I will summarize the work of references [1-3], in which we introduced a model for the dynamics and growth of bacterial colonies on soft agar plates. This model [1] consists of reaction-diffusion equations coupled to a hydrodynamic equation describing the velocity field of a complex fluid consisting of bacteria and water.

Numerical simulations [2] show that the model is able to qualitatively reproduce phase diagrams, which classify colony morphology as a function of the initial amount of nutrients on the plate and of the wetness of the agar. Simulations also indicate that complex collective motions within a colony may either stabilize or destabilize its boundary.

This is joint work with Thierry Passot, Observatoire de la Côte d'Azur, Nice, France.

References:
3. J. Lega, T. Passot, "Hydrodynamics of bacterial colonies", Nonlinearity 20, C1-C16 (2007). (Received February 27, 2007)