Phytohormones

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CONSTITUTIVE GIBBERELLIN RESPONSE MUTANT, SLENDER RICE IS CAUSED BY NULL MUTATION OF *SLR* GENE, AN ORTHOLOGUE OF *GAI/RGA/RHT/D8*

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Slender rice (*slr-1*),was unaffected by an inhibitor of gibberellin(GA) biosynthesis, GA-inducible α-amylase was produced without GA application, and endogenous GA content was lower than in the wild-type plant. These results indicate that product of the *SLR* gene is an intermediate of the GA signal transduction process. We succeeded in the cloning of the *SLR* gene, which sequence alignment showed homology to *Rht* in wheat, *D8* in maize and *GAI* and *RGA* in *Arabidopsis*. *slr-1* mutation is due to one base deletion to result in frame-shift mutation for abolishing the further protein product. Transgenic *slender* mutant in which actin promoter-drived *SLR* gene introduced by using *Agrobacterium*-mediated transformation resotred to the normal GA sensitivity.

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ISOLATION AND CHARACTERIZATION OF GIBBERELLIN INSENSITIVE SEVERE DWARF MUTANT IN RICE

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To study of the GA signal transduction in rice, we isolated a recessive dwarf mutant (GA insensitive dwarf, *gid*) from the mutant libraries caused by N-metylurea. The mutant showed severe dwarf and never developed flower. The overall of the phenotype of this mutant was quite similar to the severe allele of *d18*, which is a deficient mutant of GA biosynthesis, but the application of GA did not restore the dwarf phenotype of *gid*; indicating that the phenotypes of *gid* are s not caused by deficiency in the GA synthesis. The activity or expression of α amylase in aleurone was not induced at all by the treatment of GA. The gene expression of GA C20 oxidase was elevated dramatically in the mutant and the endogenous contents of GA20 and GA1 in the mutant seedlings were 100-120 times higher than that in wild plant.

These results strongly suggest that the mutant defects in the perception to GA, and therefore the *gid* gene may encode a positive regulator of the GA signal transduction pathway. Molecular cloning and characterization of *GAD* should shed light on black box of GA signal transduction pathway.

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Biological activities of root-promoting substance, N-(phenethyl)succinamic acid, and its structure-activity relationship

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Biological activities of N-(phenethyl)succinamic acid (PESA), which was isolated from broth of *Bacillus* sp. as a root-promoting substance, were estimated. In adzuki rooting test, PESA was most effective when it applied to cuttings after IAA-effective phase, and this effect was inhibited by TIBA treatment on upper part of the stems. In studies of stem elongation and leaf epinasty, PESA did not exhibit promotive effect whereas auxins did. For practical use, PESA promoted root growth of plug seedlings of sweet pepper. Results of QSAR analysis in a series of PESA derivatives indicated that hydrophobicity was a critical factor to exhibit potent root-promoting activity. In this study, it is supposed that N-(4-phenylbutyl)succinamic acid methyl ester is the preferable compound for practical uses.

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INDOLEBUTYROLACTONE APPEARED AT EARLY STAGE OF IBA-INDUCED ROOTING OF SAIKO

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The early metabolite of indole butyric acid (IBA) appeared in the apoplast or close to the roots of saiko (*Bupleurum falcatum* L.) was analyzed when the rooting was induced with IBA. The analysis founded Indolebutyrolactone (Fb) which was synthesized from IBA through the hydroxylation 1'-carbon of IBA. Fb appeared with the decrease of IBA in the medium. We chemically synthesized Fb and examined its rooting activity. In the experiment of the root culture of saiko, Fb induced the rooting; the activity was equal to that of IBA or lower. Furthermore, we compared the activity of Fb with a commercial available root-inducer (main component: IBA) using various kinds of cutting garden plants. Fb was more effective when it was sprayed on the plants than applied on the cutting section of the stem. Although the root-inducing activity of Fb was weaker than that of the root-inducer, Fb could show higher activity synergistically with the inducer.