Abstract Submitted
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The Unique Propulsive Wake Pattern of the Swimming Sea Slug
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The Aplysia, also sometimes referred to as the ‘Sea Hare,’ is a sea slug that swims elegantly using
large-amplitude flapping of its mantle. The Sea Hare has become a very valuable
laboratory animal for investigation into nervous systems and brain behavior due
to its simple neural system with large neurons and axons. Recently, attempts have
also been made to develop biohybrid robots with both organic actuation and organic
motor-pattern control inspired by the locomotion of Aplysia. While extensive works
have been done to investigate this animal’s neurobiology, relatively little is known
about its propulsive mechanisms and swimming energetics. In this study, incom-
pressible flow simulations with a simple kinematical model are used to gain insights
into vortex dynamics, thrust generation and energetics of locomotion. The effect
of mantle kinematics on the propulsive performance is examined, and simulations
indicate a unique vortex wake pattern that is responsible for thrust generation.

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