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Title: Epizootic Shell Disease in the American Lobster (*Homarus americanus* H. Milne Edwards, 1837)

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## ABSTRACT

Epizootic Shell Disease in the American Lobster (*Homarus americanus*) continues to persist in the waters of southern New England and eastern Long Island Sound, and results in significant mortality and economic harm. The etiological agent of this disease appears to be bacterial. Underlying susceptibility to this disease as a result of carbonic anhydrase deficiency was investigated, and no significant difference in concentration of this enzyme was detected between healthy and diseased individuals. In addition, culture-independent molecular techniques were employed to characterize the bacterial communities that populate the disease lesions and other areas of the lobster cuticle. Statistical analysis of the data has identified several bacteria that are prevalent on the surface of lobsters in different states of health. While some researchers have identified a novel chitinolytic bacterium of the genus *Aquimarina* (*A. 'homaria'*), as consistently appearing on lobsters with shell disease, this research found no evidence of correlation of this species with disease. Instead we found that the genus is present in all states of the disease and correlates only weakly with the diseased state. The data suggest that this disease is caused not by a single pathogen, but by a state of dysbiosis in which normal microflora emerge as opportunistic pathogens when there is some apparent environmental stressor that alters the surface biofilm of the lobster cuticle.