Abstract Submitted
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Emulation of Mucus Propulsion in the Trachea Driven by Constant Air Flow[1] REED OGROSKY, ROBERTO CAMASSA, MICHAEL JENKINSON, JEFFREY OLANDER, SHREYAS TIKARE, UNC — To better understand the movement of mucus through the trachea that arises as a result of air flow, we design an experiment to emulate mucus movement by an air-driven vertical flow of high-viscosity silicone oil through a thin glass tube. When a constant flux of air is delivered through the bottom of the tube, instabilities arise, generating upward moving waves at the oil/air interface. These constitute a main mechanism of momentum transfer from air to oil, whereby oil is transported upward against gravity. We test this mechanism with several different flow rates of both air and oil. Specifically, increasing the air speed results in shorter wavelengths, lower wave speed, a smaller mean thickness of oil lining the tube, and smaller displacements by arriving waves at the wetting front when oil is advancing in a dry tube. In particular, we quantify the role of waves in advancing this front, and show how waves play a dominant role in this advancement. These results give insight into the clearing of mucus in the trachea by air flows.

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