

Cytophagas. Nancy J. Schenck and Jeanne S. Poindexter (Public Health Research Institute of New York City).

Chemotaxis, the net movement of cells in response to chemical gradients in the environment, has been detected and characterized in a variety of flagellated bacteria. However, whether gliding bacteria are capable of this response is controversial. There have been reports of chemotaxis in Myxococcus xanthus, but such behavior cannot be reproducibly demonstrated. It is reasonably argued that the velocity of gliding cells is so much slower than the rate of diffusion of solutes that gradients decay before a response could possibly be manifested. The present studies were undertaken to determine whether chemotaxis could be detected in faster-moving gliding bacteria^s (two marine and one freshwater isolates of Cytophaga). In two types of assays (rate of migration and growth in soft agar, and accumulation in microdroplets of soft agar containing utilizable nutrients), neither of the marine strains exhibited a clear migratory response to nutrient concentration. In microcultures prepared in depression slides, two types of motility were observed in each of the three cytophagas; neither type was affected by ~~the existence of~~^s an initial nutrient gradient. (1) In regions where the cells moved on the cover slip bathed in a liquid phase, individual cells glided and pivoted independently of each other, and in random directions. (2) In monolayers of cells migrating between the cover slip and the agar, net translational movement was accomplished mainly by groups of 10¹-50 cells arranged in parallel within arrowhead-shaped swarms. Migration of the groups was rapid (several micrometers/min^s) within the inhabited region, but slowed considerably upon pioneering entrance into the cell-free zone. However, once a pioneer group had left the inhabited region, other groups followed in its tracks. These observations revealed that net transient

that the migration of a swarm was facilitated by previous passage of another swarm through the same region; both features are presumably evidence of facilitation of gliding by slime accumulations. In addition to slowness, the marked dependence of gliding motility on the concerted migration of cells in swarms would complicate any demonstration of chemotaxis in cytophagas.

This work was supported in part by the Foundation for Microbiology.

chemotaxis/gliding motility/Cytophaga