

Abstract Submitted  
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**Effect of Channel Length on Peristaltic Pumping** JOHN CARR, CAROLINE CARDINALE, DELIN ZENG, JESSICA SHANG, University of Rochester — Peristalsis occurs when a wave of area contraction/expansion propagates along a flexible channel filled with fluid. This pumping mechanism is common in nature; in perivascular pumping, the wavelength may exceed the channel length. Here we study the effect of channel length on flux produced by an arbitrary, periodic peristaltic wave, with no external pressure gradient. We use a long-wave approximation and present results for time-averaged and instantaneous flux as a function of channel length-to-wavelength ratio in a two-dimensional channel, and validate with finite-element simulations. Our model shows that net flux is significantly reduced when the ratio drops below 1. We conclude that models that consider small domain lengths and do not adjust the boundary conditions accordingly do not adequately represent the physics of longer systems.

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