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Poster Communication Abstract – PH.47

THE FUNDAMENTAL ROLE OF PLANT MITOCHONDRIA IN STRESS RESPONSES IS LINKED TO THE FUNCTIONALITY OF THE MITOCHONDRIAL NUCLEOID BINDING PROTEIN WHIRLY2

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In the last few years, the importance of organelles as central coordinator of plant responses to internal/external stimuli has become increasingly important. Mitochondria play a role as stress sensors of environmental stimuli, being a component of a complex communication network involving different organelles and the nucleus. Recent evidences show a link between mtDNA stability and proper mitochondrial morphology, kinetics and functionality, indicating a fundamental role in mitochondrial activity during different conditions, such as development and stress responses. Failure in maintaining the mitochondrial genome stability results in the accumulation of mutations and genomic rearrangements that can become deleterious. WHY2 among the proteins involved in mtDNA repair is the most abundant, evidences suggest an important role of WHY2 in mitochondrial genome replication and that permit a complete mtDNA activity. WHIRLYs are plant specific proteins that have been characterized as ssDNA binding proteins because of a characteristic conserved DNA binding domain In Arabidopsis, the WHIRLY family includes three members: WHIRLY1, WHIRLY2 and WHIRLY3, presenting specific target sequences that localized them in the plastids and nucleus (WHIRLY1, WHIRLY3) or the mitochondria (WHIRLY2). Recent experimental evidences show that WHYRLY2 plays a role in the response to different abiotic stresses. During my research project I tried to shed light on the connection between mtDNA maintenance, high intracellular levels of why2 and the response to abiotic stress. The obtained data suggest a link between mtDNA and stress response, and to ensure a proper mtDNA functionality the WHY's proteins are fundamental. The study of mitochondrial proteins is opening up in recent years to a new conception of the role of mitochondria as a stress response center and the molecular mechanism underlying the communication between mitochondria and nucleus in response to stress.