*Talk*

# Conserved gene modules regulate light signals in algae and plants


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## ABSTRACT

**In the Plant Development Unit (PDU) we aim to discover mechanisms that allowed photosynthetic organisms to reach the level of developmental complexity shown today. Plants are particularly good models as they have been evolving as light autotrophs for millions of years, ever since the first bacteria developed oxygenic photosynthesis and killed 99% of existing species in the process. But light is not only the main source of energy for plants, it is also one of the main regulators of their development, as endo-symbiotic cyanobacteria (chloroplasts) perfected their physiological synchronization with the emerging eukaryotes (1). Another important aspect of plant evolution was the transit to the aerial world and the acquisition of characteristics that allowed them to successfully colonise this new habitat (2). In the PDU we have followed the evolution of the day length response (photoperiod) that coordinates the daily physiological activities of plants and can be also used to regulate seasonal behaviours such as winter recesses or flowering time (3). When gene expression networks from photoperiod experiments from microalgae, bryophytes and higher plants are compared, a common nodular structure is discovered (4). Following these discoveries, we have isolated ancestor algal genes that show the same function as higher plants in the response to photoperiod such as the CONSTANS-DOF module (5). We are currently investigating common regulatory mechanisms in photoperiod sensing such as the effect on the circadian clock, senescence, retrograde signalling (6) and protein stability (7).**

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