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Transport effect of *Vorticella*'s stalk contraction cycle is more effective for motile food particles[1] SANGJIN RYU, JIAZHONG ZHOU, DAVID ADMIRAAL, University of Nebraska-Lincoln — The coiling stalk of *Vorticella* contracts in a few milliseconds and then relaxes over a few seconds. During this cycle, the cell body (zooid) of this sessile protozoan is translated toward and then away from the no-slip substrate to which *Vorticella* is attached. As a result, the surrounding water flows with a maximum Reynolds number of ˜1 and <<1 during stalk contraction and relaxation, respectively. To elucidate how *Vorticella* uses its stalk contraction-relaxation cycle, we investigated the resultant water flow using a CFD model for *Vorticella*. The simulated flow shows that one cycle can displace virtual particles around the *Vorticella* up to ˜190 μm with a maximum net vertical displacement of 3–4 μm. This transport effect seems to be caused by asymmetry in the flow field between the contraction and relaxation phases, and it appears to be more effective on motile food particles than non-motile ones. Therefore, our *Vorticella* model enabled investigating the hypothesis that *Vorticella*'s stalk contraction can enhance food transport near the substrate.

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