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Abstract

Protein Phosphatase 2A (PP2A) is a ubiquitous enzyme in eukaryotes that regulates a large array of cellular signaling processes. PP2A is composed of three subunits: catalytic C subunit, regulatory B subunit, and scaffolding/regulatory A subunit. In *Arabidopsis thaliana*, the A subunit has three isoforms - A1, A2, and A3 - that are highly conserved at the protein level, indicating that these proteins may be functionally interchangeable. In comparison to wildtype plants, seedlings with a mutation in the *A1* gene have roots with obvious root cell file rotation or twisting under conditions of moderate salt stress. Twisted root cells result in a characteristic root curling phenotype when seedlings are grown on the surface of vertically-oriented agar plates. Mutations in the *A2* and *A3* genes do not result in any observable root phenotype, even though all three A subunit isoforms are expressed in roots. To test the hypothesis that differences in expression may be responsible for mutant phenotype variation, hybrid genes were constructed containing promoters from one subunit and coding regions of a different subunit, then transformed into *a1* mutant *Arabidopsis* to test for complementation. These tests showed that *a1* mutants transformed with transgenes containing *A1* or *A3* promoters, regardless of coding region, had their mutant phenotype corrected, while the phenotypes of *a1* mutants transformed with *a2* promoters were only partially corrected. This supports the hypothesis that a deficit in the total A subunit pool, rather than subunit specificity, is a major contributor to the *a1* mutant phenotype.

(Remainder of thesis omitted at Dr. Estelle Hrabak's request)