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Application of Damping-off Resistance Gene, Using CRISPR/Cas9 in Rice

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[Introduction]

The world's population is expected to continue growing in the future. Also, as the population increases, the importance of rice as a food resource will increase. However, due to the abnormal temperature, diseases and pests of rice are getting worse, and the yield is decreasing. Among them, Damping-off is a disease that causes seeds to rot at the seedling stage when the diurnal temperature difference is severe and does not germinate, or causes symptoms of condensation and wilting in young seedlings. Since damping-off is caused by a fungus, it is easy to infect nearby plants when it is infected, which affects yield reduction. Therefore, research on creating resistant plants is needed.

[Materials and Methods]

Genome editing will be done using CRISPR/Cas9, and the *OsDGTq1* gene found by QTL mapping in Selection strategy for Damping-of resistance gene by Biotechnology in rice plant was used as the resistance gene. *OsDGTq1* is located between RM11849-RM212 on chromosome 1. *OsDGTq1* exhibits strong resistance to *Pythium graminicola* and *Rhizoctonia solani*. For guide RNA design, the RGEN Tools cas designer program was used. When designing guide RNA, GC content was set to 50% to 60%, out-of-frame 65% or more, and mismatches to 1, 0, 0

[Results and Discussion]

In this study, we will be able to create genome-editing plants. also use it check the function of the *OsDGTq1*. By checking the function of the *OsDGTq1*, it can be used as a genetic resource for related research. Furthermore, by reducing the number of dead seeds and young seedlings due to the onset of damping-off at the seedling stage, it can have a positive effect on increasing yield, which can contribute to global food problems.

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