

# nature

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# REVIEWS

march 2014 volume 12 no. 3  
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## MICROBIOLOGY

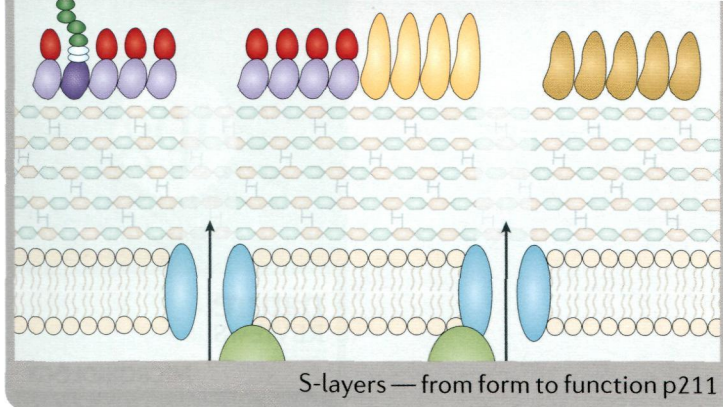
### PK-PD AND TB

From blood to lesions to  
mycobacterial cells

### Bacterial paracrystalline S-layers

Form and function





# CONTENTS

March 2014  
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## REVIEWS

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FEATURED  
ARTICLE

### Symbiotic digestion of lignocellulose in termite guts

Andreas Brune

Termites depend on an intricate symbiosis with flagellated protists, archaea and bacteria in their guts for the digestion of lignocellulose. Here, Andreas Brune gives an overview of the diversity of the termite microbiota and highlights important microbial processes in the gut microecosystem and their implications for host nutrition.

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### Bacterial transformation: distribution, shared mechanisms and divergent control

Calum Johnston, Bernard Martin, Gwennaele Fichant, Patrice Polard and Jean-Pierre Claverys

In this Review, Claverys and colleagues describe the divergent and common principles that govern the transformation process in phylogenetically distinct bacteria and discuss the potential role of imported DNA in generating genetic diversity. They also discuss how this information can be used for the prediction of new transformable species.

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### Molecular mechanisms of varicella zoster virus pathogenesis

Leigh Zerboni, Nandini Sen, Stefan L. Oliver and Ann M. Arvin

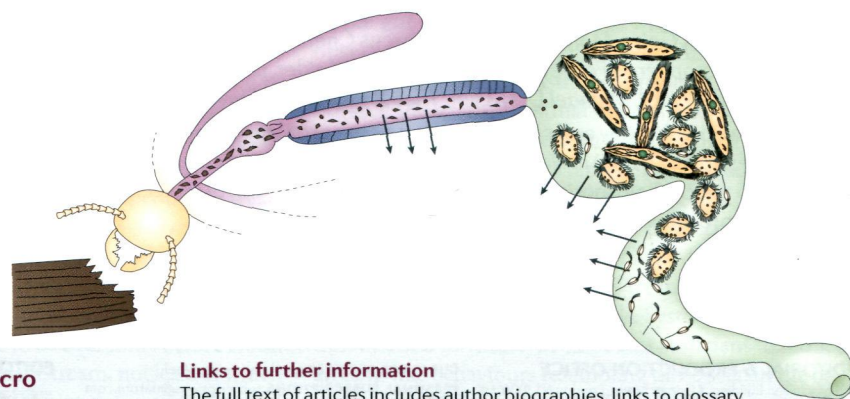
Varicella zoster virus is so well adapted to its human host that studying its pathogenesis heavily relies on human tissue transplants in immunodeficient mice. Here, Arvin and colleagues describe insights from these models that show how this viral pathogen orchestrates host cell and tissue functions to its own advantage.

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### Biogenesis and functions of bacterial S-layers

Robert P. Fagan and Neil F. Fairweather

Paracrystalline arrays of proteins decorate the surface of many bacteria. In this Review, Fagan and Fairweather discuss recent insights into the structural and functional properties of these surface layers, which are beginning to reveal their importance for the growth and survival of many species.



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Otto X. Cordero and Martin F. Polz

The co-pathogenesis of influenza viruses with bacteria in the lung  
Jonathan A. McCullers

Targeting virulence: can we make evolution-proof drugs?

Richard C. Allen, Roman Popat, Stephen P. Diggle and Sam P. Brown

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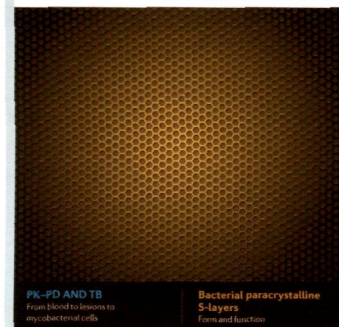
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PK- $\beta$ D AND TB  
From blood to lesions to  
mycobacterial cells

Bacterial paracrystalline  
5-layers  
Form and function

► COVER: 'Crystalline layers' by Philip Patenall, inspired by the Review on p211.

## EDITORIAL

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## PROGRESS

159 The path of anti-tuberculosis drugs: from blood to lesions to mycobacterial cells

Véronique Dartois

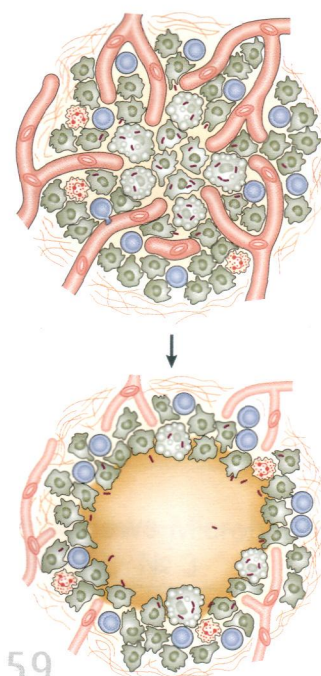
Understanding the pharmacokinetic and pharmacodynamic properties of anti-tuberculosis drugs is crucial for designing more effective dosing regimens. In this Progress article, Véronique Dartois describes the methods that are available to monitor the distribution of drugs as they travel from the blood compartment to granulomatous lesions and penetrate infected immune cells to finally reach their intended targets inside mycobacterial cells.

## PERSPECTIVE

OPINION

223 Molecular approaches to enhance surveillance of gonococcal antimicrobial resistance

Namraj Goire, Monica M. Lahra, Marcus Chen, Basil Donovan, Christopher K. Fairley, Rebecca Guy, John Kaldor, David Regan, James Ward, Michael D. Nissen, Theo P. Sloots and David M. Whitley  
David M. Whitley and colleagues discuss the problem of antimicrobial resistance (AMR) in *Neisseria gonorrhoeae*, particularly emerging resistance to the cephalosporin ceftriaxone, and propose the use of molecular approaches to enhance gonococcal AMR surveillance.



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