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Microstructure of concentrated suspensions of swimming model micro-organisms TAKUJI ISHIKAWA, TAKAMI YAMAGUCHI, Tohoku University, T.J. PEDLEY, University of Cambridge — A swimming micro-organism is modelled as a squirming sphere with prescribed tangential surface velocity, referred to as a squirmer. The centre of mass of the sphere may be displaced from the geometric centre, and the effects of inertia and Brownian motion are neglected. The well known Stokesian- dynamics method is modified in order to simulate squirmer motions in a concentrated suspension. The movement of up to 216 identical squirmers in a concentrated suspension without any imposed flow is simulated in a domain with periodic boundary conditions, and the microstructure of the suspension is investigated. The results show that; (a) an aggregation of cells appears by considering only the hydrodynamic interaction between cells, (b) the aggregated cells generate collective motions by the hydrodynamic interaction between themselves, and (c) the collective motions occur randomly in time and in space. These tendencies qualitatively agree well with earlier experiments.

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