

Detection of PC12 cells in-situ realized neurotransmitter using surface-enhancement Raman spectroscopy

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PC12 cells have frequently been used as a dopaminergic neuron model because they have various functions including secretion of catecholamines. Furthermore, PC12 cells were reported to release a measurable amount of dopamine (DA) in response to some chemicals and are one of the most common in vitro models for studying transmitter release. DA is an excitatory chemical neurotransmitter, which plays a critical role in the function of central nervous and cardiovascular systems. Recently, great effort has been devoted to develop new techniques that are capable to monitor neurotransmitter release. However, this release process is a rapid process, therefore the development of a detection techniques with high sensitivity have a great demand. Recently, several techniques such as fluorescence and electrophysiological techniques were often used. However these techniques cannot distinguish between the contributions of both exocytosis and endocytosis processes and limited to easily oxidize compounds. Here, we applied surface-enhanced Raman spectroscopy to determine the in-situ short-time effect of cisplatin, bisphenol-A and cyclophosphamide treatments on the neurotransmitter release process and the changes in extracellular DA level realized from PC12 cells with high sensitivity. In addition, the biochemical compositions changes of PC12 lysate were investigated to detect the intracellular changes based on SERS technique. Gold nano-patterned ITO substrate was developed based on electrochemical deposition onto ITO surface. The SERS results demonstrated that the changes in the Raman spectra dependent on treatment agent and these results were agreement with the results obtained from high performance liquid chromatography (HPLC) results of the extracellular DA level.

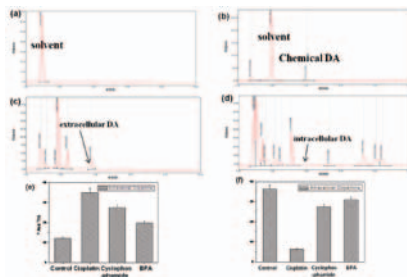


Fig. 1 HPLC for the effect of short time chemicals on DA level

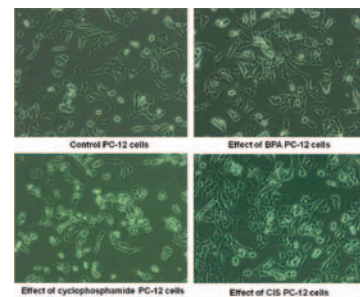


Fig. 2 Effect of short time chemicals treatment on the PC12 cells viability

Biography

Waleed Ahmed El-Said has completed his Ph.D at the age of 34 years from Sogang University (Korea) and postdoctoral studies from National Institute for Materials Science (NIMS). He has published more than 20 papers in reputed journals and serving as a referee member of repute.

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