

A new role for cytokinin plant hormones

September 9 2011

When plants, including crops, are exposed to environmental stresses such as drought or high salinity, abscisic acid (ABA), a stress-responsive hormone is synthesized to induce a protective response. At the same time, the content of another plant hormone, cytokinin (CK), which is involved in regulation of plant growth, such as promotion of cell division or inhibition of senescence, is reduced. This phenomenon suggests that CK might play an essential role in regulation of plant adaptation to environmental stresses. However, how CK regulates plant response to stresses and how stresses regulate CK metabolism; these questions required answers.

The Signaling Pathway Research Unit discovered that mutual regulation mechanism between CK and ABA affects the plant's adaptation to stressors. The authors found that the CK-deficient *Arabidopsis* plants with reduced CK levels exhibited a strong stress-tolerant phenotype that was associated with improved cell membrane integrity and ABA hypersensitivity. Additionally, using *Arabidopsis* the authors provided evidence that drought and salt stresses reduce the levels of the bioactive CKs by alteration of expression of CK metabolic genes. Taken together, the group suggested that because of the reduction in CK content under drought and salt stresses, the inhibitory effect of the CK regulatory network on the expression of stress-responsive genes is alleviated, leading to enhanced stress tolerance. CK biology, therefore, represents a promising tool for agronomy and can provide multiple biotechnological strategies to maintain agriculture in a sustainable fashion.

These results were published in the June 2011 edition of *The Plant Cell*.

Provided by RIKEN

Citation: A new role for cytokinin plant hormones (2011, September 9) retrieved 10 April 2024 from <https://phys.org/news/2011-09-role-cytokinin-hormones.html>

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