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Spontaneous Alteration of the Pattern Formation in the Bioconvection of *Chlamydomonas reinhardtii*

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Abstract

Bioconvection is an example of a collective behavior of microorganisms. Gravitactic microorganisms propel themselves preferentially upwards to form a dense accumulation at the top of the water column. When the top-heavy density gradient grows sufficiently large, an overturning convection occurs, leading to a formation of characteristic patterns, which involve highly concentrated aggregation of cells extended in two-dimensional structures. We found a quite interesting behavior of bioconvective pattern created in the suspension of the unicellular green algae, *Chlamydomonas reinhardtii*. The phenomenon, called the pattern alteration response, was characterized by a rapid decrease in the pattern size. It occurred, much like a phase transition found in the physical events, spontaneously all over the suspension which already showed steady pattern formation. Quantitative analysis of the response would stimulate further thought and research concerning gravity-related effects in biology.