Public Abstract

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Title:A Mechanistic Exploration of Signaling Crosstalk Regulating Light Responses, Growth and Immunity in Arabidopsis

For decades, processes in molecular biology have typically been studied in isolation, and for very good reason since only through carefully crafted experiments under precise conditions have discoveries to date been possible. Now that key components of numerous processes have been identified, we may begin attempting to view them in conjunction rather than isolation. Using the model plant *Arabidopsis thaliana*, our research focuses on the intersection between pathogen defense and the signals that allow plants to sense and respond to light. Light provides plants with not only with energy, but also with information. Details regarding the time of day, time of year, and position within the environment are all provided by light. This information is critical for allowing key physiological changes to be made under the appropriate conditions. Additionally, a properly functioning immune system is also paramount to plant health. Underutilization can result in disease formation while overutilization comes with a high energetic cost. Study of these two systems in tandem provides a model for how responses to both living and non-living stressors interface and affect one another. Using genetic, biochemical and physiological approaches we have discovered that select light receptors interact with and influence components of the plant immune system. The inverse was also found, where absence of certain defense components can impact responses to light. Moreover, this research prompted a more in depth study of a key immune regulator and resulted in discovery of novel functions. Through continuation of these studies, we will gain more fundamental insights into the nature of how organisms sense and respond to their environment.