

Abstract Submitted
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The intestine is a blender PATRICIA YANG, MORGAN LAMARCA, DAVID HU, Georgia Institute of Technology — According to the U.S. Department of Health and Human Services, digestive disease affects 60 to 70 million people and costs over 140 billion annually. Despite the significance of the gastrointestinal tract to human health, the physics of digestion remains poorly understood. In this study, we ask a simple question: what sets the frequency of intestinal contractions? We measure the frequency of intestinal contractions in rats, as a function of distance down the intestine. We find that intestines contract radially ten times faster than longitudinally. This motion promotes mixing and, in turn, absorption of food products by the intestinal wall. We calculate viscous dissipation in the intestinal fluid to rationalize the relationship between frequency of intestinal contraction and the viscosity of the intestinal contents. Our findings may help to understand the evolution of the intestine as an ideal mixer.

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