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Suppression of E. coli tumbling and wobbling in dilute polymeric fluids ALISON PATTESON, University of Pennsylvania, ARVIND GOPINATH, Haverford College, PAULO ARRATIA, University of Pennsylvania — Bacteria commonly utilize a run-and-tumble swimming behavior to navigate through complex environments, such as mucus in the lungs or digestive system. This swimming behavior has been extensively studied in water-like fluids; yet, studies on the role of particles/polymers on the run-and-tumble technique are limited. Here, we experimentally investigate the role of polymer concentration on the swimming dynamics of *E. coli*. We find that small amounts of polymer drastically change the run-and-tumble behavior of *E. coli* cells, significantly enhancing the translational diffusion. The average cell velocity increases with polymer concentration (and viscosity) and the mean run times are enhanced. By varying polymer molecular weight, we show that enhanced translation is a result of two mechanisms: (1) suppression of cell wobbling due to elasticity and (2) enhancement of run times due to viscosity. Our results show that the transport of chemotactic cells can be independently modified by viscosity and elasticity.

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