P1: The distribution of endogenous and exogenous auxins in gametophytes of *Physcomitrella patens*

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Although the occurrence and developmental roles of auxins in mosses are well documented, little has been reported about the distribution of auxins in either gametophytic or sporophytic tissues of these plants. We have studied auxin distribution patterns in *Physcomitrella patens* gametophytes possessing a transgenic *GUS* reporter gene controlled by the auxin-responsive *MAS* promoter. In each of three transgenic strains, we demonstrated that the plasmid vector containing a *MAS-GUS* cassette had been integrated at a unique site in the *P. patens* genome. One transformant, LT II-2 exhibited strong expression of the *GUS* reporter gene, providing a suitable system for studying endogenous and exogenous auxin distribution. In untreated plants, enhanced *GUS* expression, reflecting elevated auxin levels, occurred in leaf bases, midribs and margins as well as leaf apical cells. The application of auxin efflux inhibitors usually resulted in intense *GUS* expression in basal regions of leaves present in gametophore apices. The application of exogenous IAA or NAA stimulated *GUS* expression especially in buds and the apices of leafy gametophores, both of which became considerably elongated. We suggest that auxins accumulate preferentially in cells of buds and gametophore apices and may cause their elongation. Studies with auxin transport inhibitors suggest that endogenous auxins may be synthesized at the bases of apically positioned leaves. Interestingly, dark-grown gametophores of the transgenic moss were greatly etiolated but exhibited little/no *GUS* expression. However, *GUS* activity was detected in the apices of these leafy shoots within one day of returning them to the light. Therefore, auxin synthesis or accumulation may be light-dependent and, in contrast to light-grown moss, gametophore development in the dark may not require auxins.