Megan Blades
Cramb Group
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Poster Abstract

As the field of proteomics expands, so must the techniques used to study the biomolecular reactions involved in physiological activity. Currently, binding events at the picomolar (10^{-12}) level can be monitored with dual-colour fluorescence cross-correlation spectroscopy (FCCS). FCCS temporally correlates fluctuations in fluorescence intensities resulting from the diffusion of two molecules with spectrally distinct fluorescent labels through a small excitation volume. Species which are physically bound to one another produce a cross correlation, which provides information about the association. However, many biological reactions and pathways are complex, involving more than two interacting species. In this study, a novel FCCS technique was developed to track fluctuations in fluorescence intensities of three distinct fluorophores. A triple cross correlation can be calculated if all three species are physically linked. Currently, three-colour quantum dot barcoded nanobeads, as well as oligonucleotide-linked quantum dots, are being used to develop and optimize the technique. This study is the first example of direct three-colour FCCS.