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Cooperation and conflict in quorum-sensing bacterial populations.

Diggle SP, Griffin AS, Campbell GS, West SA

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Harvard Medical School,
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This is an exceedingly interesting article of importance to the study of quorum sensing (QS) in bacterial populations, particularly those involved in "biofilm-based" infections, as it evaluates how *Pseudomonas aeruginosa* cells involved in QS-mediated activities respond to predictions from evolutionary theory related to how individual cells that can communicate and cooperate in QS-based behaviors might be exploited by mutants that can avoid the cost of cooperation. In this study, they showed that QS-mutant cells that either did not produce QS molecules but could respond to them (signal-negative mutants) and those that could produce the signal but did not respond to QS molecules (signal-blind mutants) responded to different growth conditions that could evaluate the fitness of these different mutants when grown as individual or mixed cultures. They found that bacterial QS-directed behaviors were social traits, similar to those found in more complex organisms, and that this behavior could be exploited by signal-blind mutants when growing in the presence of cooperative, QS-producing cells. By not expending the energy, and therefore incurring the cost, of having to produce the factors controlled by QS signals, the signal-blind mutants could become prevalent in the population of cells. As it is now clear, within the lung of chronically infected cystic fibrosis patients many QS mutants of *P. aeruginosa* are isolated; it appears this likely results from the competitive pressures within this environment favoring survival and spread of QS mutants. These findings should profoundly affect the thinking about the advisability of controlling *P. aeruginosa*, and likely other QS-dependent bacterial populations, with anti-QS strategies.

Competing interests: None declared

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