# Interspecies quorum sensing signaling induces natural competence of *Vibrio cholerae* on a chitin surfaces

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*Vibrio cholerae* is the bacterium responsible for the diarrheal disease cholera, and also a natural inhabitant of marine systems where it forms biofilms on chitinous exoskeletons of zooplankton. *V. cholerae* and other *Vibrios* produce extracellular signal molecules called autoinducers (AIs), which accumulate in proportion to bacterial cell density. The population-wide response to AIs orchestrates the coordinated expression of numerous genes, and this cell to cell communication system is called quorum sensing (QS). Specifically, numerous studies in *V. cholerae* have documented that AI sensing triggers a signaling cascade resulting in production of a transcription factor (HapR), which regulates traits critical for virulence and biofilm formation in the intestine. Recently it has been shown that *V. cholerae* in biofilms on chitinous surfaces uses a QS-dependent natural transformation mechanism to take up extracellular intra-species DNA. Because comparative genomic studies suggest that horizontal transfer of genes is responsible for the extensive exchange of genetic material observed among *Vibrios* species, we sought to understand the role of *Vibrio* AI signals in this process. Specifically, we tested whether AIs produced within a chitinous biofilm can trigger natural competence by *V. cholerae*. Compared to the wild type strain, levels of DNA uptake were severely impaired in a *V. cholerae* AI-deficient strain in a monoculture biofilm. However, these responses were restored to wild type levels in response to intra-species AIs derived from a *V. cholerae* strain, and also to inter-species AIs derived from other *Vibrios* in a co-culture biofilm. We are currently exploring whether *V. cholerae* is also capable of acquiring DNA derived from other *Vibrios* in response to inter-species AIs. Understanding the role of QS in natural competence will reveal the contribution of environmental chemical signaling to the emergence of genetic diversity in pathogenic *Vibrios*.