

## **Vibrios as a cause of coral disease**

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Corals are hosts to complex communities of different microbes that affect their growth and survival. These communities are distinct from the surrounding water column and are often specific for particular species of corals. Recent culture-based and genomic studies have revealed that corals are 'holobionts', consisting of animal cells, symbiotic zooxanthellae (microalgae), bacteria, archaea, fungi and viruses. The aim of this review is to consider the role that members of the *Vibrionaceae* (vibrios) play as components of the coral holobiont and their association with bleaching and other diseases. Although there has been some disagreement about the causal role of *Vibrio* spp. as etiological agents of coral disease, there is much evidence indicating that environmental factors induce a community shift in favour of vibrios — leading to the production of toxins, extracellular enzymes, oxidative stress responses and other factors associated with pathogenicity. A particular focus of our current research is the role of quorum sensing (QS), which has been shown to be important in colonization, biofilm formation and expression of virulence factors and other extracellular enzymes in many bacteria, including vibrios. We have screened a range of vibrios isolated from a variety of healthy and diseased corals for the production of QS signal molecules, and showed that temperature has a marked effect on signal production and inhibition. The large diversity of vibrios and the different effects of temperature on production of QS signals and of virulence factors may explain the complexity of coral-associated community changes in response to environmental factors.