PUBLISHED: 30 JANUARY 2017 | VOLUME: 3 | ARTICLE NUMBER: 17004

research highlights

DEVELOPMENT

Switched by the light

Plant Cell **28,** 2889–2904 (2016)

Plants capture energy from sunlight. Most shade-avoiding plants trigger swift hypocotyl elongation to fight shaded conditions. A recent study by Christian Fankhauser's group, based at the Center for Integrative Genomics, University of Lausanne, Lausanne, Switzerland, involved a large-scale transcriptome analysis of the shade-induced transcriptional reprograming that occurs both in cotyledons (light-sensing organs) and hypocotyls (fast-elongation organs) in *Arabidopsis*.

Kohnen *et al.* investigated whole-genome transcriptional changes in cotyledon and hypocotyl samples at different time points following shade treatment. They found a strong correlation between transcriptional responses to shade and auxin treatments in both organs, while other phytohormone pathways were differentially regulated in an organ-specific manner. However, even for auxin, the shade response at later time points displayed organ specificity. The importance of auxin was further supported by a diminished shade response of auxin-defective mutants. Besides phytohormones, light-signalling PIF (PHYTOCHROME INTERACTING FACTOR) transcription factors were also suggested to be key regulators of shade-induced transcriptional reprograming. By comparing RNA and chromatin-immunoprecipitation sequencing data in *pif* mutants, the group concluded that around half of the early shade-induced genes are likely to be direct PIF targets. In addition, a similar gene expression pattern between shade-treated and etiolated hypocotyls indicated a shared mechanism of light-regulated hypocotyl elongation under different circumstances.

This study has not only confirmed many known mechanisms, but has also identified new factors involved in shade-induced transcriptional reprograming that will potentially contribute to a better understanding of light signalling and plant cell growth.

MICHAEL PEARCY / ALAMY STOCK PHOTO

Lei Lei

© 2017 Macmillan Publishers Limited, part of Springer Nature. All rights reserved.