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The curved shape of the bacterium *Caulobacter crescentus* enhances colonization of surfaces in flow ALEXANDRE PERSAT, ZEMER GITAI, HOWARD STONE, Princeton University — Bacteria thrive in all types of fluid environments; flow is thus a ubiquitous aspect of their lives. Bacteria have evolved a variety of cellular components contributing to their growth in specific environments. However, cellular features that help them survive and develop in flow have been rarely characterized. Here, we show that *Caulobacter crescentus* may have evolved its curved shape to enhance the colonization of surfaces in flow. *C. crescentus* curvature is preserved in the wild but straight mutants have no known growth disadvantage in standard laboratory conditions. Leveraging microfluidics and single-cell imaging, we demonstrate that curvature enhances surface colonization in flow, promoting the formation of larger microcolonies. Cells attach to a surface from a single pole, so that flow affects their orientation. In flow, viscous forces generate a torque on the curved cell body, which reorients the cell in the direction of the flow. The curved cell appears to arc above the surface, optimally orienting its unattached pole towards the surface. This reduces the distance between the surface and the pole, thereby enhancing attachment of its progeny. Additionally, we show that curved shape enhances colony spreading across the direction of the flow, generating more robust biofilm compared to straight mutants.

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