

## Nanobiomedical device system for nanomedicine and innovative business

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**A** new paradigm of nanobiomedical devices has been exploited in areas such as combinational chemistry, biotechnology, engineering and clinical diagnostics. One of the critical issues in the nanobiomedical system is how to differentiate signal-to-noise (S/N) ratio per very small amount of signal for high sensitivity homogenous assays. Until now, we achieved high /specific detection of biomolecule using arrayed nanostructures (i.e., nanowells). The electrochemical (EC) nanowell array biosensors have significantly improved biomolecular detection by increasing sensitivity, limit of detection (LOD), S/N ratio, multi-targeting, and being label-free, compared to conventional micro sensors. The nanowell sensors have extremely low volume on the order of atto-liters (10<sup>-18</sup> L) per well, and a total volume of approximately 32 femto-liters per sensor. Due to the geometrical constraints of nanowells, they can be designed to allow for the immobilization of only a few biomolecules. This leads to significant improvement of sensor sensitivity because it reduces potential aggregation and enhances the spatial orientation of the biomolecules compared with conventional electrodes with large surfaces. Here I'll describe a demonstration of precious molecule recognition while maintaining the bioactivity on nanostructured