Articles of Significant Interest Selected from This Issue by the Editors

The Signal-Regulating Network between NO and Ca\(^{2+}\) in *Ganoderma lucidum* under Heat Stress

*Ganoderma lucidum*, a rare type of macrofungus, has been used commonly throughout Southeast Asia. Liu et al. (e00043-18) found the existence of a novel signaling pathway in which NO production is stimulated by heat stress to regulate ganoderic acid accumulation. In addition, NO and Ca\(^{2+}\) could promote each other. However, the roles of NO and Ca\(^{2+}\) in this process were reversed. This finding improves our understanding of the mechanism of heat stress signal transduction in fungi and provides evidence for the mechanism of the environmental regulation of secondary metabolism in fungal biology.

Resveratrol as a Growth Substrate for Bacteria from the Rhizosphere

Allelopathic chemicals are used by plants for the inhibition of pathogens, competitors, and grazers. Bacterial degradation likely plays a key role in determining the persistence of such chemicals and could reduce or eliminate their effects. Resveratrol is an extensively studied allelopathic compound produced by peanuts and grapes. Kurt et al. (e00104-18) isolated resveratrol-mineralizing bacteria from the peanut rhizosphere and established the molecular basis for the initial steps of the pathway. These results establish the presence and capabilities of resveratrol-degrading bacteria in the rhizosphere and set the stage for studies to evaluate their ecological role in plant allelopathy.

Role of the CRISPR-Cas System in *Cronobacter* Species Divergence

The CRISPR-Cas system has many critical functions beyond adaptive immunity; however, its role in bacterial evolution remains unclear. Zeng and colleagues (e00267-18) recently investigated the impact of the CRISPR-Cas system in *Cronobacter* evolution and found that differentiated CRISPR activities had contributed to the bidirectional divergence and speciation of this genus. This work provides new insight into the balance between genome homeostasis and the uptake of beneficial DNA related to CRISPR-based activity in the evolution of *Cronobacter* species.

Quinone Biomarkers Resolve Microbial Redox Processes in the Ocean

Microorganisms play crucial roles in global biogeochemical cycles. Yet, we have only a fragmentary understanding of the diversity of microorganisms and their metabolisms, as the majority remains uncultured. Becker et al. (e02736-17) showed that isoprenoid quinones, which are membrane-bound electron carriers in the respiratory chains of almost all organisms, bear significant potential for tracing major microbial clades and their associated redox processes in the marine water column and underlying sediments. Their work provides a unique, vertically continuous record of the microbial diversity, abundance, and respiratory activity from oxygenated surface waters through the chemocline into deep anoxic sediments of the Black Sea, the world’s largest anoxic basin.
Evolution of Bacteriophages in a Dairy Processing Plant

*Streptococcus thermophilus* is widely used in the production of yogurt and cheeses. One of the most significant threats to dairy fermentation is bacteriophages. Lavelle et al. (e02855-17) noted the recurrent appearance of the same bacteriophage in an Irish dairy plant over a decade, highlighting the resilience of bacteriophages despite the industry’s continuous efforts to limit their proliferation. The resident bacteriophages were observed to recombine with transient bacteriophages, incorporating novel genetic elements such as novel carbohydrate-binding domains that provide the bacteriophage with additional “contact points” with the bacterial host and create the opportunity for further interactions to be established.