P2: Functional analysis of KNOX genes from the moss *Physcomitrella patens*.

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Homeobox genes determine cell fate by acting as transcriptional regulators of collections of developmental genes. KNOTTED1-LIKE homeobox (KNOX) genes can be subdivided into two classes based on sequence similarities and expression patterns (Bharathan et al. (1999) Mol. Biol. Evol. 16:553-563). Higher plant Class 1 KNOX genes regulate the formation and maintenance of meristematic tissue, while the function of Class 2 genes remains to be determined (Long *et al*., 1996; Serikawa *et al*., 1996). It has been postulated that factors such as the change in expression of KNOX genes have played a role in the evolution of plant leaf morphology and that Class 1 KNOX genes may have had a role in the acquisition of leaves in the earliest vascular land plants (Sinha *et al*., 1993). Three independent genes named MKN1-3, MKN2 and MKN4 were cloned from a P. patens genomic library. Phylogenetic analysis indicates that MKN2 and MKN4 are Class 1 genes, and MKN1-3 is a Class 2 gene. MKN2 is expressed in chloronemal apical cells. The expression patterns of MKN1-3 and MKN4 are similar. Expression of both genes was observed in some, but not all, chloronemal apical and sub-apical cells. Often, the signal was not homogenous in all cells, indicating that MKN1-3 and MKN4 RNA are sub-cellularly localized. Using directed gene knockout, the function of MKN2, MKN4 and MKN1-3 have been disrupted. Knockout phenotypes will be described. Deducing the function of moss KNOX genes may illuminate how the transition to three dimensional growth, characteristic of the Embryophytes, occurred.

Long et al. (1996) Nature 379:66-69;
Serikawa et al. (1996) Plant Mol. Biol. 32:673-683)
Sinha et al. (1993) Genes Dev. 7:787-795