Hopping bacteria—New look at behavior upends common assumptions about bacteria

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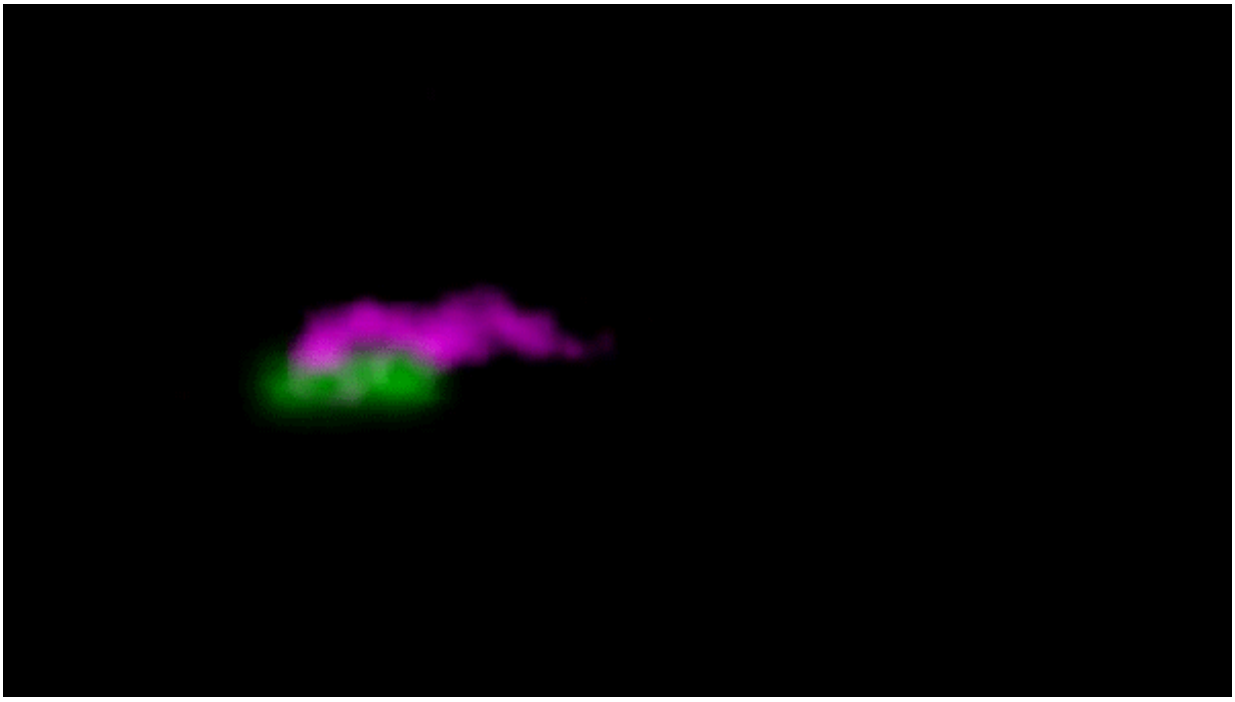

The bundled flagella (purple and green) of a confined *E. coli* bacterium struggle to get free so the organism can hop to the next trap. This behavior, newly illuminated by a Princeton study, shows a sharp contrast between longstanding models and real-world conditions. Credit: Princeton University

Current biological models assume that many bacteria spread in a run-and-tumble pattern of diffusion, based on behavior in liquid laboratory cultures. But new research from Princeton University shows the tiny

organisms actually use a hopping motion to move among tight spots in natural surroundings like the human intestine.

The research will be published in the journal *Nature Communications*, released from embargo on May 6. Sujit Datta, the lead researcher and an assistant professor at Princeton, said his team simulated the complex geometry of mucus in the gut using transparent materials to reach the findings.

The observations led to a new model that is 10 times more accurate than previous models, according to Datta, and could help improve a wide range of medical and environmental technologies.

"People have been studying bacteria for more than 300 years," Datta said. "The vast majority of those studies are in liquid cultures, or on plates, or in microfluidic channels, but in reality, most bacteria live in porous media. The bottom line here is that geometry matters."

More information: *Nature Communications* (2019). DOI: 10.1038/s41467-019-10115-1

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