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Superoxide Radical Biosensor Based on a 3D Enzyme/Carbon Nanotube Conductive Networks

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We report on a novel 3-dimensional (3D) network of crosslinked Cytochrome C/Carbon Nanotube (CytC/CNT) on a thiol-modified gold surface which can establish direct electrical communication between the redox center of Cytochrome C and the electrode. Cyclic voltammograms (CVs) results showed a pair of well defined redox peaks for Cytochrome C, located at about −0.03 and +0.06 V, cathodic and anodic respectively. Additionally, the formal potential E_0 of adsorbed Cyt c was found to be 15 mV, a value close to that of native Cyt c. Based on 3D Cytochrome c and carbon nanotube network, a sensitive superoxide radical biosensor has been proposed. The biosensor showed high sensitivity and lower detection limit of 0.3 μM of superoxide.

Keywords: 3D Crosslinked Networks, Cytochrome C, Superoxide, Biosensor.