

## **PhyB inhibits negative hypocotyl gravitropism non-cell autonomously**

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Seedling hypocotyls display negative gravitropism in the dark but agravitropism in the light. Previous works showed that the *pif quadruple* (*pifQ*) mutant lacking four members of PHYTOCHROME-INTERACTING FACTORS (PIFs) are agravitropic in the dark and the expression of PIF in endodermis is sufficient to restore the gravitropism in the *pifQ* mutant. Since phytochromes are known to induce light responses by inhibiting PIF transcription factors and COP1-SPA ubiquitin E3 ligase complex in the nucleus, we examined if phyB inhibits hypocotyl negative gravitropism in the endodermis cell autonomously. We found that the expression of phyB by epidermis-specific promoters rescue all *phyB* mutant phenotypes including hypocotyl negative gravitropism, whereas the expression of phyB by endodermis-specific promoter does not rescue. Epidermal phyB induces the degradation of endodermal PIFs in response to red light, leading to global gene expression pattern similar to one induced by phyB driven by its own promoter. Our results imply that epidermal phyB generates yet unidentified mobile signals that travel to endodermis where it promotes the degradation of PIFs to inhibit hypocotyl negative gravitropism.