P 15 Nucleoside Diphosphate Kinase 2 Interacts with Two Oxidative Stress-activated Mitogen-activated Protein Kinases to Regulate Cellular Redox State and Enhances Multiple Stress Tolerance in Transgenic Plants

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Objectives

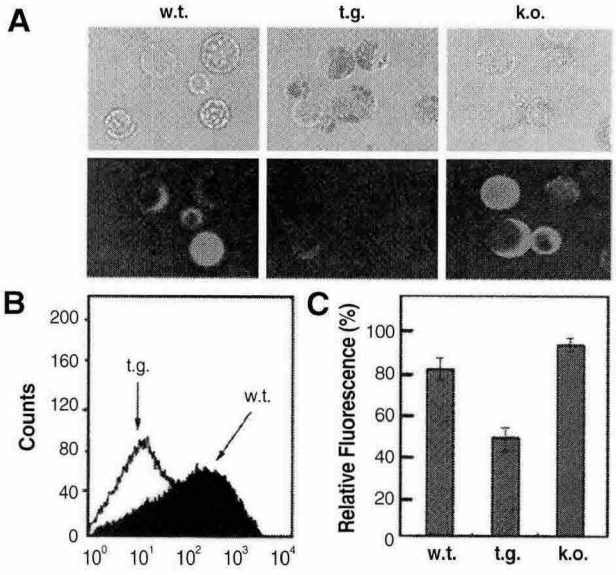
Nucleoside diphosphate kinases (NDPKs) are multifunctional proteins that regulate a variety of eukaryotic cellular activities, including cell proliferation, development, and differentiation. However, much less is known about the functional significance of NDPKs in plants. In this study, we investigated whether AtNDPK2 can play a novel regulatory role in H_2O_2-mediated MAPK signaling in plants.

Materials and methods

1. Plant materials: Wildtype (ecotype WS), *AtNDPK2* knockout, *AtNDPK2*-overexpressing, transgenic (T_3) *Arabidopsis thaliana* plants
2. Northern Blot Analysis
3. Western blot Analysis
4. Kinase and Phosphorylation Assay
5. Flow Cytometry and Confocal Microscopy Studies.
6. Yeast Two-Hybrid Assays.
7. *In Vitro* Pull Down Assay.
8. Stress Tolerance Analysis.

Results and Discussion

1. AtNDPKs Responds to Oxidative Stress.
2. *AtNDPK2* Regulates the Cellular Redox state Novel function of NDPK, nucleoside.
3. AtNDPK2 Enhances the Phosphorylation of H_2O_2-activated Endogenous proteins.
4. AtNDPK2 Specifically interacts with AtMPK3 and AtMPK6.
5. AtNDPK2 Enhances the MAP Kinase activity of AtMPK3.
6. Plants Overexpressing *AtNDPK2* Are Tolerant to Multiple Stresses.



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