Articles of Significant Interest in This Issue

Mercury Cycling in Acidic Geothermal Systems

Geothermal systems emit significant quantities of mercury into the environment. Gionfriddo et al. ([e00176-20](#)) present a new conceptual model, supported by metagenomics and detailed geochemistry, of the environmental factors controlling the fate of mercury in warm springs. This model accounts for changes in mercury form, microbial interactions with mercury, and the mobility of toxic mercury. It also yields new insights into biogeochemical links among the mercury, sulfur, and iron cycles, providing a framework for studying natural geothermal mercury sources globally.

Polio Endgame: Case-Based Surveillance of Acute Flaccid Paralysis and Environmental Surveillance Are Indispensable

The Polio Endgame Strategy 2019–2023 recommends case-based acute flaccid paralysis (AFP) surveillance and environmental surveillance as continuous activities to achieve polio eradication worldwide. Despite efforts, however, challenges remain in interrupting poliovirus transmission. Chen et al. ([e00702-20](#)) outline 28 years of polio surveillance experience in Shandong Province, China, to provide a detailed comprehensive evaluation of AFP surveillance and environmental surveillance. Environmental surveillance enhances the sensitivity of polio surveillance in the absence of polio-related AFP cases; also, it is advantageous in tracing a larger scope of enterovirus. Environmental surveillance will be indispensable for identifying virus emergence, and moreover, the strategy of case-based surveillance and environmental surveillance should be popularized.

Deciphering a Complete Catabolic Pathway of Pyridine

The biodegradation of pyridine, a notorious toxicant, has been explored for more than a hundred years. Pathways requiring a hydroxylation or reduction step before the ring cleavage have been proposed for pyridine catabolism; however, the appropriate enzymes have never been isolated or characterized. Časaitė et al. ([e00902-20](#)) describe a plasmid-borne *pyr* gene cluster and reveal a validated pathway for pyridine degradation. It is shown that PyrA monooxygenase is responsible for the first step of the catabolic pathway. This key enzyme performs an oxidative cleavage of the pyridine ring without the typical activation steps, which were suggested previously.

Nisin M Retains Full Induction Capacity but Has Significantly Reduced Antimicrobial Activity

The optimization of protein expression systems is a major goal of biotechnology. A limitation of the nisin-controlled expression system (NICE) is that the inducer, the peptide nisin A, has potent antimicrobial activity and the capacity to kill the expression host. O' Connor and colleagues ([e00984-20](#)) have harnessed bioengineering approaches to identify derivatives that exhibit superior characteristics for use as inducers in nisin-controlled induction and protein production. One variant, termed nisin M, retains full induction capacity but exhibits significantly reduced antimicrobial activity and can therefore be applied at concentrations that are normally lethal to the expression host.

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Real-Time Bacterial Chemotaxis Visualized in a Slide-in-Chamber Reveals How This Behavior Shapes Specific Patterns of Root Surface Colonization

The roots of plants excrete a variety of chemical compounds that serve as nutrients, attracting diverse microorganisms to the root surfaces and shape microbial rhizosphere community structure and activity. The interaction of microbes with the roots of plants typically has been analyzed in bulk and by end-point analyses that overlook the spatial and temporal dynamics of plant-microbe associations. Here O'Neal et al. ([e01026-20](#)) use a novel slide-in-chamber that permits the real-time visualization of rhizosphere plant-microbe associations to track how bacterial chemotaxis responses shape attraction to different regions of the plant root surface and subsequent colonization.