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► **COVER:** 'Rock, Paper, Scissors' by George Marshall, inspired by the Review on p15.



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Although bacteria are single-celled organisms, many photosynthetic Cyanobacteria can effectively become multicellular, growing as filaments in which some cells differentiate to carry out specific functions. On page 39, Flores and Herrero review the differentiation of vegetative cyanobacterial cells into heterocysts, which are metabolically specialized cells that provide the cyanobacterial filament with a micro-oxic environment in which to fix nitrogen, even under oxygenic conditions.

The evolution of specialized functions has enabled bacteria to adapt to and survive in a diverse range of environments. For example, the normally harmless commensal bacterium *Escherichia coli* can become a highly adapted pathogen of the mammalian gastrointestinal tract through the acquisition of a combination of mobile genetic elements. These elements encode a range of virulence factors that are used by pathogenic *E. coli* strains to subvert host cell functions. On page 26, Croxen and Finlay discuss the interactions between *E. coli* virulence factors and host cell components.

Another way in which bacteria have become specialized for the colonization of a particular environment is through the evolution of active mechanisms to impair or kill competing organisms. On page 15, Parsek and colleagues describe the growing body of evidence that suggests that interactions within and between bacterial species have a profound effect on their competition in nature.

Finally, as we begin the new year, we would like to thank all of our authors and referees for their contributions throughout 2009 and of course you, our readers, for your continued interest. We have a number of exciting projects planned for 2010, and we ask that, if you make only one new year's resolution, it is to keep watching this space.

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