

## Articles of Significant Interest Selected from This Issue by the Editors

### Microbial Community Assembly and Spatial Ecology

The principles and mechanisms that govern multicellular community assembly are incompletely understood. Haagenen et al. (p. 6120–6128) integrated high-resolution time-lapse microscopy with ecological spatial pattern analysis to characterize microbial community assembly and spatial organization. Their work revealed that small multicellular clusters can move, interact with each other, and fuse to form symmetric patterns of larger multicellular assemblages. Knowledge about microbial spatial ecology is central to our understanding of the structure and function of environmental, host-associated, and synthetic microbial communities. Moreover, the observed formation of primordial cell groups and their aggregation to higher-level structures may be a model for studying the emergence of multicellular life.

### Lager Brewing Yeast Genome Complexity

Lager brewing strains of *Saccharomyces pastorianus* are interspecific hybrids, resulting from spontaneous hybridization of *Saccharomyces cerevisiae* and *Saccharomyces eubayanus*, that have been domesticated to become one of the most important industrial microorganisms. van den Broek and colleagues (p. 6253–6267) report that *S. pastorianus* genomes exhibit extensive aneuploidy, variability, and dynamics, far beyond what has been described for genomes in previous publications. These new results represent an important milestone in our attempt to understand the molecular basis of complex brewing-related phenotypic traits, a prerequisite for rational strain improvement.

### Dairy Improves Probiotic Effectiveness

Although probiotic bacteria are increasingly incorporated into foods, beverages, and nutritional supplements, the importance of the carrier format to probiotic-mediated health benefits is not well understood. Lee et al. (p. 6425–6435) showed in a mouse model of inflammatory bowel disease that the probiotic *Lactobacillus casei* is significantly more effective in preventing colitis when consumed in milk than in a nonnutritive, dietary-supplement format. Consumption of milk alone or with mutant *L. casei* deficient in recombinase A or D-alanyl transfer protein relevant to function in the digestive tract was also unable to prevent disease. Study outcomes were not directly associated with colonic immune responses or changes to the indigenous intestinal microbiota. This work emphasizes how the conditions to which probiotics are exposed prior to consumption can ultimately influence their capacity to maintain and improve human health.

### Green and Red Luciferases Mitigate Signal Distortions in *Saccharomyces cerevisiae*

Luciferases are widely employed as reporters for continuous real-time monitoring of gene activity; however, their use in fast-growing microbes can be problematic. Krishnamoorthy and Robertson (p. 6484–6495) demonstrated that when a green luciferase is used to report gene activity for a promoter of interest, simultaneously monitoring output from a stably expressed red luciferase provides a means to compensate for signal distortions caused by fluctuating cell number and metabolic states. They used this system in combination with a light-inducible promoter to reveal that certain phases of the yeast metabolic cycle are more suitable for producing heterologous proteins.

### Shuttle Plasmid-Based Expression of Fluorescent Proteins in *Treponema denticola*

Oral pathogens, including *Treponema denticola*, initiate the dysregulation of tissue homeostasis that characterizes periodontitis. Understanding the role of this nutritionally fastidious anaerobe in microbe-host interactions and in the development of complex oral microbial communities has been hampered by limited genetic methodologies. Godovikova et al. (p. 6496–6504) report refinements of electroporation methods that enhance plasmid transformation of the most widely studied *T. denticola* strain. As a demonstration, a flavin mononucleotide-based fluorescent protein (FbFP) that is active under anoxic conditions was expressed in *T. denticola*. Addition of plasmid-based fluorescence labeling to the *Treponema* toolset enables more-rigorous studies of the behavior of this organism.