227f Controlled Photo Stimulation of Neuron Cells and Activation of Calcium Ions on Semiconductor Quantum Dot Layer-by-Layer Assemblies

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The controlled activation of electrically excitable cells via a biocompatible interface is of considerable interest for treatments of neuronal injuries and sensory deficits. Quantum dot layer-by-layer (LBL) assemblies show specific current and voltage responses for different layer sequences which can be exploited for controlled neuron stimulation. Neuron cells were successfully grown on surface modified LBL assemblies and the flexible biocompatible surfaces of LBL assemblies facilitate the growth of dendrites of neurons closer to the interface resulting low activation barrier for stimulation. We report the layer sequence characteristic photo stimulation properties and calcium ion activation of neuron cells. Both biocompatibility and optical-electrical-bio coupling processes at the interface are improved by introducing different sequences of layers of LBL materials. For this investigation, NG108-115 neuron cells were grown on PDDA/HgTe LBL assemblies and both electrochemical and conforcal microscopic techniques were used.