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Excitability dependent pattern formation KAUMUDI PRABHAKARA, Cornell University, Ithaca, New York, USA; Max Planck Institute for Dynamics and Self-organisation, Goettingen, Germany, AZAM GHOLAMI, Max Planck Institute for Dynamics and Self-organisation, Goettingen, Germany, EBERHARD BODENSCHATZ, Cornell University, Ithaca, New York, USA; Max Planck Institute for Dynamics and Self-organisation, Goettingen, Germany — On starvation, the amoebae Dictyostelium discoideum emit the chemo-attractant cyclic adenosine monophosphate (cAMP) at specific frequencies. The neighboring amoebae sense cAMP through membrane receptors and produce their own cAMP. Soon the cells synchronize and move via chemotaxis along the gradient of cAMP. The response of the amoebae to the emission of cAMP is seen as spiral waves or target patterns under a dark field microscope. The causal reasons for the selection of one or the other patterns are still unclear. Here we present a possible explanation based on excitability. The excitability of the amoebae depends on the starvation time because the gene expression changes with starvation. Cells starved for longer times are more excitable. In this work, we mix cells of different excitabilities to study the dependence of the emergent patterns on the excitability. Preliminary results show a transition from spirals to target patterns for specific excitabilities. A phase map of the patterns for different combinations of excitability and number densities is obtained. We compare our findings with numerical simulations of existing theoretical models.

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