

# nature REVIEWS

november 2013 volume 11 no. 11  
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Plant–microbe interactions

## MICROBIOLOGY



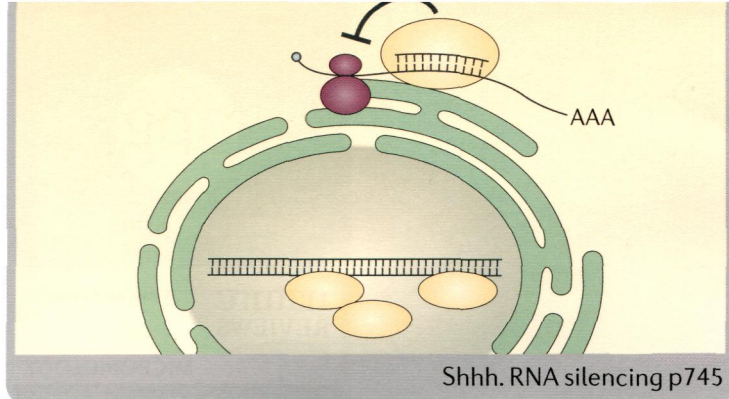
### ZIG-ZAG-ZIG

Defence, counter-defence and  
counter-counter-defence

### Structural and *in planta* analyses

Effectors in action





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## REVIEWS

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FEATURED  
ARTICLE

### RNA silencing suppression by plant pathogens: defence, counter-defence and counter-counter-defence

*Nathan Pumplin and Olivier Voinnet*

In plants, RNA silencing targets viral RNA for degradation, and viruses have evolved mechanisms to avoid silencing, most notably by expressing silencing suppressors. The recent identification of silencing suppressors in plant pathogenic bacteria and oomycetes suggests that RNA silencing functions in plant defence against a broad range of pathogens, not just viruses. There is also increasing evidence that plants have evolved counter-counter-defence responses to pathogen-mediated RNA silencing suppression.

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### On the front line: structural insights into plant–pathogen interactions

*Lennart Wirthmueller, Abbas Maqbool and Mark J. Banfield*

Structural biology studies of proteins involved in plant pathogen–host interactions are crucial to understanding the molecular mechanisms of both pathogen virulence and host defence. Banfield and colleagues review the current developments in the structural biology of plant–pathogen interactions, highlighting examples in which structural studies have had the biggest effect on our understanding of molecular function.

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### Geminiviruses: masters at redirecting and reprogramming plant processes

*Linda Hanley-Bowdoin, Eduardo R. Bejarano, Dominique Robertson and Shahid Mansoor*

Geminiviruses are important plant pathogens that cause devastating crop losses worldwide. Here, Hanley-Bowdoin and colleagues review how viral proteins interact with cellular machineries and reprogramme cellular control pathways in their plant host to support viral DNA replication, gene expression and trafficking, and to interfere with host defences.

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### Going back to the roots: the microbial ecology of the rhizosphere

*Laurent Philippot, Jos M. Raaijmakers, Philippe Lemanceau and Wim H. van der Putten*

The rhizosphere – the interface between plant roots and soil – is an intriguingly complex and dynamic niche. Laurent Philippot and colleagues review recent progress in rhizosphere research and suggest that going back to the roots could be crucial to further improve the sustainability of crop production.

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### Filamentous plant pathogen effectors in action

*Martha C. Giraldo and Barbara Valent*

Giraldo and Valent review the latest research into the molecular and cellular biology of the effectors that are secreted during biotrophic invasion of plant cells by eukaryotic filamentous pathogens, with an emphasis on results obtained by live-cell imaging of effector dynamics during natural plant invasions.

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*Rachel L. Graham, Eric F. Donaldson and Ralph S. Baric*

Antimalarial drug discovery: approaches and progress towards new medicines

*Erika L. Flannery, Arnab K. Chatterjee and Elizabeth A. Winzeler*

Keeping it quiet: chromatin control of  $\gamma$ -herpesvirus latency

*Paul M. Lieberman*

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## FOCUS ON PLANT–MICROBE INTERACTIONS

This issue features a focus on plant–microbe interactions — see the articles marked with the above logo. These articles can also be found online at: <http://www.nature.com/nrmicro/focus/plant-microbe-interactions>

### Links to further information

The full text of articles includes author biographies, links to glossary terms and links to websites and databases with relevant information.

**Key points** provides a bullet-pointed summary of the main topics covered in each article.

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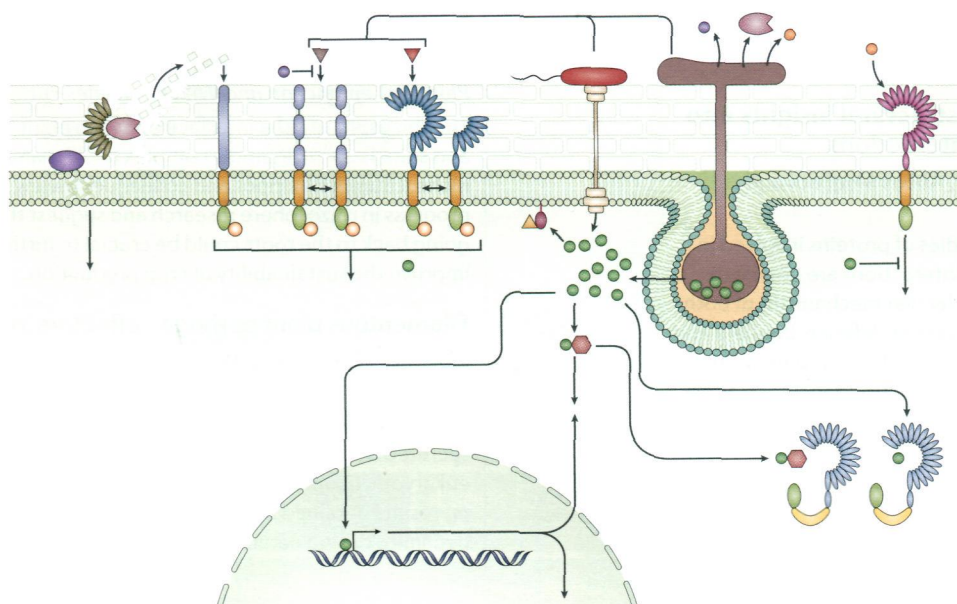
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