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Digitized Nanobiomedical Device Based on Nanowell Array Electrodes

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Abstract

Recently, state-of-the-art tools for smart biosensor-chip systems were discussed. One of the critical issues in the development of biological-nanosystem is how differentiated signal-to-noise ratio per very small amount of signal. Developing biocompatible integrated nanosystem requires the fabrication of appropriately designed nanomatrix for high sensitivity homogenous assays. Until now, we achieved high specific recognition of DNA molecule on nanowell array system integrated top-down and bottom-up technology. We obtained a 150-orders-of-magnitude enhancement in sensitivity. With this nanostructure, the electrochemical responses were significantly enhanced for the binding event of streptavidin to the biotinylated functional vesicles and the electron transfer was efficiently blocked by the captured liposome. This nanometric system could be applied to numerous other integrated digital biosensors.