Photosensory Perception and Signal Transduction by the Phytochromes

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We are interested in exploring possible photosensory, physiological, and signaling specificity among members of the phytochrome (phy) family of photoreceptors, and in identifying early signaling intermediates potentially specific to each family member.
Studies with photoreceptor mutants and transgenic seedlings of Arabidopsis overexpressing phyA, B, or C indicate that these phytochromes have differential patterns of photosensory and/or physiological activity in seedling development. A genetic screen for non-photoreceptor mutants selectively defective in red light perception has identified a locus designated RED1 that is potentially specific to the phyB signaling pathway. Similarly, a screen for suppressor mutations of a weak phyA mutant has identified a locus designated SPA1 that appears to encode a negative regulator specific to phyA signaling. The data support the notion that early steps in signaling are separate for different phytochromes, and provide the basis for molecular characterization of some of the components involved.