On Coupled Chemotaxis-Fluid Models

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We present a PDE model for the motion of oxy-tactic bacteria suspended in a droplet of water.

The model consist of the Keller-Segel chemotaxis equations (albeit in a repulsive setting) coupled to the

(Navier) Stokes equations for the fluid. The action of the bacteria on the fluid is through gravity.

We present local and global existence results and numerical comutations showing interesting instability patterns.