

## IN BRIEF

**BACTERIAL PHYSIOLOGY****Touching base on bacterial surface sensing**

Bacteria must have means to sense when they come into close enough contact with a surface to initiate attachment. Hug *et al.* now show that the flagellar motor functions as a mechanosensor. *Caulobacter crescentus* cells that lacked intracellular motor components were no longer able to initiate attachment through a signalling cascade involving cyclic diguanylate. Interestingly, mechanosensing was independent of components of the extracellular flagellum. By contrast, Ellison *et al.* show that *C. crescentus* initiates attachment when pilus retraction is impeded following surface contact. Hug *et al.* also identified a role for pili in bringing the cell pole close enough to the surface for flagellar mechanosensing under certain conditions. The importance of different mechanosensing mechanisms probably depends on experimental variables and readouts and, more generally, on environmental conditions such as fluid flow.

**ORIGINAL ARTICLES** Hug, I. *et al.* Second messenger-mediated tactile response by a bacterial rotary motor. *Science* **358**, 531–534 (2017) | Ellison, C. K. *et al.* Obstruction of pilus retraction stimulates bacterial surface sensing. *Science* **358**, 535–538 (2017)

**PARASITE DEVELOPMENT****The missing link to *Plasmodium* gametocytogenesis**

Only gametocytes, the sexual forms of *Plasmodium* spp. parasites, can be transmitted to mosquitoes. The factors that control sexual development are incompletely understood. Marti and colleagues now identify lysophosphatidylcholine as a component in human serum that inhibits sexual development of *Plasmodium falciparum*. The parasite used this phospholipid for its choline and fatty acid metabolism, and its depletion increased the level of gametocytogenesis and induced a transcriptional response in metabolic, cell cycle and differentiation pathways. It has been previously shown that patients with malaria have low lysophosphatidylcholine levels. The authors conclude that parasite phospholipid consumption and inflammatory host responses decrease lysophosphatidylcholine levels both systemically and in certain tissues, which acts as a signal that induces sexual development, for example, at sites of vascular sequestration.

**ORIGINAL ARTICLE** Brancucci, N. M., Gerdt, J. P. *et al.* Lysophosphatidylcholine regulates sexual stage differentiation in the human malaria parasite *Plasmodium falciparum*. *Cell* <http://dx.doi.org/10.1016/j.cell.2017.10.020> (2017)

**ENVIRONMENTAL MICROBIOLOGY****Around the globe in 2.2 billion sequences**

The Earth Microbiome Project has published its first comprehensive overview of global microbial diversity. The project received 27,751 samples, which originated from 43 countries and covered diverse environments ranging from ocean sediments to plant pollen. Thompson *et al.* isolated, amplified and sequenced 16S rRNA genes in a highly standardized way. To analyse bacterial and archaeal diversity, they used a reference-free approach that did not group sequences according to their similarity to operational taxonomic units. This has the advantage that the results are unbiased by the coverage of existing reference databases. Indeed, only ~10% of their sequences matched existing 16S rRNA databases, and the remaining sequences represent novel microbial diversity. Both the protocols and the data are a tremendous resource for future research.

**ORIGINAL ARTICLE** Thompson, L. R. *et al.* A communal catalogue reveals Earth's multiscale microbial diversity. *Nature* <http://dx.doi.org/10.1038/nature24621> (2017)