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Host selective toxins and suppressor effector from plant pathogens regulate Ca2+ -dependent protein kinase in the plant cell

Naotaka Furuichi
Niigata University, Japan

Abstract

Seven members of the family of host selective toxins were reported from Alternaria alternate and Alternaria solani by S. Nishimura lab. The suppressor effector for hypersensitive response of host cells was reported firstly by using Phytophthora infestans by K. Tomiyama lab. The host selective toxin (HST) effect on the host plant and induced the infection of the pathogen into the tissue, which has no resistant genes against HST. The suppressor effector induced the inhibition of hypersensitive cell death, accumulation of phytoalexins and the symptom of HR, hypersensitive response, in host tissues. Recently, the Ca2+ -dependent protein kinase in the plasma membrane of host cells was stimulated after the treatment of Alternaric acid, a HST, from A. solani and the suppressor effector from P. infestans in vitro, in the assay as reported. This means that the kinase, CPKs, could recognize the HST and suppressor in host plasma membrane and regulate the occurrence of HR in host cells. So far, the receptor sites for the PAMPS were reported. However, there are few reports with regard to the receptor for HST in plant cells. The CPKs in the host plasma membrane are a candidate against receptor of HST in potato and other plants. The suppressor of P. infestans has a □ -1,3-linkages of glucose, and also contains glucosamine. Recently, cyclic nucleotide gated protein channel (CNGC) activity was induced by the treatment of At pep peptides effector in host cells, resulting the HR response in the cells. The CNGC channel activity was reported by the Fluorescent protein method. For the activation of CPKs, the influx of calcium into the cytoplasm is important physiological phenomena in host cells. In plant, CNGC played a role for the occurrence of Ca2+ influx in host cell, as reported. The CPKs signaling cascades regulated the occurrence of HR response in host cells, and the HST effect on the inhibition of HR in potato and tomato.

Biography

Naotaka Furuichi received his Ph.D. degree in Molecular Plant Pathology with the Professor K. Tomiyama at Nagoya University (1981) and had postdoctoral training of Prof. S. Nishimura (1982, Nagoya University) and of Prof. Anne J. Anderson (1988, Utah State University). He was a Project PI of Plant Defense Center, Niigata University, (2003). He also had the Visiting Professor lab, Protein Institute, Osaka University (2005-2009).He had been elected as a Fulblight Senior Scientist, Utah State University, Logan, Utah (1993-94) and as a Visiting Professor, Utah State University, (1993-94).