

## **Molecular basis of Rac GTPase in plant innate immunity**

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### **【Outline of survey】**

Plants induce a series of defense responses through recognition of pathogen-derived molecules with the receptors. Since the defense responses are similar in some way to those of animals, it is recently called as “plant innate immunity”. So far, we have shown that small GTPase OsRac1 functions as a key molecular switch to induce innate immunity response in rice. To understand molecular basis of OsRac1 in immunity responses, we identified many OsRac1 interactors by affinity chromatography. They contained NBS-LRR type plant receptors and chaperons required for function of the receptors. Recently, we found that OsRac1 forms a big complex with many defense factors including the receptor, the chaperon, and MAP kinase etc. In this project, to understand a comprehensive regulatory system for plant immunity, we will examine how the OsRac1 protein complex regulates recognition of pathogens and activation of defense signals during the immunity response.

### **【Expected results】**

In this project, we will reveal molecular basis of plant immunity responses by understanding the roles of the OsRac1 protein complex that play a key role in pathogen recognition and defense signaling. We also analyze dynamics of the protein complex during the immunity responses by bio-imaging technique. The results obtained in the project will be useful to create a novel type of disease-resistant plants that are suitable for preservation of natural environment.

### **【References by the principal investigator】**

- 1) Kawasaki T., Koita H., Nakatsubo T., Hasegawa K., Wakabayashi K., Takahashi H., Umemura K., Umezawa T. and Shimamoto K. (2006) Cinnamoyl-CoA reductase, a key enzyme in lignin biosynthesis, is an effector of small GTPase Rac in defense signaling in rice. **Proc Natl Acad Sci USA.** 103:230-235.
- 2) Ono E., Wong H.L., Kawasaki T., Hasegawa M, Kodama O., and Shimamoto K. (2001) Essential role of the small GTPase Rac in disease resistance of rice. **Proc. Natl. Acad. Sci. USA** 98: 759-764

**【Term of project】 FY2007–2011**

**【Budget allocation】 21,300,000 yen**

(2007 direct cost)

**【Homepage address】**

<http://bsw3.aist-nara.ac.jp/simamoto/simamoto.html>