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REVIEWS

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MICROBIOLOGY

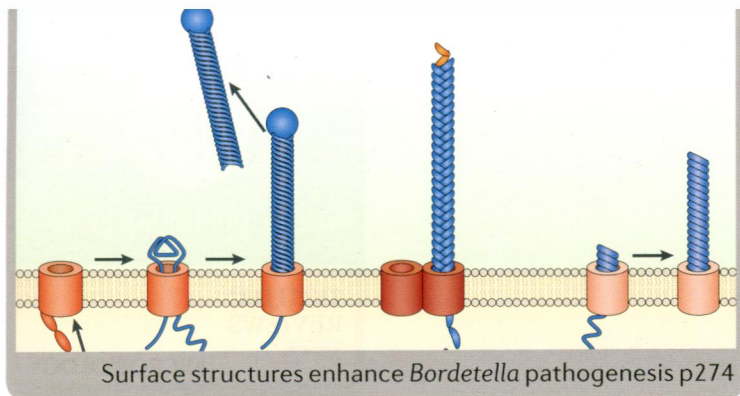


GENE FLOW

Ecological and evolutionary dynamics

A re-emerging problem

Understanding *Bordetella pertussis* pathogenesis



CONTENTS

April 2014
volume 12 no. 4

REVIEWS

239

FEATURED
ARTICLE

The cryptic sexual strategies of human fungal pathogens

Iuliana V. Ene and Richard J. Bennett

Although once thought to be clonal, and thus undergo asexual reproduction, accumulating evidence now suggests that many human fungal pathogens retain sexual reproductive machinery and undergo sexual or parasexual reproduction. Iuliana V. Ene and Richard J. Bennett discuss the sexual cycles of three of the most prominent human pathogens — *Candida albicans*, *Cryptococcus neoformans* and *Aspergillus fumigatus*.

252

The co-pathogenesis of influenza viruses with bacteria in the lung

Jonathan A. McCullers

Mortality from influenza viruses is strongly linked to secondary bacterial invaders. Here, Jonathan A. McCullers reviews viral and bacterial virulence factors that contribute to the pathogenesis of co-infections by disrupting physical barriers, dysregulating immune responses and delaying a return to homeostasis.

263

Explaining microbial genomic diversity in light of evolutionary ecology

Otto X. Cordero and Martin F. Polz

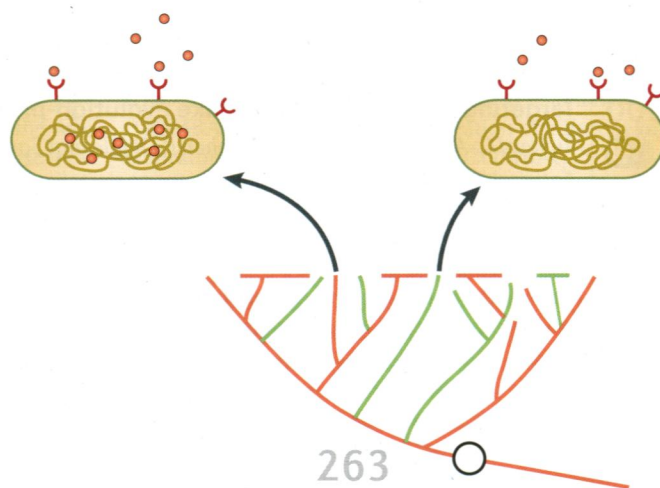
Wild populations of bacteria and archaea show high levels of genotypic diversity. In this Review, Cordero and Polz discuss recent studies that show that this diversity arises owing to social and ecological interactions, which have important consequences for microbial ecology and population dynamics.

274

Bordetella pertussis pathogenesis: current and future challenges

Jeffrey A. Melvin, Erich V. Scheller, Jeff F. Miller and Peggy A. Cotter

The causative agent of whooping cough, *Bordetella pertussis*, has recently re-emerged as a serious public health concern. Here, Cotter, Miller and colleagues discuss the pathogenesis of pertussis, the shortcomings of current vaccines and the future challenges that need to be addressed for the development of more effective therapeutic strategies.



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Lei S. Qi and Adam P. Arkin

Semi-synthetic artemisinin: a model for the use of synthetic biology in pharmaceutical development
Chris J. Paddon and Jay D. Keasling

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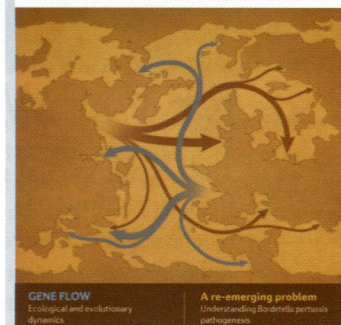
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E-alert table of contents

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► **COVER:** 'Gene flow' by Vicky Summersby and Philip Patenall, inspired by the Review on p263.

COMMENT

231 **ND4BB:** addressing the antimicrobial resistance crisis

RESEARCH HIGHLIGHTS

233 Selections from the recent scientific literature

NEWS & ANALYSIS

238 **Genome watch** Found in translation

PERSPECTIVES

OPINION

289 **In search of a new paradigm for protective immunity to TB**

Cláudio Nunes-Alves, Matthew G. Booty, Stephen M. Carpenter, Pushpa Jayaraman, Alissa C. Rothchild and Samuel M. Behar

Protective immunity against tuberculosis is multifactorial, and correlates of protection — either during natural infection or after vaccination — are lacking. Here, Behar and colleagues discuss why it is time to look beyond interferon- γ for protective mechanisms against *Mycobacterium tuberculosis*.

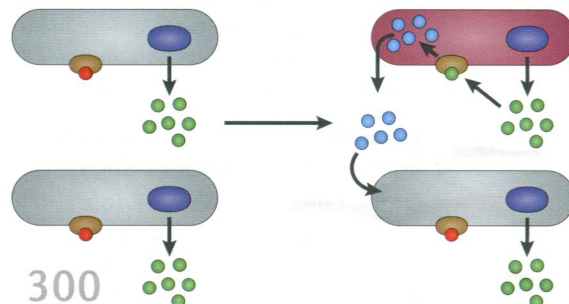
OPINION

300 **Targeting virulence: can we make evolution-proof drugs?**



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

Antivirulence drugs are a promising avenue to revitalize the antimicrobial drug-development pipeline, and it has been claimed that such compounds will generate much weaker selection for resistance than traditional antibiotics. Sam P. Brown and colleagues examine this claim and argue that, although resistance to antivirulence drugs may emerge, the crucial factor is whether or not this resistance will spread.



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