Golden 2-like genes in Physcomitrella patens

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Two maize genes, Golden 2 and Golden 2-like (Glk), encode putative transcription factors that are thought to be involved in the regulation of chloroplast development. Two Glk genes have also been found in rice and Arabidopsis, all of which have a conserved DNA binding domain and C-terminal motif. Glk genes are included in the GARP gene family, together with Arabidopsis response regulators. In Physcomitrella patens, two Glk genes have been identified (PpGlk1 and 2). Phylogenetic analysis suggests that these genes form a sister group to the rest of the Glk gene family, indicating that independent duplication events have occurred. Both PpGlk genes are expressed in the protonema and gametophore, and as in Arabidopsis, maize and rice, their expression levels increase on exposure to light. We are currently selecting mutations in both genes to assess whether the Glk gene function is conserved between lower plants and higher plants.