

Bioluminescent bacteria in the Hawaiian bobtail squid, *Euprymna scolopes*, use a small molecule to coordinate light production and symbiosis.



MICROBIAL SIGNALING

Light conversation

In dedicated symbioses, a host organism can communicate with and provide a favorable environment for a single microbial species or even a single strain. The Hawaiian bobtail squid, *Euprymna scolopes*, has such a relationship with the bioluminescent bacterium *Vibrio fischeri*, which colonizes the squid's light organs. Zink *et al.* used imaging mass spectrometry to identify the cyclic dipeptide cyclo(D-histidyl-L-proline) as a contributor to biofilm formation, which is important for successful colonization. This molecule, which is likely produced by the bacteria in response to signals from the squid, was present in the colonized squid light organ and stimulated luminescence by the bacteria *in vitro*. —MAF *mBio* 12, e03636-20 (2021).

indicating that the monkeys reacted differently when they were consciously aware that they had seen a stimulus compared with when they were not. —SNV

Proc. Natl. Acad. Sci. U. S. A. 118, e2017543118 (2021).

GEOLOGY

Clay-driven compaction

Active gas reservoirs often subside during fossil fuel production. The mode of deformation, elastic or inelastic, is critical for assessing the production impact and hazard associated with extraction. Verberne *et al.* compared two drill cores from before and 50 years after gas production began in the Groningen field in the Netherlands. Detailed observations revealed that the permanent deformation was due to the fracture of feldspar grains,

which was driven by deformation of weak clay films. Better understanding this compaction is vital for modeling this site, along with others in various stages of production. —BG

Geology 10.1130/G48243.1 (2020).

SIGNAL TRANSDUCTION

Taking control of networks

Cell-regulatory signaling pathways can be mapped as binary interaction graphs and Boolean networks. Disruption of such networks might be translatable into cancer therapies, for instance, but it is difficult to predict the best ways to do this. Part of the problem may be the redundancy of causal connections in networks, which likely buffers critical circuits to

unintended perturbations but makes intended adjustments harder to define. Gates *et al.* propose a method to define the “effective graph” for interventions that can switch a system into a more desirable state. The method showed promise in analyzing complex networks controlling flower development and in a breast cancer model. Further testing in other biological systems will determine whether this difficult problem might yield to an effective graph method. —LBR

Proc. Natl. Acad. Sci. U. S. A. 118, e2022598118 (2021).

VACCINES

Vaccines, economics, and evolution

Persistent respiratory tract infections caused by *Streptococcus*

pneumoniae (pneumococcus) lead to chronic antibiotic misuse. However, the dangers of death from antibiotic resistance, which leads to invasive disease, are growing. Using an agent-based model, Lu *et al.* demonstrate that, to some extent, we can vaccinate our way out of trouble. China accounts for about 12% of global childhood pneumococcal infections. Increasing pneumococcal conjugate vaccine coverage in this country would reduce the use of several common antibiotics. The authors tested various scenarios, including accelerated vaccine coverage, which after 5 years reduces antimicrobial resistance by up to 17% and cumulative costs by up to \$586 million USD. Thus, government investment in pneumococcal vaccination can bring both economic and evolutionary benefits. —CA

Proc. Natl. Acad. Sci. U. S. A. 118, e2004933118 (2021).

SCIENCE COMMUNICATION

Creative destruction by review papers

Reviews allow scientists to curate, synthesize, and simplify individual findings into a coherent overview of a specific field. However, once the review is available, what happens to the individual findings themselves? McMahan and McFarland analyzed data from millions of journal articles to determine the consequences of review articles for the publications they cite. In general, the review is cited instead of the specific findings contained within, resulting in a loss of future citations for individual papers. Additionally, reviews lead to focused attention around key findings and the relations between them, resulting in a substantial simplification of a domain of knowledge. The authors describe this as “creative destruction,” in which those who do the science become overshadowed by those who summarize the science. —MMC

Am. Sociol. Rev. 10.1177/0003122421996323 (2021).