

THE *MtTdp2* (5'-TYROSYL-DNA PHOSPHODIESTERASE) GENE IS INVOLVED IN THE PLANT RESPONSE TO GENOTOXIC STRESS

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Because of their sessile lifestyle, plants are exposed to environmental stresses, that produce the highly cytotoxic Reactive Oxygen Species (ROS). To avoid ROS accumulation, plants have evolved complex antioxidant (enzymatic and non-enzymatic) mechanisms. Effective DNA repair pathways are activated by plant cells to remove oxidative DNA damage and preserve genome integrity [Balestrazzi *et al.* 2011, Macovei *et al.* 2011]. In animal cells, a novel DNA repair function encoded by the *TDP2* (5'-Tyrosyl-DNA Phosphodiesterase) gene has been recently described [Cortés-Ledesma *et al.* 2009]. The TDP2 enzyme is able to resolve the stabilized covalent complexes formed when DNA topoisomerase II (Topo II) binds DNA sites containing the oxidized nucleotide 8-oxo-deoxy-guanine (8-oxo-dG) or when cells are exposed to Topo II poisons [Zeng *et al.* 2011]. The TDP2 function avoids the conversion of the stabilized DNA-Topo II complexes into double strand breaks (DSBs).

We report for the first time in plants on the *MtTDP2* gene identified and characterized in the model legume *Medicago truncatula*. Bioinformatic investigations carried out in plant databases have highlighted the presence of distinct TDP2 isoforms, which differ in the number of zinc finger RanBP2 domains. Quantitative Real Time PCR (qRT-PCR) analyses showed that *MtTDP2* is constitutively expressed in vegetative and reproductive tissues. *MtTDP2* is also significantly up-regulated by osmotic and photo-oxidative stress (provided by using the herbicide paraquat), suggesting a relevant role of the DNA repair response not only in the nuclear compartment but, possibly, in chloroplasts. Additional investigation on the gene expression profiles are currently in progress as well as the production of transgenic barrel medic lines overexpressing the *MtTdp2* gene.

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