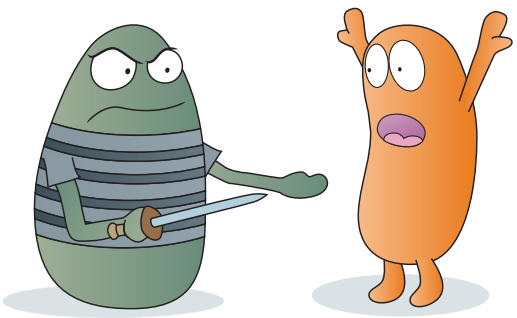
Nature Reviews Microbiology | Published online 20 Nov 2017; doi:10.1038/nrmicro.2017.147

ANTIMICROBIALS

Daylight robbery by *Acinetobacter*

> contact-dependent neighbour killing may be a widespread contributor to cross-species HGT

Horizontal gene transfer (HGT) has a major role in the spread of antibiotic resistance. *Acinetobacter baumannii* emerged as a public health threat owing to its ability to rapidly acquire drug resistance genes from other human pathogens through HGT, but it is not well understood how *A. baumannii* acquires foreign genes at such high rates at the population level. Previous studies reported that bacterial predation enhances HGT; for example, *Streptococcus* spp. coordinate bacteriocin production and competence induction, and *Vibrio cholerae* uses its type VI secretion system (T6SS) to release DNA from lysed prey cells.



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Here, Cooper *et al.* used microfluidic traps to show in real time that bacterial predation by *Acinetobacter baylyi* (which is closely related to *A. baumannii*) increases the rate of HGT from *Escherichia coli*. Their results support a model whereby the T6SS of *A. baylyi* promotes HGT by killing neighbouring *E. coli* cells, which then release their DNA for subsequent uptake by *A. baylyi*. Importantly, predatory *A. baylyi* cells acquired antibiotic resistance genes from *E. coli* prey cells. Newly kanamycin-resistant *A. baylyi* outcompeted both *E. coli* and the sensitive parent strain in the presence of the antibiotic, which indicates functional and adaptive HGT from prey to predator. Moreover, co-culture of *E.coli* with wild-type *A. baylyi* and a mutant *A. baylyi* that lacked a functional T6SS (non-killing cells) increased HGT from *E. coli* to non-killing *A. baylyi*. These results highlight the importance of polymicrobial population dynamics in HGT and in the emergence of multidrug resistance.

Finally, the authors developed a mathematical population dynamics model, which revealed that killing is most important for HGT when the prey is at low density, the predator is at high density and the interaction time is short. The authors conclude that contact-dependent neighbour killing may be a widespread contributor to cross-species HGT among Gram-negative bacteria.

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ORIGINAL ARTICLE Cooper, R. M., Tsimring, L. & Hasty, J. Inter-species population dynamics enhance microbial horizontal gene transfer and spread of antibiotic resistance. *eLife* http://dx.doi.org/10.7554/eLife.25950 (2017)