Proceedings of the Joint Meeting AGI-SIBV-SIGA
Assisi, Italy – 19/22 September, 2011
ISBN **978-88-904570-2-9**

Oral Communication Abstract – 2B.04

AN *ARABIDOPSIS* TAIL-ANCHORED PROTEIN INVOLVED IN ORGANELLE FISSION UNVEILS A DYNAMIC NETWORK OF ENDOMEMBRANE STRUCTURES

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Mitochondria, peroxisomes, chloroplasts, organelle fission, inter-organelle connections

In plant cells, metabolic connections, functional interactions and signaling cross-talk are established among peroxisomes, mitochondria and plastids. However, until now it is not clear how this directional trafficking of metabolite/signalling molecule is achieved, and whether physical connections are established among peroxisomes, mitochondria and plastids. In *Arabidopsis*, peroxisomes share with mitochondria and chloroplasts some molecular components of their fission machinery (e.g. FIS1A and DRP5). In particular, the tail-anchored FISSION1A (FIS1A) protein is localized on the membranes of peroxisomes and mitochondria and it is implicated in peroxisomal and mitochondrial fission. Interestingly, there are some indications that FIS1A is also localized on chloroplasts. The DYNAMIN RELATED PROTEIN5 (DRP5) is instead involved in the fission of peroxisomes and chloroplasts. DRP5 interact *in vivo* with FIS1A on peroxisomes, while so far their interaction on chloroplasts has not been investigated.

In this work, we analyzed the expression pattern and the subcellular localization of FIS1A on different organelles during plant development, generating stable transgenic plants. Our data indicate that the sub-cellular localization of FIS1A is not restricted to the compartments so far described, unveiling the existence of connections among the different organelles mediated by tubular protrusions extending from them. We analyzed the motility of these tubular protrusions *in vivo* and the trafficking of FIS1A inside this network, investigating whether there was a physical continuity among the different organelles. In order to investigate *in vivo* the mechanism involved in the multiple subcellular targeting of FIS1A, we obtained stable transgenic plants expressing truncated FIS1A proteins. Moreover, in order to gain inside the role of FIS1A in the organelle remodeling, we tested and localized the interactions *in vivo* of FIS1A with some cytosolic proteins implicated in organelle fission (e.g. DRP5).