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Chemotaxis in Marine Bacterium Vibrio alginolyticus LI XIE, SUDDHASHIL CHATTOPADHYAY, TUBA ALTINDAL, XIAO-LUN WU, University of Pittsburgh — We investigated swimming behavior of marine bacterium *Vibrio alginolyticus* in an uniform chemical environment. The typical bacterial trajectory consists of consecutive run (forward swimming) and reverse (backward swimming) intervals with occasional sudden changes of swimming directions, which we call "flagellar flicks". This mode of chemotaxis is different from the canonical run-and-tumble strategy adopted by *Escherichia coli* and may be selected for in *V. alginolyticus* due to the ocean environment where nutrients are scarce and are subject to rapid turbulent dispersion. We measured the statistical distributions of run T_{run} and revers T_{rev} time intervals, $P(T_{run})$ and $P(T_{rev})$, and found that while the back-swimming time appears to have a well-defined time scale of $0.5\,s$, the forward swimming time is more broadly distributed, suggestive of a Poisson process. Measurements of the time interval T_{flick} between two consecutive directional changes show that $P(T_{flick})$ is also peaked at a finite time, $T_{flick} \sim 1\,s$, and the mean directional change is $\Delta\theta \sim 70^0$. Interestingly, this $\Delta\theta$ observed is nearly optimal for efficient randomization of swimming directions. Altogether, our experiments suggest that *V. alginolyticus* employs both run-and-reverse and flicking activities for chemotaxis, and this behavior presumably optimizes their foraging efficiency in a turbulent environment.

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