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

Poster Communication Abstract – 2B.07

MECHANISM OF GAMMA-ZEIN PROTEIN BODY FORMATION WITHIN THE ENDOPLASMIC RETICULUM

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Endoplasmic reticulum, protein bodies, transcriptomics, unfolded protein response, zein

Protein bodies (PB) are formed within the endoplasmic reticulum (ER) lumen by the extensive polymerization and insolubilization of seed storage proteins of the prolamin class, a process occurring in the seed endosperm cells of a number of cereals. PB-forming proteins have been exploited for the high accumulation of recombinant proteins, but the detailed mechanism of PB formation and ER retention is not yet fully clarified. Although PBs are formed by the assembly of many different polypeptides, certain individual prolamins, such as maize gamma-zein, are able to form PB also when expressed ectopically. We show that polymerization and insolubilization of gamma-zein requires cystein residues that are located in the N-terminal domain and are involved in inter-chain disulfide bonds. We have previously shown that this domain can promote PB formation when fused to the otherwise soluble vacuolar storage protein phaseolin, in the chimeric fusion protein zeolin. In an effort to identify ER proteins involved as helpers of PB formation, we have now studied the changes in the Arabidopsis transcriptome upon zeolin expression. Results will be presented in relation to the unfolded protein response that modulates ER activities in stressed situations.

Supported by the 2006 Short-Term Mobility Program of CNR, by Program "Risorse biologiche e tecnologie innovative per lo sviluppo sostenibile del sistema agroalimentare" of CNR-Regione Lombardia and Project PRIN 20073YHRLE of the Ministero dell'Istruzione, dell'Università e della Ricerca of Italy.