Cell sorting induced by spiral chemical waves in the mound stage of Dictyostelium discoideum

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This talk concerns a simple mathematical model for cell sorting induced by propagation of chemical signals along 2D-spiral waves. The biological motivation for this model is the spiral geometry of the signal propagation in the multicellular, "mound" stage of Dictyostelium discoideum. Since in the mid '90s cAMP-chemical waves propagating around the center were observed in the mound of Dictyostelium discoideum, the sorting process taking place at this stage has been oft explained in terms of differential chemotactic sensitivity to cAMP. In line with this explanation, the main result that we have obtained so far is the proof of the existence of steady states of the model for which the population of cells with higher (lower) sensitivity is mainly concentrated near to (far from) the center of the mound, under the assumption that the spiral chemical wave remains tight enough for increasing distances from the center.