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IN BRIEF

BACTERIAL PATHOGENESIS

Chlamydia keeps cells alive

During intracellular replication, the bacterial pathogen *Chlamydia trachomatis* modulates stress-related signalling pathways to maintain host cell viability and thereby ensures completion of its life cycle. González *et al.* show that *C. trachomatis* induces the degradation of p53, a key host factor involved in apoptosis, to prevent host cell death. p53 degradation was mediated by MDM2, a ubiquitin ligase that ubiquitylates p53 and targets it for proteasomal degradation. Furthermore, inhibition of the p53–MDM2 interaction prevented p53 degradation in infected cells and led to a decrease in infectious progeny, which suggests that the pathogen was unable to complete its normal developmental cycle. Finally, blocking MDM2-induced p53 degradation re-sensitized infected host cells to apoptotic stimuli. In sum, this study reveals a mechanism whereby *C. trachomatis* interferes with the stress response of the host to ensure its own survival.

ORIGINAL RESEARCH PAPER González, E. *et al. Chlamydia* infection depends on a functional MDM2–p53 axis. *Nature Commun.* **5**, 5201 (2014)

ANTIMICROBIALS

Targeting virulence

With resistance to antibiotics on the rise, alternative therapeutic strategies to treat infectious diseases, such as anti virulence approaches, are urgently needed. Curtis *et al.* developed a broad-spectrum inhibitor (LED209) of the membrane-bound histidine kinase QseC, which is conserved in several Gram-negative pathogens and promotes the expression of key virulence genes. The authors showed that LED209 is highly selective and reduces the virulence of several multidrug-resistant pathogens *in vitro* and in infected mice. The compound has a unique mode of action by acting as a prodrug scaffold to deliver a 'warhead' that allosterically inhibits QseC signalling to decrease virulence gene expression. The authors also found that pre-treatment of mice with LED209 conferred low-level protection against bacterial infection.

ORIGINAL RESEARCH PAPER Curtis, M. M. *et al.* QseC inhibitors as an antivirulence approach for Gram-negative pathogens. *mBio* **5**, e02165-14 (2014)

CELLULAR MICROBIOLOGY

Linking MreB to the membrane

The bacterial actin homologue MreB forms membrane-associated filaments and is integral for determining rod cell shape, which is suggested to be due to its role in assembling the enzymes involved in cell wall synthesis. However, the factors that determine MreB membrane localization and its interactions with the cell wall synthesis enzymes are poorly understood. Schirner *et al.* used a combination of small-molecule inhibitors and gene deletions to show that MreB membrane localization depends on the presence of the peptidoglycan precursor lipid II in *Bacillus subtilis*. Treatment of *B. subtilis* with cell wall synthesis inhibitors resulted in the disassembly of MreB filaments and the distribution of MreB throughout the cell. The authors propose that MreB binds to intracellular lipid II, which enables filament formation and the assembly of the cell wall synthesis machinery. Thus, these findings suggest a mechanistic link between the metabolic state of the cell (that is, the availability of peptidoglycan precursors) and cell growth.

ORIGINAL RESEARCH PAPER Schirner, K. *et al.* Lipid-linked cell wall precursors regulate membrane association of bacterial actin MreB. *Nature Chem. Biol.* http://dx.doi.org/10.1038/nchembio.1689 (2014)