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TITLE

GFP as a intracellular temperature probe

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Temperature is one of the most important variables in living systems since all cellular mechanisms and processes are influenced and controlled by intracellular temperature. In addition, local changes in temperature have recently been used to control several molecular biology techniques such as gene expression, drug release and applied to photothermal cancer therapy. While, several techniques for measuring intracellular temperature have been developed so far, they suffer from a reduced reliability and/or a significant invasiveness. These methods are typically based on the delivery of a foreign thermal probe to the cytoplasm or rely on the insertion of a thermocouple through the plasma membrane. These probes may compromise the integrity of the plasma membrane or may interfere with cell mechanisms.

Here we report the use of green fluorescent protein (GFP) as a thermal nanoprobe suited for intracellular temperature measurements. Temperature probing is achieved by monitoring the fluorescence polarization anisotropy of GFP in transfected HeLa and U-87 MG cell lines. The thermal mapping of a cell was obtained with a spatial resolution of300nm and a temperature accuracy of 0.4°C.

The presented method combines the advantages of high spatial resolution, good temperature accuracy, fast readout and most importantly, high biological compatibility (non-invasive). Based on these unique advantages it has the potential to become a powerful tool to unravel intimate cellular processes that involve heating at the single cell level.

Biography

Sebastian A. Thompson after he completed his Bachelor at the Buenos Aires University, he received his Master and Doctorate of Philosophy in Chemistry (2009) from the University City New York. He completed his first post doctorate positions in Hunter College at the City University New York. He is currently performing his second post doctorate position at Institute of Photonic Science (Barcelona Spain)in the Plasmon Nano-Optics Groups. He has published 6 papers and one book chapter