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Articles of Significant Interest in This Issue

Host Genetic Effect on the Gut Microbiota

Host genetics is an important factor in determining the host gut microbiome. Korach-Rechtman et al. (e00826-19) demonstrated that two inbred mouse lines had different bacterial compositions while their genetically identical reciprocal offspring (reciprocal F_1) shared their microbiota, with no special maternal effect. Moreover, cohabitation of the two inbred mouse lines had minor effects on the microbiota, indicating that when exposed to unlike exogenous microbiota each line tends to maintain a unique bacterial signature reflecting the line. Taken together, the results of this study show that mouse genetics has a greater effect on the gut microbiota than does the maternal effect or exposure to unlike bacteria.

Chitin to Methane: Identification of Key Primary Degraders

Chitin is the most abundant biopolymer in aquatic environments, directly impacting the carbon and nitrogen cycles. Wörner and Pester (e00963-19) quantified the rates of methanogenic chitin degradation in freshwater sediments and linked them to the microbial succession driving this activity. Three degradation phases were identified; *Chitinivibrio* spp. (*Fibrobacteres*) and *Ruminiclostridium* spp. (*Firmicutes*) were found to drive the early and late phases, respectively, while a diverse community of *Fibrobacteres*, *Bacteroidetes*, *Proteobacteria*, *Spirochaetes*, and *Chloroflexi* members drove the intermediate phase. This work unraveled the microbial ecology behind anaerobic chitin degradation and identified target microorganisms enabling biogas production from this abundant biopolymer.

Plant-Pathogenic Bacterium Increases Water Availability both On and Inside Leaves

The bacterial pathogen *Pseudomonas syringae* B728a, which causes disease in green beans, produces an amphiphilic chemical known as a biosurfactant. While biosurfactants have been shown to aid bacteria in consuming hydrophobic compounds, Hernandez and Lindow (e01014-19) demonstrate that the biosurfactant syringafactin that is produced by *P. syringae* can absorb water vapor and make it available to cells on the leaf surface and in the leaf apoplast. This bacterium's ability to modify the microhabitats in which it lives is significant because water is often unavailable in the leaf microenvironment.

Engineered Bacteria Release Plant-Available Phosphate

Phosphate fertilizers are essential for high-yield agriculture yet are costly and environmentally damaging. Shulse and colleagues (e01210-19) used a combinatorial, synthetic biology approach to engineer plant root-associated bacterial strains that release plant-available phosphate from phytate, a common organic phosphate found in soils. This work demonstrates that DNA synthesis approaches can be used to generate plant-associated microbes with novel capabilities benefitting plant growth.

Yogurt-Derived *Lactobacillus delbrueckii* Inhibits the Growth of the Periodontal Pathogen *Porphyromonas gingivalis*

Porphyromonas gingivalis is associated with the development of periodontal disease as well as some systemic diseases. Certain *Lactobacillus* species have been used in the treatment of periodontitis, but the effectiveness has varied, potentially due to strain and species differences. Therefore, new strategies to decrease *P. gingivalis* colonization of the mouth are needed. Cornacchione et al. (e01271-19) demonstrate that specific isolates of *Lactobacillus delbrueckii* from yogurt and kefir can kill *P. gingivalis* through the production of the toxic metabolite hydrogen peroxide. These findings highlight the importance of strain variability in the development of microbial interventions.

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