

Determining the Role and Regulatory Control of POLTERGEIST and POLTERGEIST-LIKE1 in Plant Stem Cells

Sean R. James

Biology Department, The University of North Carolina at Chapel Hill, Chapel Hill, NC
27514

All plant biomass originates from meristems, which contain discrete populations of stem cells. Maintenance of these stem cell populations, in *Arabidopsis*, is controlled by cell-cell signaling networks composed of a transmembrane receptor kinase (from the CLAVATA1 clade), a peptide ligand (from the CLE family), and a transcription factor (from the WOX family). The signaling cascade from this RK-WOX network is responsible for limiting stem cell proliferation and allowing differentiation. The two redundant class 2C protein phosphatases, POLTERGEIST (POL) and POLTERGEIST-LIKE 1 (PLL1), negatively regulate the RK-WOX pathways. Mutation in one of these genes causes no noticeable phenotype, but the *pol pll* double mutant is seedling lethal, indicating its importance in development. It is currently unknown how these proteins negatively regulate the signaling network, or how they are regulated themselves. POL has two novel conserved domains, ISGAS and SAPL, which are enriched in serine residues. Many of these residues are evolutionarily conserved and phosphorylated. I hypothesize that the novel domains of POL are involved in regulation, post-transcriptionally, via phosphorylation. Using different approaches, I hope to elucidate the function and regulation of the Poltergeist family of protein phosphatases in *Arabidopsis*.