

7th International Conference and Exhibition on

Analytical & Bioanalytical Techniques

September 28-30, 2016 Orlando, USA



Chen-Zhong Li

Florida International University, USA

Electronic micro devices for neuron activity recording and mapping

Understanding and controlling the interface between neuronal cells, neuronal network and electrical devices is vital to both biological science and technology. Recent developments in the field of *in vitro* neuron mapping focus on the development of optical and electrochemical strategies for either single neuron cell/neuron measurement or artificial neuronal networks/brain slices mapping. To mimic *in vivo* neuronal networks and to elucidate the mechanisms of computation, spontaneous and elicited electrical activity needs to be monitored, and multiple simultaneous recordings are required for monitoring individual unit and collective network activity. In this way, both individual cells and cell networks can be scrutinized in order to understand how the changes in single unit activity and functionality are. In the present study, we developed a large-scale integration based amperometric sensor array system for electrochemical bioimaging and throughput sensing of dopamine expression from three-dimensional (3D)-cultured PC12 cells upon dopaminergic drugs exposure. It has been shown that individual cells behave differently from the population even under the identical conditions, as a complementary study, we also explore the possibility of single cell-on-chip based analytical technique which can collect real-time change in cell physiology by measurement of cell exocytosis, i.e., release of neurotransmitters, in a neuronal model cell line, i.e. PC12 cells. The study of single cell dynamics could help us better understand the complex processes, such as, neurotransmitter kinetics, ion channel functions, and cell communications, single cell analysis can be an equivalent and complementary strategy to existing approaches.

Biography

Chen-Zhong Li is the Director of the Nanobioengineering/Bioelectronics Laboratory at Florida International University, USA. The impact of his work is documented in 9 granted patents, more than 100 peer-reviewed journal papers and over 140 presentations at national/international conferences including more than 90 keynote/invited lectures and seminars. He is the Associate Editor of 3 SCI indexed scientific journals and received numerous awards and honors.

licz@fiu.edu