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IN BRIEF

ENVIRONMENTAL MICROBIOLOGY

Zero-valent sulphur and marine methane oxidation

In marine sediments, anaerobic oxidation of methane (AOM) coupled to sulphate reduction was thought to be carried out by a consortium of methanotrophic archaea (ANME) and co-occurring sulphate-reducing deltaproteobacteria, but the mechanistic details of this partnership had not been resolved. Now, Milucka *et al.* show that ANME carry out AOM as well as dissimilatory sulphate reduction to form disulphide and other zero-valent sulphur compounds. Instead of carrying out the coupled sulphate reduction processes, as previously expected, the deltaproteobacteria in the culture took up the disulphide produced by ANME, and this disulphide was then disproportionated to sulphide and sulphate, the latter of which could feed back to ANME for further rounds of AOM. These studies provide the first evidence for the direct formation of zero-valent sulphur compounds during sulphate reduction and reveal that AOM is not necessarily an obligate syntrophic process between ANME and deltaproteobacteria. The precise details of the enzymatic pathways involved in dissimilatory sulphate reduction by ANME remain to be determined.

ORIGINAL RESEARCH PAPER Milucka, J. *et al.* Zero-valent sulphur is a key intermediate in marine methane oxidation. *Nature* **491**, 541–546 (2012)

BACTERIAL PHYSIOLOGY

Dual-action riboswitch

Riboswitches are highly structured regulatory domains found in the UTRs of numerous mRNAs. They directly sense the levels of cellular metabolites using an aptamer domain and then modulate transcription termination, translation or splicing through their expression platform domain. Caron *et al.* now show that the *Escherichia coli* lysine-sensing *lysC* riboswitch is a dual-acting riboswitch that regulates gene expression at the level of translation and also controls mRNA decay. Binding of lysine to *lysC* led to the riboswitch adopting an OFF state that prevented translation initiation and also exposed an RNAse E cleavage site in the riboswitch expression platform domain, resulting in mRNA decay. Importantly, both regulatory activities could be inhibited separately, indicating that the two activities can function independently of each other.

ORIGINAL RESEARCH PAPER Caron, M. P. *et al.* Dual-acting riboswitch control of translation initiation and mRNA decay. *Proc. Natl Acad. Sci. USA* 19 Nov 2012 (doi:10.1073/pnas.1214024109)

FUNGAL PATHOGENESIS

Fungal fist in a velvet glove

The soil-borne ascomycete *Fusarium oxysporum* causes vascular wilt in more than 100 different crop species and can also infect immunocompromised mammals. *F. oxysporum* with a mutation in *VelB*, which encodes a component of the velvet complex, had been shown to exhibit attenuated virulence in mice, leading López-Berges *et al.* to characterize the role of the velvet complex more thoroughly. The velvet complex coordinates fungal development and secondary metabolite biosynthesis by modifying chromatin accessibility and gene expression. Accordingly, the authors found that the velvet complex components VeA, VelB and VelC have roles in *F. oxysporum* conidiation and that the VeA and LaeA components are required for virulence in tomato plants and immunocompromised mice because these proteins control the biosynthesis of beauvericin, a mycotoxin.

ORIGINAL RESEARCH PAPER López-Berges, M. S. *et al.* The velvet complex governs mycotoxin production and virulence of *Fusarium oxysporum* on plant and mammalian hosts. *Mol. Microbiol.* 19 Nov 2012 (doi:10.1111/mmi.12082)