



**HAL**  
open science

# Mécanismes de résistance aux virus dans les plantes transgéniques

Richard Berthomé, Pierre-Yves Techeney, Marc Tepfer

► **To cite this version:**

Richard Berthomé, Pierre-Yves Techeney, Marc Tepfer. Mécanismes de résistance aux virus dans les plantes transgéniques. *Virologie*, 2000, 4 (1), pp.49-60. hal-03741610

**HAL Id: hal-03741610**

**<https://hal.inrae.fr/hal-03741610>**

Submitted on 1 Aug 2022

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - NonCommercial - NoDerivatives | 4.0 International License

[Accueil](#) > [Revue](#)s > [Virologie](#) > **Mécanismes de résistance aux virus dans les plantes transgéniques**

MON PANIER (0)

## Virologie



### Mécanismes de résistance aux virus dans les plantes transgéniques

Volume 4, numéro 1, Janvier - Février 2000

[Imprimer](#)[Ajouter à mes favoris](#)[Citer cet article](#)[Envoyer un lien vers article](#)

Résumé

Texte intégral

**Références**

Illustrations

1. Sanford JC, Johnston SA. The concept of parasite-derived resistance-deriving resistance genes from the parasite's own genome. *J Theor Biol* 1985 ; 113 : 395-405.
2. Powell PA, Nelson RS, De B, *et al.* Delay in disease development in transgenic plants that express the tobacco mosaic virus coat protein gene. *Science* 1986 ; 232 : 738-43.
3. Beachy RN. Mechanisms and applications of pathogen-derived resistance in transgenic plants. *Curr Op Biotech* 1997 ; 8 : 215-20.
4. Tepfer M, Lecoq H, Jacquemond M. Évaluation des risques écologiques potentiels associés à l'utilisation agronomique de plantes exprimant des gènes viraux. *Virologie* 1998 ; 2 : 17-31.
5. Havelda Z, Szittyá G, Burgyan J. Characterization of the molecular mechanism of defective interfering RNA-mediated symptom attenuation in tombusvirus-infected plants. *J Virol* 1998 ; 72 : 6251-6.
6. Roossinck MJ, Sleat D, Palukaitis P. Satellite RNAs of plant viruses : structures and biological effects. *Microbiol Rev* 1992 ; 56 : 265-79.
7. Jacquemond M, Tepfer M. Satellite-RNA-mediated resistance to plant viruses : are the ecological risks well assessed ? In : Khetarpal RK, Kohanezawa H, Hadidi A eds. *Control of plant virus diseases*. St Paul, MN USA : APS Press, 1998 : 94-120.
8. Vaish NK, Kore AR, Eckstein F. Recent developments in the hammerhead ribozyme field. *Nucl Acids Res* 1998 ; 26 : 5237-42.

9. de-Feyter R, Young M, Schroeder K, Dennis ES, Gerlach W. A ribozyme gene and an antisense gene are equally effective in conferring resistance to tobacco mosaic virus on transgenic tobacco. *Mol Gen Genet* 1996 ; 250 : 329-38.
10. Kooter JM, Matzke M A, Meyer P. Listening to the silent genes : transgene silencing, gene regulation and pathogen control. *Trends Plant Sci* 1999 ; 9 : 340-7.
11. Hamilton AJ, Baulcombe DC. A species of small antisense RNA in post-transcriptional gene silencing. *Science* 1999 ; 286 : 950-2.
12. Register JC, Nelson RS. Early events in plants virus infection : relationships with genetically engineered protection and host gene resistance. *Sem Virol* 1992 ; 3 : 441-51.
13. Pang SZ, Slightom JL, Gonsalves D. Different mechanisms protect transgenic tobacco against tomato spotted wilt and impatiens necrotic spot tospoviruses. *Bio/Technology* 1993 ; 11 : 819-24.
14. Tacke E, Salamini F, Rohde W. Genetic engineering of potato for broad-spectrum protection against virus infection. *Nature Biotech* 1996 ; 14 : 1597-601.
15. Ares X, Calamante G, Cabral S, *et al.* Transgenic plants expressing potato virus X ORF2 protein (p24) are resistant to tobacco mosaic virus and Ob tobamoviruses. *J Virol* 1998 ; 72 : 731-8.
16. Wintermantel WM, Banerjee N, Oliver JC, Paolillo DJ, Zaitlin M. Cucumber mosaic virus is restricted from entering minor veins in transgenic tobacco exhibiting replicase-mediated resistance. *Virology* 1997 ; 231 : 248-57.
17. Flor HH. The complementary genetic system in flax and flax rust. *Adv Genet* 1956 ; 8 : 29-54.
18. Staskawicz BJ, Ausubel FM, Baker BJ, Ellis JG, Jones JDG. Molecular genetics of plant disease resistance. *Science* 1995 ; 268 : 661-7.
19. Jones JDG. Plant disease resistance genes : structure, function and evolution. *Curr Op Biotech* 1996 ; 7 : 155-60.
20. Whitman S, Dinesh-Kumar SSP, Choi D, Hehl R, Corr C, Baker B. The product of the tobacco mosaic virus resistance gene *N* : similarity to Toll and the Interleukin-1 receptor. *Cell* 1994 ; 78 : 1101-15.
21. Bendahmane A, Kanyukaa K, Baulcombe D. The *Rx* gene from potato controls separate virus resistance and cell death responses. *Plant Cell* 1999 ; 11 : 781-92.
22. Whitham S, McCormick S, Baker B. The *N* gene of tobacco confers resistance to tobacco mosaic virus in transgenic tomato. *Proc Natl Acad Sci USA* 1996 ; 93 : 8776-81.
23. Dempsey DA, Klessig DF. Signals in plant disease resistance. *Bull Inst Pasteur* 1995 ; 93 : 167-86.
24. Nasuta N, Takana H, Uehara K, Kuwata S, Koiwai A, Noma M. Broad resistance to plant viruses in transgenic plants conferred by antisense inhibition of a host gene essential in S-adenosyl-methionine dependent transmethylation reactions. *Proc Natl Acad Sci USA* 1995 ; 92 : 6117-21.
25. Oldroyd GED, Staskawicz B. Genetically engineered broad-spectrum disease resistance in tomato. *Proc Natl Acad Sci USA* 1998 ; 95 : 10300-5.
26. Girbès T, Ferreras JM, Iglesias R, Citores L, De Torre C, Carbajales ML, *et al.* Recent advances in the uses and applications of ribosome-inactivating proteins from plants. *Cell Mol Biol* 1996 ; 42 : 461-71.
27. Lodge JK, Kaniewski WK, Tumer NE. Broad-spectrum virus resistance in transgenic plants expressing pokeweed antiviral protein. *Proc Natl Acad Sci USA* 1993 ; 90 : 7089-93.
28. Bonness M, Ready MP, Irvin JD, Mabry T. Pokeweed antiviral protein inactivates pokeweed ribosomes : implications for the antiviral mechanism. *Plant J* 1994 ; 5 : 173-83.

29. Lee-Huang S, Huang PL, Huang PL, Bourinbaiar AS, Chen HC, Kung HF. Inhibition of the integrase of human immunodeficiency virus (HIV) type 1 by anti-HIV plant proteins MAP30 et GAP31. *Proc Natl Acad Sci USA* 1995 ; 92 : 8818-22.
30. Tumer NE, Hwang DJ, Bonness M. A C-terminal deletion mutant of pokeweed antiviral protein inhibits viral infection but does not depurinate host ribosomes. *Proc Natl Acad Sci USA* 1997 ; 94 : 3866-71.
31. Whitelam GC, Cockburn W. Antibody expression in transgenic plants. *Trends Plant Sci* 1996 ; 1 : 268-72.
32. Zimmermann S, Schillberg S, Liao YC, Fischer R. Intracellular expression of TMV-specific single-chain Fv fragments leads to improved virus resistance in *Nicotiana tabacum*. *Mol Breeding* 1998 ; 4 : 369-79.
33. Voss A, Niersbach M, Hain R, *et al.* Reduced virus infectivity in *Nicotiana tabacum* secreting a TMV-specific full-size antibody. *Mol Breeding* 1995 ; 1 : 39-50.
34. Sen GC, Ransohoff RM. Interferon-induced antiviral actions and their regulation. *Adv Virus Res* 1993 ; 42 : 57-101.
35. Truve E, Kelve M, Aaspollu A, Kuusksalu A, Seppanen P, Saarma M. Principles and background for the construction of transgenic plants displaying multiple virus resistance. *Arch Virol* 1994 ; 9 : 41-50.
36. Truve E, Aaspollu A, Honkanen J, *et al.* Transgenic potato plants expressing mammalian 2',5'-oligoadenylate synthase are protected from potato virus X infection under field conditions. *Bio/Technology* 1993 ; 11 : 1048-50.
37. Mitra A, Higgins DW, Langerberg WC, Nie H, Sengupta DN, Silverman R. A mammalian 2-5A system functions as an antiviral pathway in transgenic plants. *Proc Natl Acad Sci USA* 1996 ; 93 : 6780-5.
38. Ogawa T, Hori T, Ishida I. Virus-induced cell death in plants expressing the mammalian 2',5'-oligoadenylate system. *Nature Biotech* 1996 ; 14 : 1566-9.
39. Terenzi F, De veer MJ, Ving H, Restifo NP, Williams BRG, Silvermann RH. The antiviral enzymes PKR and RNase L suppress gene expression from viral and non-viral based vectors. *Nucl Acids Res* 1999 ; 27 : 4369-75.
40. Yeung MC, Chang DL, Camantigue RE, Lau AS. Inhibitory role of the host apoptogenic gene *PKR* in the establishment of persistent infection by encephalomyocarditis virus in U937 cells. *Proc Natl Acad Sci USA* 1999 ; 96 : 11860-5.
41. Kaufman RJ. Double-stranded RNA-activated protein kinase mediates virus-induced apoptosis : a new role for an old actor. *Proc Natl Acad Sci USA* 1999 ; 96 : 11693-5.
42. Lino Y, Sugimoto A, Yamamoto M. *Schizosaccharomyces pombe* pac1+, whose overexpression inhibits sexual development, encodes a ribonuclease III-like RNase. *EMBO J* 1991 ; 10 : 221-6.
43. Rotondo G, Huang JY, Frendewey D. Substrate structure requirements of the Pac1 ribonuclease from *Schizosaccharomyces pombe*. *RNA* 1997 ; 3 : 1182-93.
44. Watanabe Y, Ogawa T, Takahashi H, *et al.* Resistance against multiple plant viruses in plants mediated by a double stranded-RNA specific ribonuclease. *FEBS* 1995 ; 372 : 165-8.
45. Sano T, Nagayama A, Ogawa T, Ishida I, Okada Y. Transgenic potato expressing a double-stranded RNA-specific ribonuclease is resistant to potato spindle tuber viroid. *Nature Biotech* 1997 ; 15 : 1290-4.
46. Langenberg WG, Zhang L, Court DL, Giunchedi L, Mitra A. Transgenic tobacco plants expressing the bacterial *rnc* gene resist virus infection. *Mol Breeding* 1997 ; 3 : 391-9.
47. Teycheney PY. Plantes et virus : la guerre sans fin. *Biofutur* 1999 ; 189 : 30-3.

## MON COMPTE

---

Bonjour **Richard Berthomé**

> [Connexion à mon institution](#)

> [Déconnexion](#)

### MON COMPTE



Mes abonnements revues



Mes articles / ma bibliographie



Mes informations personnelles



Mes adresses



Mes commandes / factures



Mes ebooks et chapitres



Mes statistiques de consultation



Mes quiz



Mes newsletters

### MES ABONNEMENTS

ALERTES SOMMAIRE

PETITES ANNONCES



---

### ESPACE PARTENAIRES

[Publicité](#) • [Partenaires](#) • [Auteurs revues](#) • [Auteurs livres](#)

---

### SERVICES

[Abonnez-vous](#) • [Conditions générales de vente](#) • [Achetez un numéro](#) • [Article à la carte](#) • [Congrès](#) • [Petites annonces](#)



