

Abstract Submitted
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Wettability control of droplet durotaxis¹ HECTOR GOMEZ, Purdue University, JESUS BUENO, Leonyte Biosystems, YURI BAZILEVS, Brown University, RUBEN JUANES, MIT — Durotaxis refers to cell motion directed by stiffness gradients of an underlying substrate. Recent work has shown that droplets also move spontaneously along stiffness gradients through a process reminiscent of durotaxis. Wetting droplets, however, move toward softer substrates, an observation seemingly at odds with cell motion. Here, we extend our understanding of this phenomenon, and show that wettability of the substrate plays a critical role: while wetting droplets move in the direction of lower stiffness, nonwetting liquids reverse droplet durotaxis. Our numerical experiments also reveal that Laplace pressure can be used to determine the direction of motion of liquid slugs in confined environments. Our results suggest new ways of controlling droplet dynamics at small scales, which can open the door to enhanced bubble and droplet logic in microfluidic platforms.

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