

Molecular mechanisms of plant immunity and its suppression by pathogens.**Ken Shirasu**

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【Outline of survey】

Most eukaryotic organisms are able to recognize potential pathogens and express appropriate defenses to prevent disease. While animals use both antibody-based (adaptive) and cell-based (innate) immunity systems, plants employ its own innate immunity mechanism. Like animal pathogens, most of plant pathogens suppress host's immunity system by injecting multiple effector proteins into the cells. Plants have evolved a sophisticated surveillance system where by pathogen effectors are detected by a repertoire of immune receptors. Recent reports showed animals also use immune receptors that contain the similar domain architecture, suggesting plants and animals may share a common immunity mechanism. In this study, I aim to understand molecular mechanisms of plant immunity system by studying immunity-related proteins and pathogen effectors.

【Expected results】

A multidisciplinary approach combining genetics, genomics, biochemistry, proteomics, and structural characterization will dissect plant immunity systems at the molecular level. Through this project I hope to build a unified model for how plant immunity related proteins and pathogen effectors function during resistance activation and its suppression. This information will be used for developing immune enhanced crops and targeted low-impact agricultural compounds to control devastating pathogens.

【References】

- Azevedo et al, EMBO J 25:2007 2006.
- Takahashi et al, Proc Acad Natl Sci USA 100:11777 2003.
- Azevedo et al, Science 295: 2073 2002.
- Shirasu et al, Cell 99:355 1999.

【 Term of project 】 FY2007 - 2011**【 Budget allocation 】** 7,200,000 yen
(2007 direct cost)**【Homepage address】**<http://ksg.psc.riken.jp/index.en.html>