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GAINING INSIGHT INTO THE MOLECULAR AND PHENOTYPIC EFFECTS OF TRANSGENERATIONAL MEMORY DUE TO CHROMIUM STRESS IN PLANTS

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It is already well-known that plants remember previous events of environmental stress and may use this memory to activate a better response when these events occur again. However, plant transgenerational stress memory is a complex phenomenon that is still far to be fully elucidated.One of the most important plant stresses due to heavy metals is excess of Chromium (Cr) that is largely used in many anthropic activities. The aim of this work was to gain insight into the molecular mechanisms of transgenerational stress memory in plants in response to heavy metals using A. thaliana and chromium stress as a model system. Phenotypic data showed that chromium stress have significant transgenerational effects in terms of root length, stress tolerance and seed germination. The comparison of leaf transcriptomic responses between F0 and F1 confirmed that a Cr stress transgenerational memory occurs probably due to epigenetic modifications. Functional data mining identified key candidate genes involved in transgenerational stress memory such as those involved in response to iron starvation and homeostasis: bHLH TF family (ORG2, ORG3, bHLH100, MATE transporter, BRUTUS. Findings will be very useful to: 1) clarify molecular mechanisms of transgenerational stress memory in plants; 2) identify genes usable in biotechnological approaches for enhancing phytoremediation of Cr contaminated soils.