

# nature

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# REVIEWS

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## MICROBIOLOGY



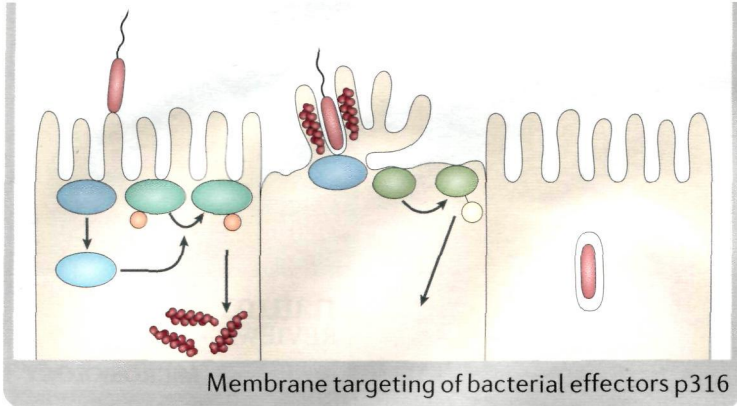
### IT'S A SMALL WORLD

Making and measuring microbial microenvironments

### Subcellular targeting of secreted bacterial effectors

Hitting the spot





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## REVIEWS

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FEATURED  
ARTICLE

### Bacterial replication, transcription and translation: novel mechanistic insights from single-molecule biochemical studies

Andrew Robinson and Antoine M. van Oijen

*In vitro* single-molecule technologies have emerged as powerful tools for the study of complex biological phenomena. Here, Robinson and van Oijen summarize the latest insights that fluorescence-based single-molecule studies have provided for DNA replication, transcription and translation in bacterial cells.

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### Exploitation of eukaryotic subcellular targeting mechanisms by bacterial effectors

Stuart W. Hicks and Jorge E. Galán

Many bacterial species have evolved specialized secretion systems that deliver effector proteins into host cells in order to promote bacterial survival and replication. To exert their functions in a spatially coordinated manner, effector proteins must be accurately targeted to specific subcellular compartments. Here, Hicks and Galán review how bacterial effectors exploit the host cell machinery involved in processes such as lipidation and ubiquitylation to accurately target the biochemical activities of these effectors within the host cell.

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### The role of mutational robustness in RNA virus evolution

Adam S. Lauring, Judith Frydman and Raul Andino

RNA viruses have extremely high mutation rates, which are crucial for the ability of these viruses to adapt but can also lead to population extinction. Here, Andino and colleagues describe the mechanisms that RNA viruses use to cope with the high mutational load and discuss the impact of mutational robustness on population dynamics, pathogenicity and antiviral therapies.

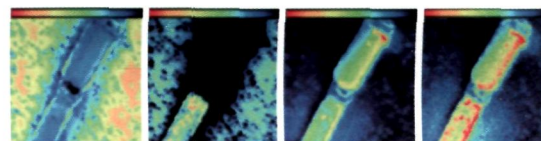
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### Going local: technologies for exploring bacterial microenvironments

Aimee K. Wessel, Laura Hmelo, Matthew R. Parsek and Marvin Whiteley

Microorganisms can form complex, spatially organized communities that are coordinated by both physical and chemical intercellular interactions, as well as by other molecules present in the surrounding environment. Here, Whiteley and colleagues describe a number of microscale techniques for reproducing small bacterial communities in the laboratory. They also discuss the analytical tools available to monitor the impact of spatial organization on both bacterial behaviour and the generation of phenotypic heterogeneity.



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Joseph A. Lemire, Joe J. Harrison and Raymond J. Turner

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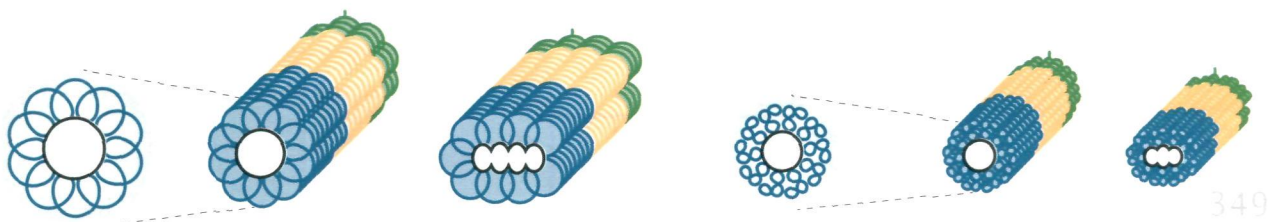
349 **Genome architecture and global gene regulation in bacteria: making progress towards a unified model?**

*Charles J. Dorman*

The bacterial nucleoid was first described more than 50 years ago, but the recent application of new imaging technologies and physical analytical methods has brought fresh insights to the structure of the DNA within the nucleoid. Here, Charles Dorman discusses these insights and argues that, in addition to DNA topology and nucleoid-associated proteins, gene regulation is an important organizing principle of nucleoid architecture.

301 **Ready, aim, fire! (erratum)**

*Lucie Wootton*



### EDITORIAL OFFICE

**LONDON:** NatureReviews@nature.com  
The Macmillan Building, 4 Crinan Street,  
London N1 9XW, UK  
Tel: +44 (0)20 7843 3620;  
Fax: +44 (0)20 7843 3629

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### EDITORS



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CHRISTINA TOBIN KÄHRSTRÖM



RACHEL DAVID



URSULA HOFER