Nature Reviews Microbiology | Published online 3 Oct 2017; doi:10.1038/nrmicro.2017.124

BACTERIAL PATHOGENESIS

It takes two to tango

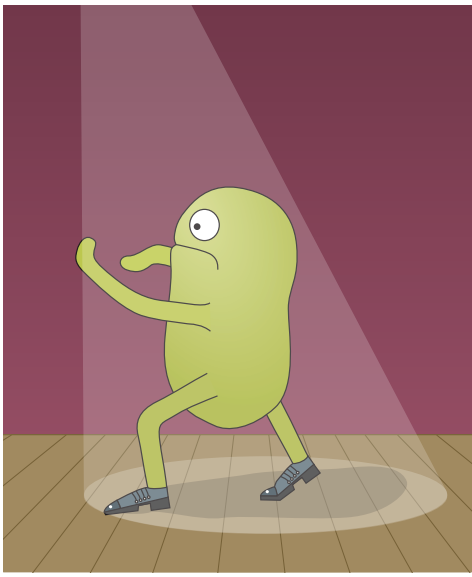
> “the findings link the host environment to pathogen virulence”

The bacterial species *Bacteroides fragilis* includes commensal strains and strains that are opportunistic human pathogens; enterotoxigenic *B. fragilis* (ETBF) strains express the colitis-inducing *B. fragilis* toxin (BFT). However, humans are also asymptomatically colonized by ETBF, which suggests that both microbial virulence factors and host susceptibility factors influence disease pathogenesis. In a recent study, Hecht *et al.* developed a mouse model of homeostatic ETBF colonization to investigate factors that contribute to disease susceptibility.

Colonic mucus maintains intestinal homeostasis by protecting the epithelium from enteric microorganisms and by providing a carbon source to promote the growth of commensals in this niche. Investigating the role of the secreted intestinal glycoprotein mucin 2 (MUC2) in ETBF pathogenesis, the authors showed that colonization of MUC2-deficient mice with ETBF was lethal. However, animals with intact colonic mucus that were colonized by ETBF, and MUC2-deficient mice that were colonized with ETBF strains that lack BFT, were unaffected.

Next, the authors showed that a two-component response regulator system, comprising RprY and RprX, regulates the expression of *bft*. They detected decreased *bft* transcript levels when mice were inoculated with an ETBF strain that overexpressed RprX, whereas *bft* transcript levels were increased when the authors used a mutant bacterial strain that lacked RprX. Finally, colonization of MUC2-deficient mice with bacteria that overexpressed RprY or RprX prevented lethal disease.

In summary, this study reveals a two-component response regulator system that regulates the expression of BFT, and the findings link the host environment to pathogen virulence.



Nicola Hawes/Macmillan Publishers Limited

Andrea Du Toit

ORIGINAL ARTICLE Hecht, A. L. *et al.* A two-component system regulates *Bacteroides fragilis* toxin to maintain intestinal homeostasis and prevent lethal disease. *Cell Host Microbe* http://dx.doi.org/10.1016/j.chom.2017.08.007 (2017)