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学 位 論 文 要 旨
Dissertation Abstract

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学位論文題目：
Title of Dissertation　Studies on regulatory mechanisms of hypersensitive responses in *Nicotiana benthamiana*.
（*Nicotiana benthamiana*における過敏感反応の制御機構に関する研究）

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Plants have a variety of active defense mechanisms to protect themselves from microbial pathogen infection. One of the best characterized defense responses is the hypersensitive response (HR), which is a defense response accompanied by programmed cell death. Previously, more than 50 gene fragments, which were regulated in tobacco plants after inoculation with *R. solanacearum* (*R. solanacearum*-responsive genes, RsRGs; Kiba et al. 2007) have been isolated. Many RsRGs showed no similarity to any known genes and thus might represent novel genes related to plant defense responses. The objective of this study is isolation and characterization of RsRGs related to HR. I focused on *RsRG308* and *RsRGM10,* which encodes a putative translationally controlled tumor protein (*NbTCTP*) and asparagine-rich protein (*NbARP*), respectively.

RsRG308 showed homology with *N. benthamiana* translationally controlled tumor protein (*NbTCTP*). An HR induction was accelerated in *NbTCTP*-silenced *N. benthamiana* plants challenged with incompatible bacteria and *Agrobacterium*-mediated transient expression of HR inducers, such as *AvrA*, *BAX*, *INF1* and $NbMEK2^{DD}$. *NbTCTP* silencing enhanced *NbrbohB* and *NbMEK2*-mediated ROS production leading to HR-cell death. Transient expression of both the full-length sequence of *NbTCTP* and the Bcl-xL domain of *NbTCTP* reduces the HR cell death induced by *INF1* treatment. Therefore, *NbTCTP* might act as negative regulator of HR.

RsRGM10 showed homology with *N. benthamiana* asparagine-rich protein (*NbARP*). Induction of the HR by incompatible bacteria Rs8107, *Pseudomonas cichorii* and *Pseudomonas syringae* pv. *syringae* was delayed in *NbARP*-silenced plants. Silencing of *NbARP* reduced induction of HR-cell death by *Agrobacterium tumefaciens*-mediated transient expression of HR inducers. These results suggest that NbARP is closely related to the HR.

Taken together, plant cell death regulators, including *NbTCTP* and *NbARP* might have a role to fine tune HR during plant defense responses.