NITRIC OXIDE DISRUPTS DNA BINDING OF THE AtMYB2 TRANSCRIPTION FACTOR

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MYB factors represent a family of proteins sharing the conserved MYB DNA-binding domain. The plant R2R3 *Myb* gene subfamily is one of the largest groups of transcription factors described to date. They play important regulatory roles in specific cellular processes. Discrete evolutionary steps have shaped the plant-specific R2R3 *Myb* genes from the broadly distributed R1R2R3 *Myb* genes. In the studies presented here, we have utilized the DBD of AtMYB2, an *Arabidopsis thaliana* transcriptional activator involved in the ABA (abscicic acid) signal transduction pathway under drought stress in plants. We have used the *rd22* gene promoter, one of the targets of AtMYB2, as a model to investigate whether MYB domain could be modulated in vitro by the signaling molecule nitric oxide (NO). We have cloned, expressed and purified the R2R3 domain of MYB2. This protein has the highly conserved Cys53 residue characteristic of the R2R3 MYB domain. NO-generating agents severely inhibited specific DNA binding of AtMYB2 domain. This inhibition was readily reversible upon treatment with excess DTT. This is the first work reporting that the redox-sensitive cysteine (Cys53) might be responsible for this NO sensitivity. We predict that S-nitrosylation disrupts DNA binding by a structural effect.

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