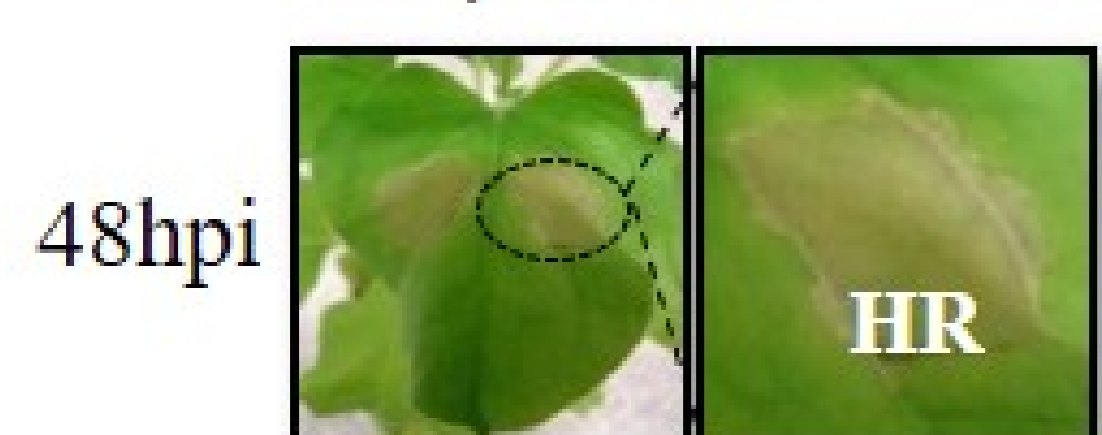


PthA4^{AT}, a short TAL-effector from *Xanthomonas citri* subsp. *citri* induces immunity in *Nicotiana benthamiana*

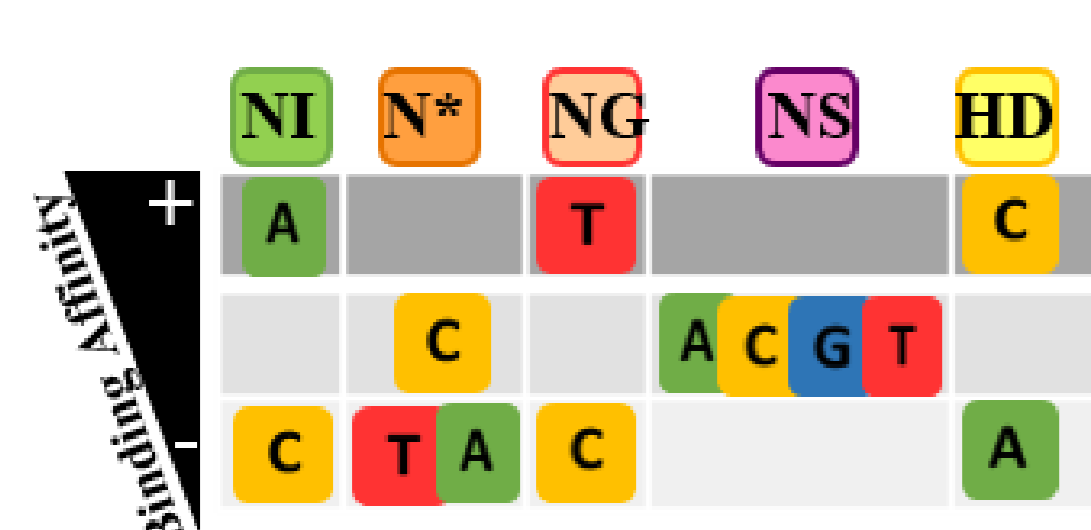
Roeschlin, R.A.^{1,2,3}; Chuán, A.⁴; Uviedo, F.^{2,3}; García, L.^{2,3}; Martínez, F.^{2,3}; Molina C.^{2,3}; Boch, J.⁵; Marano, M.R.^{2,3}; Gadea, J.⁴

(1) Instituto Nacional de Tecnología Agropecuaria (INTA) Estación Experimental Agropecuaria Reconquista, Argentina. (2) Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET). (3) Instituto de Biología Celular y Molecular de Rosario (IBR), Facultad de Ciencias Bioquímicas y Farmacéuticas (UNR), Rosario, Argentina. (4) Instituto de Biología Molecular y Celular de Plantas (IBMCP), UPV, Spain. (5) Institute for Plant Genetics, Leibniz University, Germany.

1 The short pthA4^{AT} TAL-effector from *X.citri causes hypersensitive response (HR) in *Nicotiana benthamiana**



RVD sequence of the pthA4^{AT} TAL effector causing an HR in *Nicotiana benthamiana*

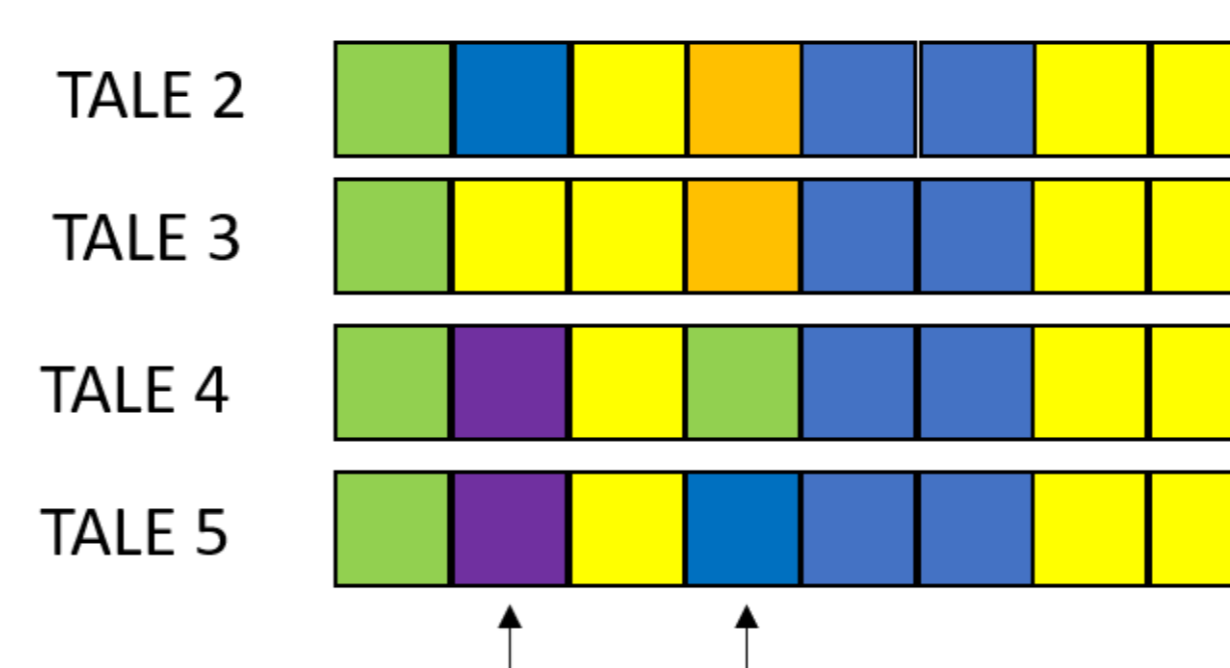


Binding affinities for the pthA4^{AT} RVD residues. The short length and binding ambiguity hampers identification of target genes

pthA4^{AT} -mediated HR depends on RVD specificity

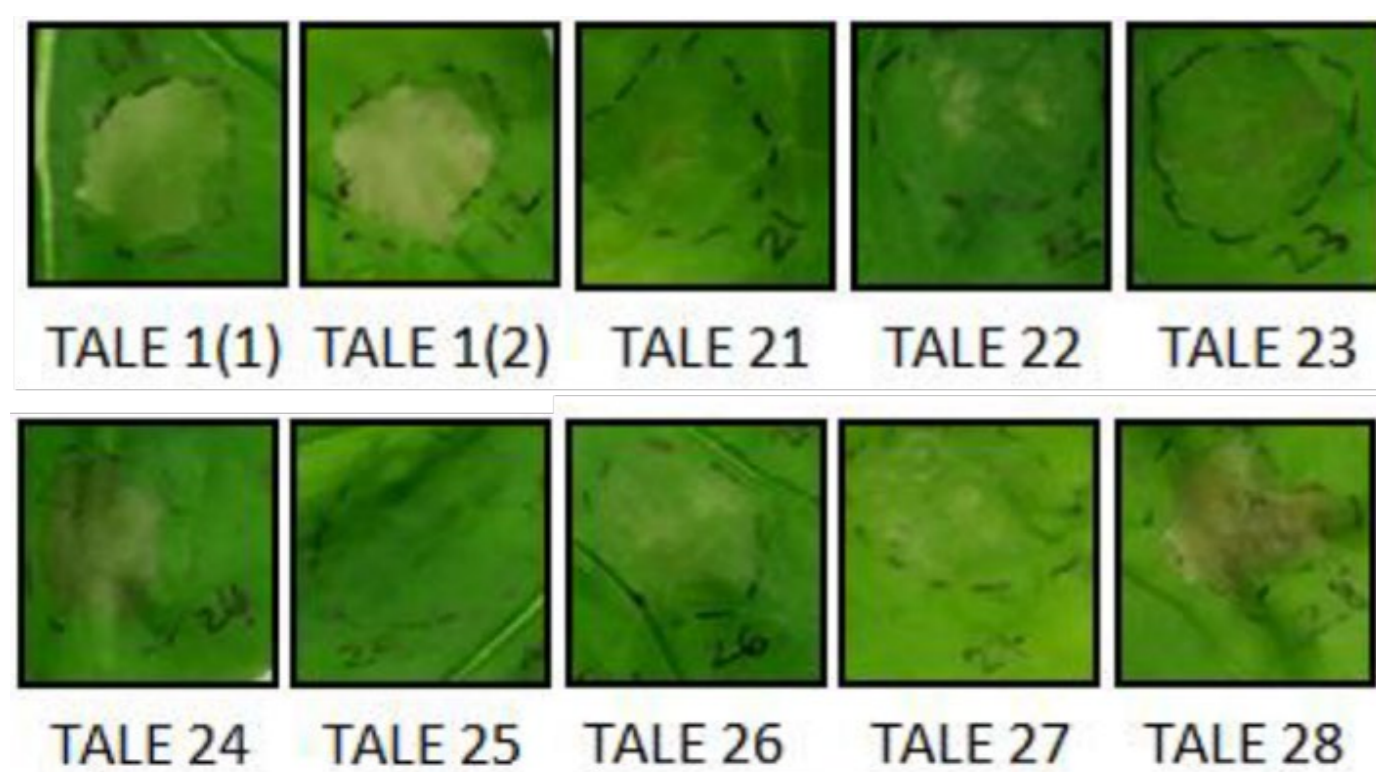


An artificial TALE (TALE1) with the same RVD mimicks pthA4^{AT} response.

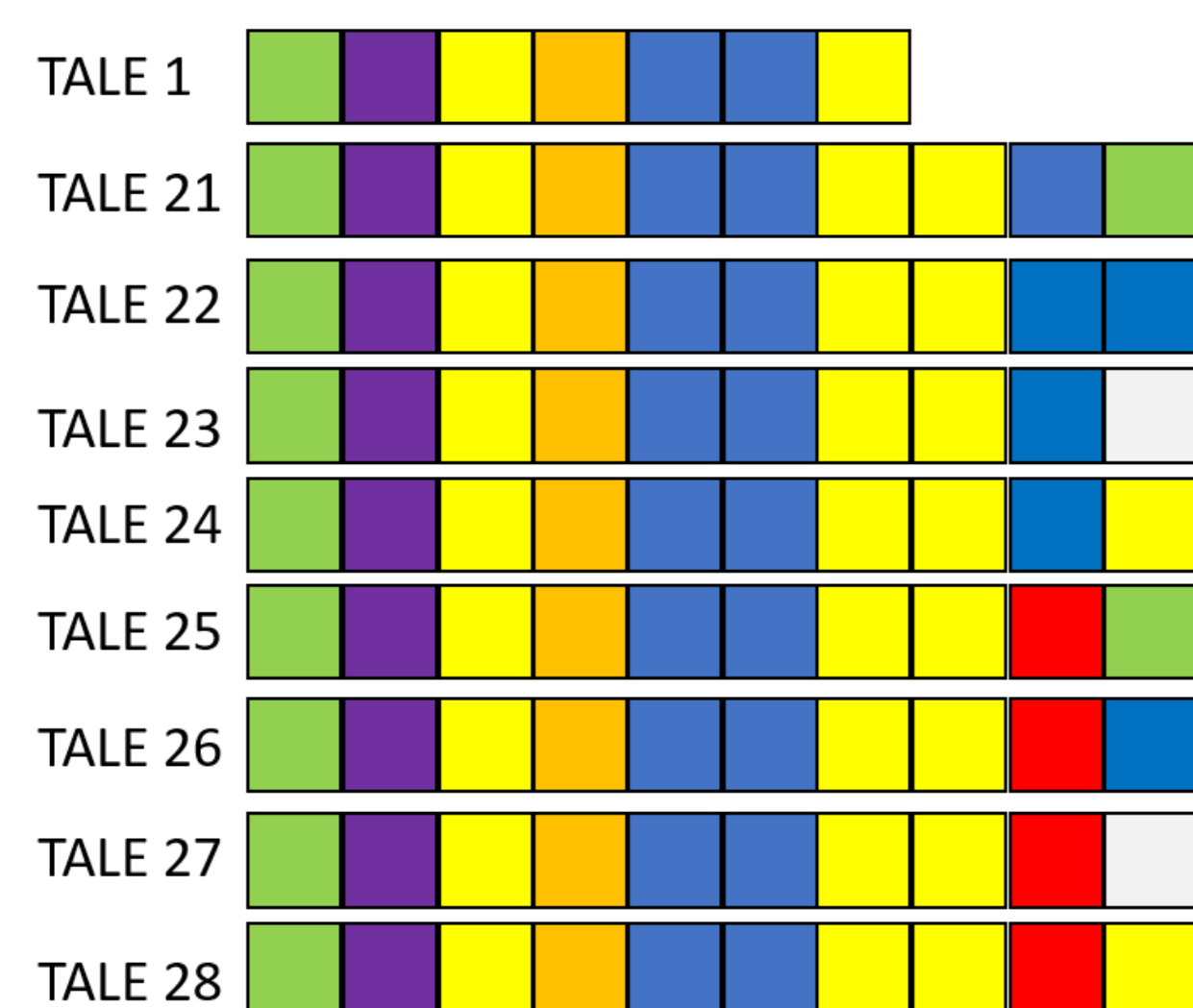


Artificial TALEs altering specific residues in the RVD disrupt HR.

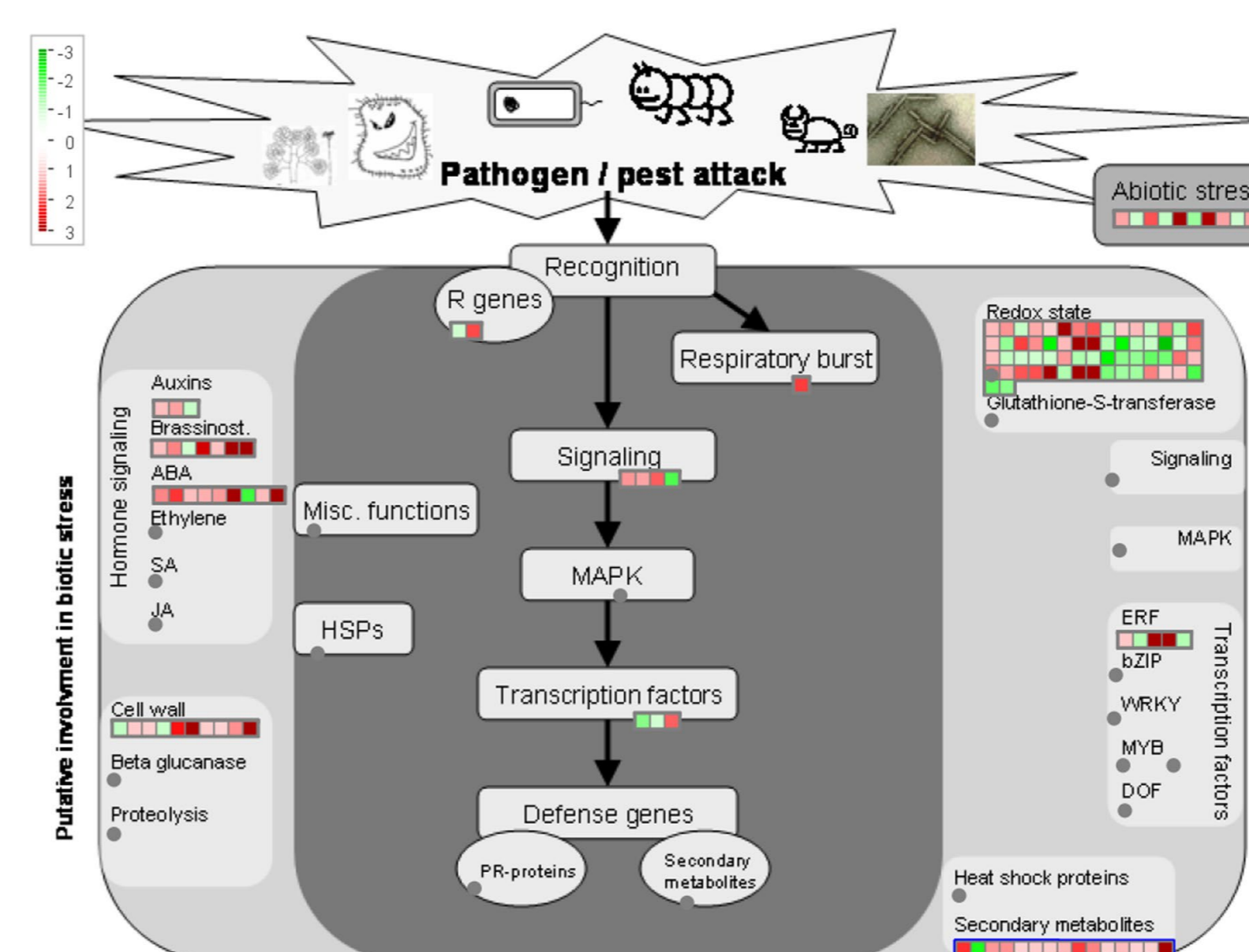
3 Artificial longer versions of pthA4^{AT} retain ability to trigger a canonical HR



Artificial TALEs extending pthA4^{AT} RVD allow refinement of specificity



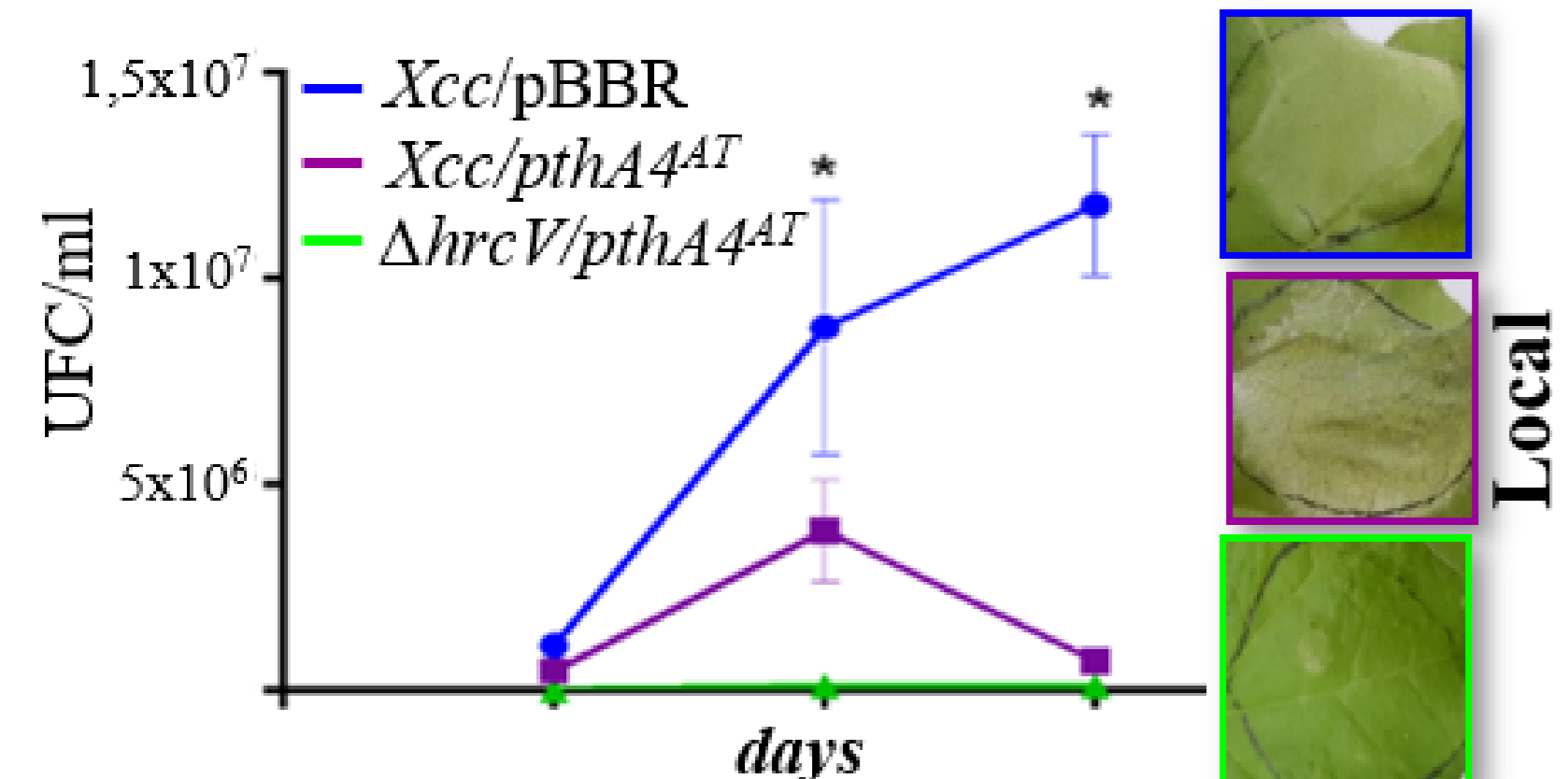
TALE24 and TALE28 retain TALE1-ability to trigger HR in *Nicotiana*



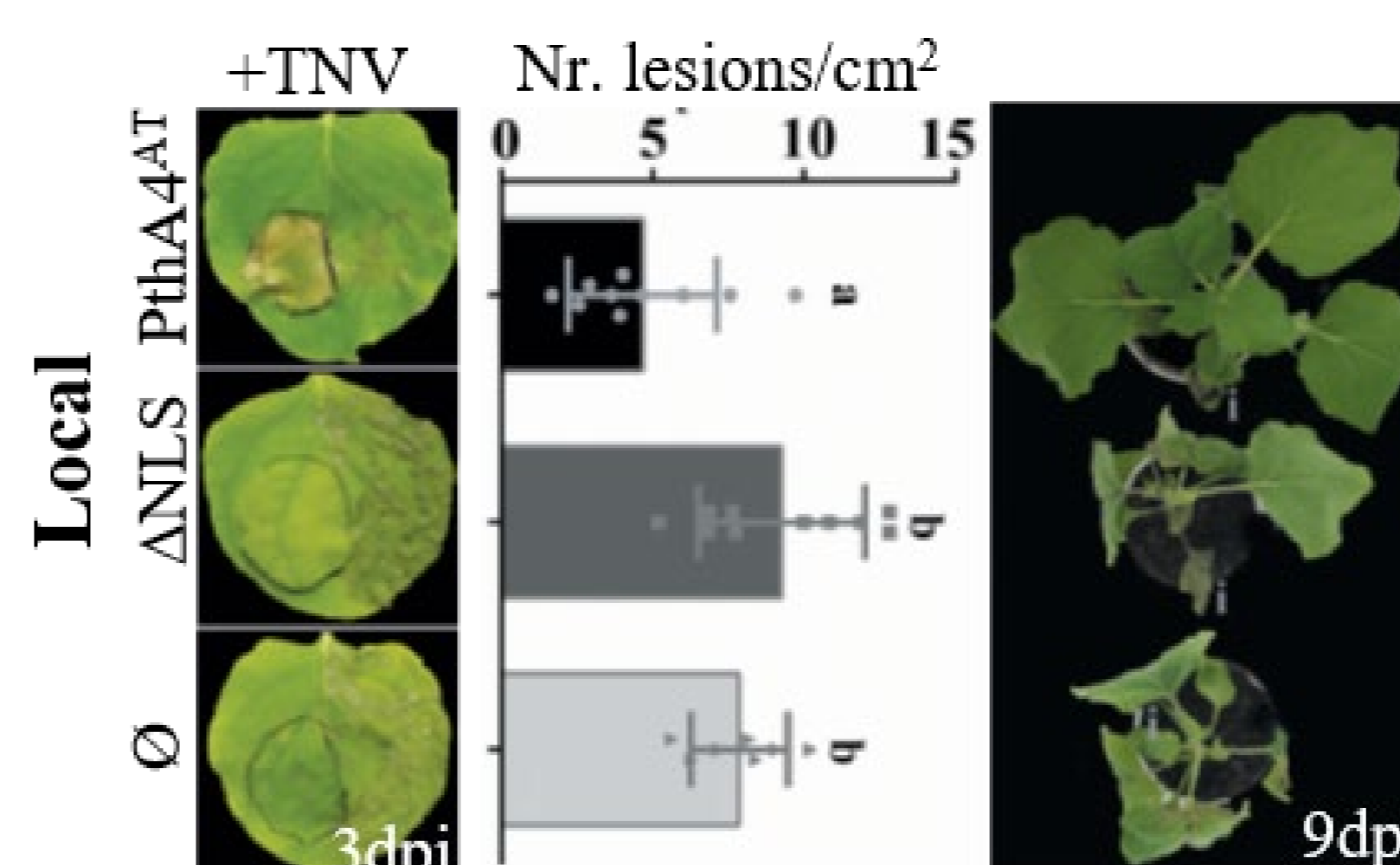
Comparative transcriptome analysis of TALE2 and TALE28-inoculated leaves.

N. benthamiana were agroinfiltrated with TALE2 or TALE28 and evaluated at 36hpi. Differentially-expressed genes and functional analysis show a clear defense response being activated by TALE28

4 pthA4^{AT} expression avoid disease progression of *Xanthomonas campestris* and Tobacco necrosis virus (TNV) in *Nicotiana benthamiana*



Bacterial growth of pthA4^{AT}-expressing *X. campestris* at 3 dpi in *N. benthamiana* leaves.



N. benthamiana leaves agroinfiltrated with pthA4^{AT}, ΔNLSpthA4^{AT} (mutant in the nuclear localization signals) or empty vector (∅) and further inoculated with tobacco necrosis virus (TNV) at 4 d.p.i. Number of lesions is quantified at 3dpi with TNV.