Functional Imaging In Living Plants - Cell Biology Meets Physiology

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Summary : Free functional imaging in living plants - cell biology meets physiology pdf download - the study of plant cell physiology is currently experiencing a profound transformation novel techniques allow dynamic in vivo imaging with subcellular resolution covering a rapidly growing range of plant cell physiology several basic biological questions that have been inaccessible by the traditional combination of biochemical physiological and cell biological approaches now see major progress instead of grinding up tissues destroying their organisation or describing cell- and tissue structure without a measure for its function novel imaging approaches can provide the critical link between localisation function and dynamics thanks to a fast growing collection of available fluorescent protein variants and sensors along with innovative new microscopy technologies and quantitative analysis tools a wide range of plant biology can now be studied in vivo including cell morphology migration protein localization topology movement protein-protein interaction organelle dynamics as well as ion ros redox dynamics within the cell genetic targeting of fluorescent protein probes to different organelles and subcellular locations has started to reveal the stringently compartmentalized nature of cell physiology and its sophisticated spatiotemporal regulation in response to environmental stimuli most importantly such cellular processes can be monitored in their natural 3d context even in complex tissues and organs a condition not easily met in studies on mammalian cells recent new insights into plant cell physiology by functional imaging have been largely driven by technological developments such as the design of novel sensors innovative microscopy imaging techniques and the quantitative analysis of complex image data rapid further advances are expected which will require close interdisciplinary interaction of plant biologists with chemists physicists mathematicians and computer scientists high-throughput approaches will become increasingly important to fill genomic data with life on the scale of cell physiology if the vast body of information generated in the -omics era is to generate actual mechanistic understanding of how the live plant cell works functional imaging has enormous potential to adopt the role of a versatile standard tool across plant biology and crop

breeding we welcome original research papers methodological papers reviews and mini reviews with particular attention to contributions in which novel imaging techniques enhance our understanding of plant cell physiology and permits to answer questions that cannot be easily addressed with other techniques

Pusblisher : Frontiers Media SA on 2015-05-08 / **ISBN :** 9782889194650

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