

## Study on gibberellin perception

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### 【Outline of survey】

Gibberellins (GAs) are phytohormones that are essential for many developmental processes in plants. Recently, we isolated a GA insensitive dwarf mutant of rice, *gid1*, which showed typical GA-insensitive phenotypes such as severe dwarfism, no induction of  $\alpha$ -amylase activity in seed, higher expression of GA biosynthetic genes, and increased accumulation of bioactive GAs. Recombinant GID1 (rGID1) protein had a high affinity only for bioactive GAs, and the mutated rGID1 did not. The  $K_d$  value of rGID1 for GA<sub>4</sub> was estimated to be around  $10^{-7}$ M, enough to account for the GA dependency on shoot elongation. Moreover, GID1 bound to SLR1, a rice DELLA protein, in a GA dependent manner in yeast cells. GID1 overexpression gave a GA-hypersensitive phenotype.

In this project, we will examine the domain analyses of both GID1 and SLR1 proteins for GA binding and their interaction in order to clarify the molecular mechanism of GA perception. We will perform the structural analysis of GID1 with or without GA and also GID1-SLR1 complex. We will also examine the molecular interaction between SLR1 and GID2, a specific F-box protein for SLR1 degradation to study the mechanism of GA-dependent degradation of SLR1.

### 【Expected results】

The experiments described above will reveal important domains of GID1 for interaction with GA and SLR1. Such information helps us to construct the molecular mechanism of GA perception of GID1 and signal transduction from GID1 to SLR1. All available data of genetical experiments suggest there are only three important protein factors essential for events from GA perception to degradation of SLR1. Consequently, these biochemical and structural studies on GID1, SLR1 and GID2 will clarify the molecular mechanism from GA perception to SLR1 degradation.

### 【References by the principal researcher】

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【Term of project】 FY2006 - 2010

【Budget allocation】 18,000,000 yen

【Homepage address】

<http://www.agr.nagoya-u.ac.jp/~naikan/index.html>