

Developing high-resolution oxygen monitoring techniques to accelerate research towards stress tolerant plants.

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In plants, molecular oxygen has an important role, not just as a key participant in biochemical reactions, but also as a vital signalling molecule. Oxygen levels in plants vary strongly between cells and organs, dependent on cell density, metabolic demand and environmental conditions. These *in planta* oxygen gradients provide important clues to a plant, about existing internal and external conditions and shape developmental decisions and stress responses. It is therefore extremely important to get a mechanistic insight into how plants sense oxygen levels, integrate it with other external and endogenous cues and translate it into appropriate physiological and morphological responses. One of the current challenges hampering research in this area, is the lack of non-invasive tools to accurately monitor oxygen concentrations in plant cells. In this project, we will explore a class of small molecular probes that have demonstrated promise in optical intracellular oxygen sensing in mammalian cells. With this FF seed money, we will synthesize, test and optimize a set of probes for intracellular oxygen detection in plant tissues. These results will be used as preliminary evidence for developing an external proposal to acquire funding towards further development and establishment of this non-invasive method for intracellular oxygen measurements in plants.