

P008 Targeted optical nanosensors for intracellular imaging and measurement

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Currently under development is a new and innovative technology platform designed to enhance the prospect of intracellular measurements of ion concentrations and gradients within cellular micro domains. Fluorescent molecules, sensitive to the ionic species of interest, are physically entrapped within a sphere of bio-compatible polymer matrix (~50 nm \varnothing) which is delivered to the intracellular domain without physical or chemical perturbation to the cell. This is the driving factor behind the technology development as any appreciable damage to the cell will evoke an abnormal cellular response or state; a response investigators must endeavour to avoid. This work aims to optimise an elegant delivery technique which utilises the properties of cell penetrating peptides (CPP) to deliver a cargo into a cell. By conjugating CPPs to the surface of the nanosensor through the use of a hetero-bifunctional cross-linker the cellular internalisation properties of the CPP are in turn imparted upon the nanosensor itself. Confocal microscopy is subsequently used to observe live images from single viable cells as stimuli, such as agonists, are applied. The responses triggered inside the cell (such as an increase in a secondary messenger, e.g. Ca^{2+}) diffuse through the polymer matrix, act upon the fluorophore, and can be imaged as a localised increase in fluorescence.