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Poster Abstract – C.32

TRANSCRIPTION PROFILING OF RICE METAL TRANSPORTERS GENES PUTATIVELY INVOLVED IN CADMIUM ACCUMULATION

SALA T., SARI GORLA M., FROVA C.

Department of Biomolecular Sciences and Biotechnology, University of Milano, Via Celoria 26, 20133 Milano (Italy)

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Heavy metals, including cadmium (Cd), are important soil and water pollutants deriving from the use of ammendants, poor quality irrigation water and mineral fertilizers. Their uptake and translocation by plants are accomplished via a complex network of metal transporters that is still poorly understood. Several crops, and rice in particular, may adsorb Cd through the roots, translocate it to the seedling and finally accumulate it into the grains, thus allowing this toxic metal entrance in the food chain

As a first step to unravel the genetic basis of Cd accumulation in rice grains, with the long term goal to prevent it, we have undertaken the transcription profiling of rice genes coding for metal transporters putatively involved in Cd uptake and translocation. So far we have turned our attention to three metal transportes families, the ZIP, the NRAMP and the ABC (subfamily MRP), previously reported to play a role in Cd transport, compartmentalization or extrusion in other plant species.

Last year we presented preliminary results concerning 3 members of the ZIP family (*OsZIP1,3,4*). Here we report conclusive data on these 3 genes and on two members of the NRAMP family (*OsNRAMP1* and *2*). The analysis was performed via Real Time PCR on roots and leaves of control and Cd treated (0.1 µM $CdCl_2$ for 10 days) plants of three rice cultivars: two high- (Gladio and Loto) and one low- (Roma) cadmium accumulators. At this Cd concentration, which mirrors the situation in most rice fields, no phenotypic effects were observed on any cultivar.

For all genes, and in all cultivars, the basal transcription was low, in particular *OsZIP3* in roots was almost undetectable. As for Cd treated plants, no significant induction or inhibition was observed, with the exception of a mild induction of *OsZIP4* in Loto leaves and roots. In conclusion, no correlation could be found between the expression of these genes, in both control and treated plants and the metal accumulation characteristics of the three cultivars.

We also started the expression analysis of six members of the ABC-transporter family: *OsABC1, 2, 3, 7, 9, 12*. Preliminary data show that, in control conditions, *OsABC9* is more expressed in roots in all cultivars, while the opposite is true for the other five genes. Interestingly the expression rate of all genes (except *OsABC9*) was higher in the cultivar Roma in both tissues, but expecially in leaves. Cadmium treatment resulted in a slight induction of *OsABC2* in Loto leaves,while *OsABC3* and *OsABC9* were induced in Roma leaves. However, these data are both incomplete and preliminary and need confirmation.

We are currently testing a higher Cd concentration (1µM $CdCl_2$), and recording any phenotypic effect. Trancription profiling of some of the previously analyzed genes will also be performed and preliminary data presented.