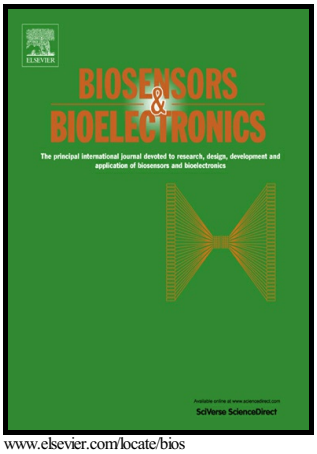

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Towards Single Molecule Biosensors using Super-Resolution Fluorescence Microscopy

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Abstract

Conventional immunosensors require many binding events to give a single transducer output which represents the concentration of the analyte in the sample. Because of the requirements to selectively detect species in complex samples, immunosensing interfaces must allow immobilisation of antibodies while repelling nonspecific adsorption of other species. These requirements lead to quite sophisticated interfacial design, often with molecular level control, but we have no tools to characterise how well these interfaces work at the molecular level. The work reported herein is an initial feasibility study to show that antibody-antigen binding events can be monitored at the single molecule level using single molecule localisation microscopy (SMLM). The steps to achieve this first requires showing that indium tin oxide surfaces can be used for SMLM, then that these surfaces can be modified with self-assembled monolayers using organophosphonic acid derivatives, that the amount of antigens and antibodies on the surface can be controlled and