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Titel des Beitrags:
Selection of Functional Quorum Sensing Systems by Lysogenic Bacteriophages in Pseudomonas aeruginosa

Abstract:
Quorum sensing (QS) in Pseudomonas aeruginosa coordinates the expression of virulence factors, some of which are used as public goods. Since their production is a cooperative behavior, it is susceptible to social cheating in which non-cooperative QS deficient mutants use the resources without investing in their production. Nevertheless, functional QS systems are abundant; hence, mechanisms regulating the amount of cheating should exist. Evidence that demonstrates a tight relationship between QS and the susceptibility of bacteria against the attack of lytic phages is becoming abundant; nevertheless, the relationship between temperate phages and QS has been much less explored. Therefore, in this work, we studied the effects of having a functional QS system on the susceptibility to temperate bacteriophages and how this affects the bacterial and phage dynamics. We find that both experimentally and using mathematical models, that the lysogenic bacteriophages D3112 and JBD30 select QS-proficient P.
aeruginosa phenotypes as compared to the QS-deficient mutants during competition experiments with mixed strain populations in vitro and in vivo in Galleria mellonella, in spite of the fact that both phages replicate better in the wild-type background. We show that this phenomenon restricts social cheating, and we propose that temperate phages may constitute an important selective pressure toward the conservation of bacterial QS.

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