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TITLE: Pathogenesis of a Tissue Loss Disease Affecting Multiple Species of Corals Along the Florida Reef Tract

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ABSTRACT:

An outbreak of stony coral tissue loss disease (SCTLD), emerged on reefs off the coast of southeast Florida in 2014 and continues to spread throughout Florida's Reef Tract. SCTLD is causing extensive mortality of multiple coral species and disease signs vary among affected coral species with differences in rates of tissue loss (acute and subacute), lesion morphology (adjacent bleached zone or not) and lesion occurrence (focal and multi-focal). We examined the virulence, transmission dynamics and response to antibiotic treatment of coral species exhibiting different types of tissue loss lesions from two regions in Florida. *M. cavernosa* with subacute tissue loss lesions in the southeast Florida region near Fort Lauderdale was compared to corals (multiple species) with acute tissue loss lesions in the Middle Keys. Corals from both regions showed progressive tissue loss but the in situ rate of mortality was significantly higher in tagged colonies in the Keys. Aquaria studies showed disease transmission occurred through direct contact and through the water column for corals from both regions. However, transmission success was higher for corals with acute vs. subacute lesions. There was 100% transmission for both test species, *M. cavernosa* and *M. meandrites*, touching acute lesions. Among the three species touching subacute lesions, the disease transmitted readily to *O. faveolata* (100%) followed by *M. cavernosa* (30%) with no transmission occurring with *P. astreoides*. Diseased fragments of all species tested responded to antibiotic treatment with a cessation or slowing of the disease lesions suggesting that bacteria are involved in disease progression. Mortality was higher for in situ corals with acute lesions and transmission was higher in *M. cavernosa* exposed to acute lesions compared to subacute lesions, suggesting that different microbes may be involved with the two lesion types. However, since in situ mortality of *M. cavernosa* was not measured in the Middle Keys, we cannot completely rule out that a common pathogen is involved but is less virulent within *M. cavernosa*.

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