected on top of the ITO electrode surface due to lower magnitude of electric field (c) PI dye staining image confirm that many cells are dead (d) merge image of live cells and dead cells.

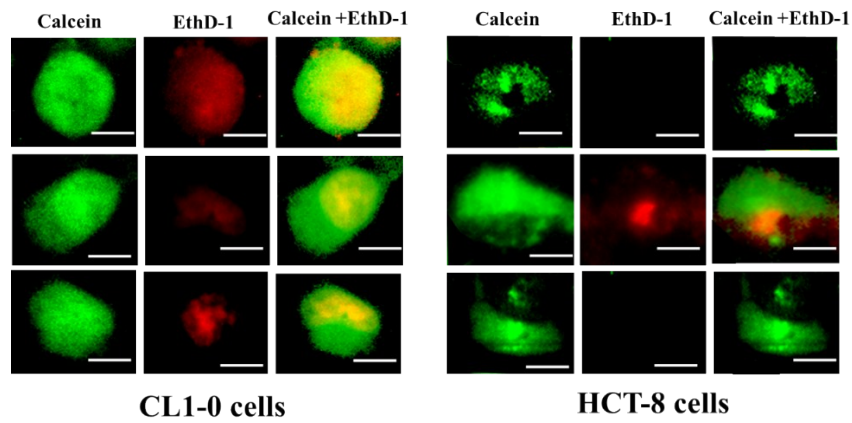


Figure S5 Cell viability test of lung cancer (CL1-0) and colon cancer (HCT-6) cells after 12 hours of LSCEP experiment. Scale bar 5 μ m.

References:

- [1] S.L.Neale, A.T.Ohta, H.Y.Hsu, J.K.Valley, A.Jamshidi and M.C.Wu, *Optic Express*, **17**(7), 5232-5239 (2009).
- [2] A.T.Ohta, P.Y.Chiou, H.L.Phan, S.W.Sherwood, J.M.Yang, A.N.K.Lau, H.Y.Hsu, A.Jamshidi and M.C.Wu, *IEEE J Sel Top Quantum Electron* **13**, 235-243 (2007).
- [3] A.T.Ohta, P.Y.Chiou, T.H.Han, J.C.Liao, U.Bhardwaj, E.R.B.McCabe, F.Yu, R.Sun and M.C.Wu, *J Microelectromech. Systems* **16**, 491-499 (2007).