AtbZIP63 modulates the pace of starch degradation in Arabidopsis thaliana

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The efficient management by an organism of its energetic resources is crucial to ensure its development and reproduction. Plants as sessile organisms developed sophisticated mechanisms to optimize the balanced use of their available energetic resources in response to environmental changes. Carbohydrates such as sucrose and starch, which are end products of CO2 fixation by photosynthesis during daytime, are primary sources of energy. During the night period, in the model organism Arabidopsis thaliana (Arabidopsis), starch is degraded at a rate compatible with a constant and regular supply of carbohydrates to sustain growth until dawn. The regulation of this process involves the circadian clock and a mechanism which quantifies the available starch. We will provide evidences that the Arabidopsis bZIP type Transcription Factor (TF) AtbZIP63 is also involved in this regulatory scheme. In response to changes in carbohydrate levels, this TF modulates the expression of PRR7, a key component of the clock. On the other hand, AtbZIP63 is regulated by the clock and is also the main target of the SnRK1/KIN10 kinase which mediated energetic stress responses. We suggest that AtbZIP63, by regulating PRR7, adjusts the activity of the clock to the energetic status of the organism.