NOVEL FLUORESCENT PROTEINS CHARACTERISED FOR SUPER RESOLUTION IMAGING.

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Super resolution techniques have revolutionised the field of microscopy allowing scientists to see further into cells and other biological structures revealing more about their inner workings. Stochastic Optical Reconstruction Microscopy (STORM) is one such technique and applies temporal selection of fluorophores in the field of view to increase the spatial resolution by up to a factor of 10. This temporal selection occurs as a result of a fluorophore being able to exist in either an active emitting state or a dark state. Some fluorescent proteins exhibit suitable fluorescence kinetics for STORM and can be genetically fused to a protein of interested allowing specific localisation of that protein within the cell. As such the development of novel fluorescent proteins that exhibit such properties are of great importance, especially if such fluorophores are brighter than those currently available. The localisation precision available in STORM is proportional to the square root of the number of photons detected. The resolution of the reconstruction that is obtained from a STORM dataset is therefore reliant on the brightness of the fluorophore used.

Here we will demonstrate recent developments into novel protein probes for super resolution imaging including the nano-patterning techniques that are being used to test them. Proteins of interest are attached to a nano-pattern on a glass surface and imaged to gain important characteristics such as the duty cycle, number of photons per event etc.