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Statistical analysis and modeling of collective cell motion and pattern formation[1] ANDRAS CZIROK, ANDRAS SZABO, Eotvos University, Dept of Biological Physics — Cell motility and its guidance through cell-cell contacts is instrumental in vasculogenesis and in several other morphogenic processes as well. During vasculogenesis multicellular sprouts invade rapidly into avascular areas, eventually creating an interconnected network pattern. Epithelial cell sheets migrate during organogenesis or wound healing. These phenomena were studied with time-lapse microscopy both in vivo and in vitro. Statistical analysis of cell trajectories reveals that motile confluent cultures may behave either as vortical fluids or as deforming elastic sheets. The observed flow fields and pattern formation can be explained by our generalized cellular Potts model – representing cell polarization and self-propulsion, links between the cytoskeleton of adjacent cells as well as an asymmetric preferential attraction to the surface of adjacent cells.

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