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Development of cellular platform for enhancing neuron differentiation

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Material surface properties are considered as critical factor for the study of *in Vitro* cell growth pattern and activities. It provides advantages not only for study of cellular activity but also for biomedical technology such as tissue engineering. Neuron is a typical cell type widely used to examine cell communication, alignment and differentiations. In the present study, a simple pattern of indium tin oxide (ITO) for neuron culture is introduced. Circular inter-digitated design of ITO electrode was fabricated to capture a small amount of cell for cellular observations. In order to enhance cell attachment, the fabricated electrode surface was modified by poly-L-lysine, a type of extracellular matrix. SH-SY5Y cell, a human neuroblastoma cell line, was cultured on the modified surface and the cell growth was observed periodically. Small electrical field was applied to the culture for a period of time then cells were fixed for SEM imaging. It is clearly demonstrated that the amount of differentiated cell increased from 42% to 63.5% after subjected to small electric field. In addition, the possibility of fabricated nanostructure electrode can indicate the potential utilize as a single cellular activities without cell invasion.

Keywords: Neuron, SH-SY5Y, cell differentiation, ITO electrode, electrical effect

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