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Coral responses to bacterial and fungal pathogens

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Abstract

The healthy coral holobiont consist of the coral animal, an appropriate suite of zooxanthellae and associated microbes in the mucus layer. Environmental perturbations can disrupt these associations and allow the establishment of pathogenic organisms. Scleractinian and gorgonian corals respond to physical and biological insults using a number of innate mechanisms. These include the stimulation of ameobocytes and changes in the surface mucopolysaccharide microbial community (normal microbiota). Members of this community protect the coral animals by metabolic exclusion and the production of antibiotics. In addition, gorgonians respond by the overproduction of gorgonin and melanin, and an increase in pigmented sclerites. We have previously shown that the pigment associated with sclerites in *G. ventalina* and other Caribbean gorgonians is a carotenoid. Using Raman Laser Spectroscopy, absorption spectra appear similar, regardless of disease status, source, or species. Carotenoid production in sclerites appears to be a general response for Caribbean gorgonians. The overall effect of coral disease can range from the death of a small section of a colony to colony mortality. Diseases that specifically affect zooxanthellae tend to be chronic.

Biography

Garriet Smith is a Microbial Ecologist at USCA where he studies microbial interactions with marine organisms. He is on the Graduate faculty in the Dept. of Marine Medicine and Environmental Studies at MUSC and the College of the Environment at USC-Columbia. He maintains a laboratory at the Center for Hydrogen Research where he screens nitrogen-fixing bacteria for their potential to produce hydrogen in fuel cells. Smith also studies diseases of corals throughout the world and is the co-chair of the Coral Disease Working Group in the World Bank's Targeted Coral Research Program. Smith has identified pathogens associated with diseases of scleractinian corals, gorgonians, echinoderms and sponges. His research, while concentrating in the Caribbean, includes studies in the Indian Ocean, the Red Sea and throughout the Pacific. He has published over 100 scientific papers in peer reviewed journals.