Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Reusable Floating-Electrode Sensor for Real-Time Electrophysiological Monitoring of Nonadherent Cells VIET ANH PHAM BA, Seoul Natl Univ, VAN-THAO TA, Hanoi Natl Univ of Education, JUHUN PARK, EUN JIN PARK, SEUNGHUN HONG, Seoul Natl Univ — We herein report the development of a reusable floating-electrode sensor (FES) based on aligned single-walled carbon nanotubes, which allowed quantitatively monitoring the electrophysiological responses from nonadherent cells. The FES was used to measure the real-time responses of normal lung cells and small-cell lung cancer (SCLC) cells to the addition of nicotine. The SCLC cells exhibited rather large electrophysiological responses to nicotine compared to normal cells, which was attributed to the overexpressed nicotinic acetylcholine receptors (nAChRs) in the SCLC cells. Importantly, using only a single device could measure repeatedly the responses of multiple individual cells to various drugs, enabling statistically meaningful measurements without errors from the device-to-device variations of the sensor characteristics. As results, that the treatment with drugs such as genistin or daidzein reduced Ca^{2+} influx in SCLC cells was found. Moreover, tamoxifen, has been known as an anti-estrogen compound, was found to only partly block the binding of daidzein to nAChRs. Our FES can be a promising tool for various biomedical applications such as drug screening and therapy monitoring.

Viet Anh Pham Ba
Seoul Natl Univ

Date submitted: 10 Nov 2014 Electronic form version 1.4