筑波大学遺伝子実験センター
形質転換植物デザイン研究拠点
研究セミナー(1)

PTraD initiative
形質転換植物デザイン研究拠点

日時: 6 月 28 日　13 時から 15 時

場所: 遺伝子実験センター内セミナー室　(2 階)

Roles of two distinct modes of MAPK activation in ROS homeostasis.

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Rapid recognition and signal transduction of mechanical wounding are necessary early event leading to stress resistance in plants. Accelerated propagation of wound response operates various signaling molecules including calcium (Ca^{2+}), protein phosphorylation and reactive oxygen species (ROS). However, how these factors cooperate with each other is unclear. In this seminar, we report a novel function of *Arabidopsis* mitogen-activated protein kinase8 (MPK8) connects protein phosphorylation, Ca^{2+} and ROS in wound signaling pathway. MPK8 is activated by mechanical wounding, and this activation requires direct binding of calmodulins (CaMs) in a Ca^{2+}-dependent manner. MPK8 is also phosphorylated and activated by a MAPKK MKK3 in the prototypic kinase cascade, and full activation of MPK8 needs both CaMs and MKK3 *in planta*. Loss-of- and gain-of-function analysis revealed that MPK8 pathway negatively regulates ROS accumulation through controlling the expression of *RbohD* (*respiratory burst oxidase homolog D*) gene,　a key enzyme of ROS production and ROS-related signaling. These findings suggest that two major activation modes in eukaryotes, Ca^{2+}/CaMs and the MAP kinase phosphorylation cascade, converge at MPK8 to monitor or maintain an essential part of ROS homeostasis.

Reference:

Takahashi *et al.*, 2007 (Plant Cell)

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