

Abstract Submitted
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Helicobacter pylori Couples Motility and Diffusion to Actively Create a Heterogeneous Complex Medium in Gastric Mucus¹ HENRY FU, SEYED AMIR MIRBAGHERI, University of Utah — *Helicobacter pylori* swims through mucus gel by generating ammonia that locally neutralizes the acidic gastric environment, turning nearby gel into a fluid pocket. The size of the fluid zone is important for determining the physics of the motility: in a large zone swimming occurs as in a fluid through hydrodynamic principles, while in a very small zone the motility could be strongly influenced by nonhydrodynamic cell-mucus interactions including chemistry and adhesion. We calculate the size of the fluid pocket. We model how swimming depends on the de-gelation range using a Taylor sheet swimming through a layer of Newtonian fluid bounded by a Brinkman fluid. Then, we model how the de-gelation range depends on the swimming speed by considering the advection-diffusion of ammonia exuded from a translating sphere. Self-consistency between both models determines the values of the swimming speed and the de-gelation range. We find that *H. pylori* swims through mucus as if unconfined, in a large pocket of Newtonian fluid.

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