Light-induced morphogenetic changes improving access to sunlight.

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Arabidopsis is a typical shade-avoiding plant that displays a suite of growth and developmental adaptations in response to foliar shade, known as the Shade Avoidance Syndrome (SAS). Phytochrome B (phyB) is the primary photosensory receptor detecting competition for light from neighboring plants. The SAS involves phyB directly controlling protein abundance of Phytochrome Interacting Factors 4 and 5 (PIF4 and PIF5). PIF4 and PIF5 rapidly promote elongation growth via auxin-mediated processes and simultaneously turn on HFR1, a negative regulator of the SAS [1-3]. We are using a combination of computational modeling and experimental validation to study the SAS regulatory network. This lead to the identification of a novel role of HFR1 and further insight into the mechanism enabling PIFs to control auxin biosynthesis and sensitivity [4]. We are comparing mechanism controling hypocotyl elongation in response to shade with the molecular events underlying the shade response in leaves: petiole elongation, reduced blade growth and leaf hyponasty [5]. To this end we developed a novel phenotyping platform allowing us to analyze leaf growth and positioning with great spatial and temporal resolution [6].

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