

Electrical and fluorescence based approaches for bio-screening using single walled carbon nanotubes

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Carbon nanotube-field effect transistor (CNT-FET) composed of highly pure single walled carbon nanotubes (SWNT) are successfully demonstrated as a highly selective biosensor. Selective biological events, such as antigen-antibody recognition are monitored from electrical conductance change of the device while constant bias voltage is applied to the Drain electrode. Systematic studies in order to elucidate the mechanism of the conductance changes also have been performed by fabricating CNT-FET devices having metal contact electrodes (Pd/Au) passivated with self-assembled monolayers of mPEG-SH. Metal-nanotube contact area of the CNT-FET is evicted to be highly responsible for the generation of the electrical signals while direct charge injection from biomolecules into carbon nanotube, or modulated electrical double layer field effect are minor(1).

Parallel to the electronic detection approach using carbon nanotube devices, as one of the most conventional screening methods for biological interaction, fluorescence-based screening technique is also attempted with a carbon nanotube thin film substrate. Recent progress in protein chip application using high yield SWNT pseudo-3D film substrates will be introduced(2),

References

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