

Fatal attraction: bacterial chemotaxis towards antibiotics

Bacteria use tiny grappling hooks called pili to pull themselves along surfaces. This form of motility allows cells to navigate through the biofilm communities where most bacteria live. While bacteria are known to use pili to move towards nutrients, we hypothesized that surface-attached cells may also have evolved to move away from harmful stimuli like antibiotics, which in natural settings are often produced by competing bacteria.

Unexpectedly, we observed the opposite response - *P. aeruginosa* actively reverses direction to move towards a wide variety of antibiotics, such that they reach potentially lethal concentrations. We developed a novel method to isolate and extract migrating cells using fluid-walled microfluidic devices, which showed these cells can no longer reproduce despite remaining highly motile. We hypothesise that antibiotics signal the presence of nearby competitors and that *P. aeruginosa* has evolved to move towards antibiotics as a counterattack manoeuvre. Consistent with this, we find that migrating cells upregulate the production of pyocins that are used to kill competing bacteria. Our results suggest that the antibiotics used to treat infections in clinical settings may have the potential to serve as a bait that lures bacteria to their death