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Articles of Significant Interest Selected from This Issue by the Editors

Culturing the Unculturable: Isolation of Novel Oral Bacterial Species

Culture-independent molecular analyses have revealed the diversity of the human oral microbiome, but around one-third of oral bacterial taxa have yet to be cultivated. *In vitro* biofilms established by Thompson et al. (p. 8307–8314) from a dental plaque inoculum were found to harbor a complex bacterial community, including numerous previously uncultivated oral bacteria. A targeted approach led to the isolation of cultures of *Lachnospiraceae* HOT 500 from this source material. *In vitro* mixed-biofilm cultures can provide the first step in the isolation of novel bacteria, thereby enabling the study of their pathogenicity, antimicrobial resistance, and interactions with other bacteria and the human host.

Glycyl Radical Enzyme-Associated Bacterial Microcompartments

Bacterial microcompartments (BMCs) are proteinaceous, icosahedral organelles encapsulating sequential enzymatic reactions of metabolic pathways. Experimentally characterized examples of BMCs include carboxysomes, as well as the propanediol- and ethanolamine-utilizing metabolosomes. In-depth bioinformatic analyses by Zarzycki et al. (p. 8315–8329) provide insight into a widespread, recently discovered group of glycyl radical enzyme-associated microcompartments (GRMs). The study suggests that there are at least three functionally distinct types of GRMs, differing not only in their complements of encapsulated enzymes but also in the permeability of their shells and in the details of their assembly. The authors also discuss the evolution of GRMs and their roles in the environment and pathogenesis.

Migratory Birds Import Exotic Ticks and Pathogens to the United States

Natural movements of wild animals provide a means for pathogen dispersal, sometimes across vast distances. Field-based investigations by Cohen et al. (p. 8366–8378) revealed that over 3% of migratory birds arriving in the southern United States are parasitized by exotic tick species from Central or South America, including some infected with pathogens. Given that billions of birds follow this migratory pathway, the propagule pressure is estimated to exceed 19 million exotic ticks imported to the United States annually. Ongoing changes to the climate and vertebrate host community may facilitate the invasion process, leading to new health risks for humans and other animals.

Facultative Control of Matrix Production Optimizes Competitive Fitness in Biofilms

The matrix is a defining feature of biofilms and supports the formation of structures that enhance access to oxygen in different biofilm models. Using *Pseudomonas aeruginosa* PA14, Madsen and colleagues (p. 8414–8426) evaluated the relevance of matrix production to in-biofilm ecology and evolvability. Pel polysaccharide is a critical matrix component in pellicle (air-liquid interface) and colony (solid-surface) biofilms. Pel production could be exploited by nonproducing mutants ("cheaters") in colonies but not in pellicles. Pellicles favored spontaneous mutants with enhanced Pel production that were disfavored in colonies. Facultative control of Pel production is therefore advantageous even in biofilm models with similar constraints on oxygen availability.

Iron-Reducing Metabolites: a Key to Soil Organic Matter Degradation by Ectomycorrhizal Fungi?

An extracellular metabolite with Fe^{3+}-reducing activity from the ectomycorrhizal fungus *Paxillus involutus* was characterized under growth conditions promoting oxidative decomposition of soil organic matter. Shah et al. (p. 8427–8433) also demonstrated that this metabolite drives an *in vitro* Fenton reaction via Fe^{3+} reduction. These findings suggest that the mechanism for Fe^{3+} reduction and hydroxyl radical generation via Fenton chemistry by ectomycorrhizal fungi is similar to that of the evolutionarily related brown-rot saprotrophs. It remains to be demonstrated whether this metabolite can release and reduce Fe^{3+} from iron oxide crystals found in soil or if cooperative actions of other metabolites and enzymes are needed.

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