Ultrathin electrodes-based single-cell technology for monitoring dopamine exocytosis

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Ultrathin Au nanowire (NW) electrodes-based single-cell system was developed for monitoring dopamine exocytosis. This system enables both an electrical cell stimulation and detection of the resulting neurotransmitter release with extremely high spatial resolution [1]. With highly precise and well-controlled electrode-to-cell interface, we observed that dopamine release from a PC12 cell is more stimulated by a more negative voltage pulse, which opens Ca2+ channels of the cell membrane for dopamine exocytosis. Detailed single-cell level studies of the biological responses to electrical stimulation could help us to understand such mechanisms and improve therapeutic efficacy. [This work was supported by the Intelligent Synthetic Biology Center through the Global Frontier Project (2011-0031963) of the Ministry of Science, ICT & Future Planning through the National Research Foundation of Korea.]

Reference

1. M. Kang, S.M. Yoo, et al., Nanoscale. 8, 214 (2016).