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**Abscisic acid inducible mitogen-activated protein kinase kinase kinases in *Arabidopsis*; their roles in abscisic acid signaling and utilization for plant biotechnology**

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Plants are sessile organisms which are constantly exposed to a variety of biotic and abiotic stresses in their external environment. Environmental stresses such as salinity, cold and drought, influence plant growth and limit the yield of crops. In order to survive, plants have developed various signal transduction pathways to modulate cellular responses to environmental changes. The phytohormone Abscisic acid (ABA) plays important roles in plant growth and stress responses. ABA regulates many aspects of plant growth and development including seed maturation, dormancy, germination, leaf senescence and responses to environmental stresses. These functions are regulated by various signaling components for example second messengers including Ca<sup>2+</sup> and reactive oxygen species, SnRK2, PP2C pathway and G-protein. It is also known that mitogen activated protein kinase (MAPK) cascades function in ABA signaling. MAPK cascades play important roles in responses to various biotic and abiotic stresses, plant hormones, cell division and developmental processes in plants. In *Arabidopsis*, 20 MAPK, 10 MAPKK and about 80 MAPKKK genes have been found which suggests that the signaling cascades generated by these molecules are complex. In this lecture, I will introduce our recent research that an *Arabidopsis* MAPKKK, MAPKKK18 functions in ABA signaling. Furthermore, we generated transgenic *Arabidopsis* plants constitutively expressing MAPKKK18 (35S:MAPKKK18) or its kinase-negative form (35S:MAPKKK18KN). Senescence of the rosette leaves was promoted in 35S:MAPKKK18 whereas suppressed in 35S:MAPKKK18KN and it showed vigorous growth. These results indicate the possibility of enhanced biomass production of plants. Overexpression of the other ABA inducible MAPKKKs is also introduced.

**Biography**

Daisuke Matsuoka has completed his PhD (2002) from Kobe University in Japan and Post-doctoral studies at Osaka Prefecture University in Japan. He is the Assistant Professor of Graduate School of Agricultural Science at Kobe University. His research is focused on stress signal transduction in plants. He has published more than 25 papers in reputed journals.

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