Vibrio spp. within Coral Mucous Provide Protective Activity Against Potential Coral Disease Pathogens

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Coral reefs worldwide are undergoing a significant decline in coral species abundance and changes in community structure. A contributing factor to this decline is bacterial infections of scleractinian corals. Recently, a bacterial pathogen, *Serratia marcescens*, has been identified as the etiological agent for acroporid serratiosis (white pox disease). The current hypothesis for the development of this disease is based on a dose response relationship between *S. marcescens* and the affected host, *Acropora palmata*. However, mechanisms of natural resistance associated with coral systems have not been determined. To address this issue, bacterial isolates (n=150) recovered from mucous samples collected from corals in the Florida Keys were screened for their ability to inhibit or prevent growth of *S. marcescens* and *E. coli*, using a soft agar overlay method. Isolates that demonstrated inhibition or prevention of growth of either pathogen were further characterized using antibiotic resistance analysis (ARA), ribotyping, Biolog GN2 plates and sequencing of the 16S rRNA gene. Approximately 5% (n=7) of the isolates demonstrated pathogen inhibition. Six of the seven isolates had identical ARA and ribotyping profiles. The other isolate had unique ARA and ribotyping profiles. All isolates were biochemically identified as *Vibrio alginolyticus*. However, their relative positions on a phylogenetic tree found the isolates more closely related to *V. alginolyticus* (n=2), *V. harveyi* (n=1), *V. proteolyticus* (n=2) and *V. fisheri* (n=2). The characterized *Vibrio* species were capable of preventing or inhibiting the growth of *S. marcescens* and *E. coli*. These results indicate bacterial disease mechanisms in coral reef systems are much more complex than the current model and that the coral mucous layer acts as a primitive immune system, providing a first line defense against the establishment of pathogens.

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