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DETECTION OF MITOCHONDRIAL CA^{2+} DYNAMICS IN ARABIDOPSIS PLANTS EXPRESSING THE FRET-BASED CAMELEON PROBE

ZOTTINI M.*, COSTA A.*, LORO G.*, DRAGO I.**, POZZAN T.**, LO SCHIAVO F.*

*) Department of Biology, University of Padova, Via U. Bassi 58B, Padova (Italy)
**) Department of Biomedical Sciences, University of Padova, Via U. Bassi 58B, Padova (Italy)

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Mitochondria represent a key organelle in plant cells being involved in many aspects of the plant life: normal cell metabolism, stress response and programmed cell death regulation. Despite the pronounced metabolic connection among mitochondria and the other cellular compartments, little is known about the signals that mediate this communication or about the coordination of the activities by signalling molecules. Many factors have been suggested to be involved in the retrograde signalling control, ranging from ROS, cellular carbohydrate status, the mETC reduction state and calcium. In this work we describe the unprecedented use of FRET-based mitochondria-targeted calcium specific probe Cameleon to produce stably transformed Arabidopsis plants that enable the analysis of mitochondrial Ca2+ dynamics in planta and reveal independent regulation of [Ca2+]m resulting from physiological or environmental stimuli. Moreover, by crossing plant expressing the Cameleon in the nucleus with the mitochondria-targeted one, we were able to monitor in vivo, at the same time, the Ca2+ dynamics in two different subcellular compartments.