

Abstract Submitted  
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**Could gastropods crawl using Newtonian mucus?** JANICE LAI, Stanford University, MARIA VAZQUEZ-TORRES, UCIII Madrid, JUAN C. DEL ALAMO, UC San Diego, JAVIER RODRIGUEZ-RODRIGUEZ, UCIII Madrid, JUAN C. LASHERAS, UC San Diego — The locomotion of terrestrial gastropods is driven by a train of periodic muscle contractions (pedal waves) and relaxations (interwaves) that propagate from their tail to their head (direct waves). We study the locomotion of these animals on smooth flat surfaces by measuring the three-dimensional displacements of the ventral foot surface induced by the passage of the waves. A simple model based on lubrication theory is proposed in accordance with the experimental observations. This model uncovers a new mode of locomotion that works even when the lubricant between the foot and the animal is Newtonian. The model can also be adapted to situations where the animal's foot is in contact with the ground only at discrete points, as is the case when it crawls on a wire mesh or on rough soil surfaces. Furthermore, comparison between the stress exerted by the animal on the substrate and the model predictions allows us to clarify the role of the complex rheology observed in the mucus of terrestrial gastropods.

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