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Inappropriate expression of an NLP effector in Colletotrichum orbiculare impairs infection on cucurbitaceae cultivars via plant recognition of the C-terminal region (Article)

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Abstract

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The hemibiotrophic pathogen Colletotrichum orbiculare preferentially expresses a necrosis and ethylene-inducing peptide 1 (Nep1)-like protein named NLP1 during the switch to necrotrophy. Here, we report that the constitutive expression of NLP1 in C. orbiculare blocks pathogen infection in multiple Cucurbitaceae cultivars via their enhanced defense responses. NLP1 has a cytotoxic activity that induces cell death in Nicotiana benthamiana. However, C. orbiculare transgenic lines constitutively expressing a mutant NLP1 lacking the cytotoxic activity still failed to infect cucumber, indicating no clear relationship between cytotoxic activity and the NLP1-dependent enhanced defense. NLP1 also possesses the microbe-associated molecular pattern (MAMP) sequence called nlp24, recognized by Arabidopsis thaliana at its central region, similar to NLPs of other pathogens. Surprisingly, inappropriate expression of a mutant NLP1 lacking the MAMP signature is also effective for blocking pathogen infection, uncoupling the infection block from the corresponding MAMP. Notably, the deletion analyses of NLP1 suggested that the C-terminal region of NLP1 is critical to enhance defense in cucumber. The expression of mCherry fused with the C-terminal 32 amino acids of NLP1 was enough to trigger the defense of cucurbits, revealing that the C-terminal region of the NLP1 protein is recognized by cucurbits and, then, terminates C. orbiculare infection. © 2018 The American Phytopathological Society.

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EMTREE drug terms: (fungal protein)

EMTREE medical   (amino acid sequence)   (cell death)   (chemistry)   (Colletotrichum)   (Cucurbitaceae)
terms:

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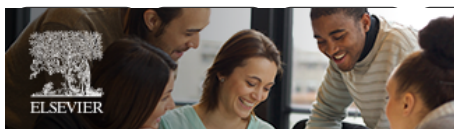
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References (40)

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☐ 1 Albert, I., Böhm, H., Albert, M., Feiler, C.E., Imkampe, J., Wallmeroth, N., Brancato, C., (...), Nürnberger, T.
An RLP23-SOBIR1-BAK1 complex mediates NLP-triggered immunity

(2015) *Nature Plants*, 1, art. no. 15140. Cited 80 times.
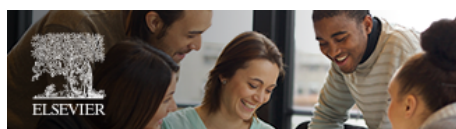http://www.nature.com/nplants/
doi: 10.1038/nplants.2015.140

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☐ 2 Amsellem, Z., Cohen, B.A., Gressel, J.
Engineering hypervirulence in a mycoherbicidal fungus for efficient weed control

(2002) *Nature Biotechnology*, 20 (10), pp. 1035-1039. Cited 72 times.
doi: 10.1038/nbt743

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