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IN BRIEF

ENVIRONMENTAL MICROBIOLOGY

Attracting bacteria in the soil

Plants release various secondary metabolites through their roots, including volatile organic compounds (VOCs), which have been implicated as antimicrobials or as chemoattractants. Here, the authors developed a glass olfactometer system in which bacteria that were inoculated at one end in a soil-containing glass tube could migrate towards VOCs that were produced by *Carex arenaria* in a central vessel. They monitored the migration of cells from a bacterial community that was isolated from the rhizosphere of *C. arenaria* and found that distant soil bacteria were attracted by plant root VOCs. Moreover, the VOC profile that was released from healthy plants differed from that of plants infected with the fungal pathogen *Fusarium culmorum*, and specific bacterial species were attracted more to the VOCs from infected plants, including species that inhibit fungal growth. The findings of this study highlight the role of VOCs in long-range plant–microorganism interactions in the soil.

ORIGINAL ARTICLE Schulz-Bohm, K. *et al.* Calling from distance: attraction of soil bacteria by plant root volatiles. *ISME J.* https://doi.org/10.1038/s41396-017-0035-3 (2018)

ANTIMICROBIALS

Bacterial enzymes 'straighten out' antibiotics

Bacteria use diverse mechanisms to overcome antibiotics, including their destruction or chemical modification. Rifamycins, which are semi-synthetic antibiotics, adopt a characteristic basket-like structure that is essential for binding to the RNA exit tunnel of the target β-subunit of bacterial RNA polymerase to inhibit RNA synthesis. In this study, Wright and colleagues report the structure and function of a rifamycin monooxygenase (Rox) from *Streptomyces venezuelae* that inactivates a broad range of rifamycins. They determined the crystal structure of the Rox and identified a new molecular mechanism of resistance: monooxygenation of the C2 naphthyl ring, which results in ring opening and subsequent linearization of the antibiotic. The altered conformation prevents the antibiotic from binding to its target.

ORIGINAL ARTICLE Koteva, K., Cox, G., Kelso, J. K. *et al.* Rox, a rifamycin resistance enzyme with an unprecedented mechanism of action. *Cell Chem. Biol.* https://doi.org/10.1016/j.chembiol.2018.01.009 (2018)

BACTERIAL PHYSIOLOGY

Spacers go off-site

During the CRISPR–Cas adaptation process, the Cas1–Cas2 complex inserts new spacers between the leader sequence and the first repeat of the CRISPR array. Now, Nivala *et al.* report that non-canonical off-target integrations can occur *in vivo* at CRISPR repeat-like sequences within the genome of *Escherichia coli*. Most of the off-target spacer integrations occured downstream of endogenous promoters within protein-coding regions of non-essential genes and off-target integration products were shown to be expressed. The authors propose that, although probably mostly deleterious, off-target integration could potentially lead to the expression of functional CRISPR RNAs and increase spacer diversity. They also uncovered putative off-target spacer integration events in previously sequenced genomes of *Yersinia pestis* and *Sulfolobus islandicus*, and termed the phenomenon of non-canonical spacer integration 'neo-CRISPR genesis'.

ORIGINAL ARTICLE Nivala, J., Shipman, S. L. & Church, G. M. Spontaneous CRISPR loci generation *in vivo* by non-canonical spacer integration. *Nat. Microbiol.* http://dx.doi.org/10.1038/s41564-017-0097-z (2018)