

Abstract Submitted
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Bacteria rolling: motilities of rosette colonies in *Caulobacter crescentus* YU ZENG, BIN LIU, Univ of California - Merced — The aquatic bacterium *Caulobacter crescentus* has two life cycle stages with distinct motilities: freely swimming swarmer cells and immotile stalked cells. Here, we show a new type of movement performed by freely suspended rosettes, spontaneous aggregates of stalked cells aligned radially relative to each other. Reproductive rosette members generate pre-divisional daughter cells with flagella, inducing rotations of the rosette as a whole. Such rotations exhibit dynamic angular velocities and lead to intermittent linear movements along liquid-solid interfaces, resembling rolling movements. We reconstructed the translational and rotational dynamics of the rosette movements from high-speed filming and long-term tracking. A mechanical model was developed to explain the hydrodynamic mechanism underlying such motilities. Our study illustrated a nontrivial mechanism for clustered bacteria to achieve motilities and sheds light on the adaptive significance of the collective behaviors of microorganisms in complex fluid environments.

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