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Main Research Topics

Role of DNA repair in the plant response to abiotic stresses. The main goal is the characterization of genes involved in the plant response to genotoxic stress (DNA Damage Response-DDR) useful to predict the profiles of abiotic stress resistance in crops. The research activity carried out by the Plant Biotechnology Group has led to the identification and functional characterisation of novel DNA repair genes, among which are *Tdp1* and *Tdp2* (Tyrosyl-DNA phosphodiesterase), and *TFIIS-like* (Transcription Elongation Factor IIS). The roles played by these genes in DDR have been elucidated using gene silencing, RNA-Seq, genotoxicity tests (Comet Assay, DNA Diffusion Assay) in the model plants *Medicago truncatula*, *Populus alba* and *Petunia hybrida*. In collaboration with ITQB-New University of Lisbon (Portugal), The Czech Academy of Sciences, The Polish Academy of Sciences.

Molecular profiling of seed quality. The main goal is the identification of molecular indicators of seed vigor. DNA repair mechanisms are activated during the early phase of seed germination (imbibition) when the 'pre-germinative metabolism' is triggered. A working system made with imbibed seeds from model plants (*Medicago truncatula*; *Petunia hybrida*) has been established and it is currently used to validate the role of novel DNA repair genes associated with the induction of 'pre-germinative metabolism'. A parallel investigation is performed, as translational research activity, using seeds from horticultural and cereal species of commercial relevance, in collaboration with Seed Companies (ATLAS srl, APSOVSEMENTI srl, Fertiprado, Bejo BV, Hoopmann Group), Breeders (NIRP International), ITQB-New University of Lisbon (Portugal), The Czech Academy of Sciences, The Polish Academy of Sciences, ICGEB (New Delhi, India).