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Hydrodynamics of Choanoflagellate Feeding ANDERS ANDERSEN, Department of Physics, Technical University of Denmark and Centre for Ocean Life, Villum Kann Rasmussen Centre of Excellence, LASSE TOR NIELSEN, THOMAS KIORBOE, National Institute of Aquatic Resources, Technical University of Denmark and Centre for Ocean Life, Villum Kann Rasmussen Centre of Excellence —
Choanoflagellate filter feeding is a poorly understood process. Studies indicate that the pressure differences created by the beating of the flagellum are insufficient to produce an adequate water flow through the collar filter, the mechanism believed to ultimately transport food particles to the cell. The collar is composed of numerous microvilli arranged as a palisade, and the low porosity of the filter provides high resistance to the water flow. Additionally, ultrastructural studies often show signs of mucus-like substances in and around the collar, potentially further hampering water flow. We present high-speed video of live material showing the particle retention and the beating of the flagellum in the choanoflagellate species Diaphanoeca grandis. We use the observations as input to model the low Reynolds number fluid dynamics of the fluid force produced by the flagellum and the resulting feeding flow.

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