Title: Trails and patterns formed by hapto- and chemo-taxing cells

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Populations of biological cells that communicate with each other can organize themselves to generate large-scale patterns. Here, we introduce a new class of self-organized patterns of cell populations that we term as 'cellular trail networks'. They were observed with populations of rat microglia, the immune cells of the brain and the experimental evidence suggested that haptotaxis is the key element responsible for them. The essential features of the observed patterns are well captured by the mathematical model cells that actively crawl and interact with each other through a decomposing but non-diffusing chemical attractant laid down by the cells. More lately, we also observed that they could be attracted also by a global chemical cue like ATP. Thus, in some biologically relevant situations, the motile behaviors of these cells are a consequence of two (or even more) different mechanisms working together. We discuss some interesting population dynamics brought by chemo- and hapto-taxing cells.