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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 eld of *in vitro* neuron mapping focus on the development of optical and electrochemical strategies for either single neuron cell/neuron measurement or arti cial 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 di erently 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

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