Potential for Marine Antimicrobial Compounds from a *Pseudovibrio* sp.

Maria Vizcaino[1, 2], Katherine Williams[1, 2], Peter D.R. Moeller[1, 2, 3], and Pamela J. Morris[1, 2, 4, 5]

[1]*Marine Biomedicine and Environmental Sciences Center, Medical University of South Carolina, Charleston, SC*
[2]*Hollings Marine Laboratory, Charleston, SC,*
[3]*Toxin Chemistry, NOAA National Ocean Service, Charleston, SC*
[4]*Department of Cell Biology and Anatomy, Medical University of South Carolina, Charleston, SC*
[5]*Center for Coastal Environmental Health and Biomolecular Research, NOAA National Ocean Service, Charleston, SC*

Increased emergence of antimicrobial-resistant pathogenic bacteria has prompted the search for novel antibiotics in marine ecosystems, including coral reefs and the diverse microbial community associated with the corals' surface mucopolysaccharide layer (SML). Since marine bacteria can produce compounds that are chemically distinct from their terrestrial counterparts there is potential for the discovery of novel antibiotics, which serve as chemical defenses against other bacteria, including marine pathogens. We have characterized the chemical ecology of the microbial community associated with the gorgonian coral *Pseudopterogorgia americana*, focusing on the hypothesis that *P. americana* SML-associated bacteria produce antibiotics against human and coral pathogens. For these studies, we first conducted an antimicrobial assay on 142 bacteria isolated from *P. americana*'s SML using seven test strains known to be human or coral pathogens. Our results showed that 70% (99/142) of the coral isolates inhibited at least one test strain. Only one coral isolate, with 99% 16S rDNA similarity (1200 bp) to *Pseudovibrio* spp., inhibited all seven test strains. This isolate was mass cultured and extracted using dichloromethane and methanol. The methanol extract, which inhibited Gram-positive *Bacillus subtilis* and Gram-negative *Vibrio harveyi* and *V. coralliilyticus*, was purified using high performance liquid chromatography. Using bioassay-guided fractionations, we detected at least two fractions with antibacterial activity, one inhibiting Gram-positive and the other inhibiting Gram-negative bacteria. Nuclear magnetic spectroscopy (NMR) and mass spectrometry suggests that one of the compounds is a small peptide (mass range 200-400). *Pseudovibrios* have been isolated from marine sponges, tunicates, and seawater and only one antibiotic has been characterized from the Genus. These results highlight the potential of *Pseudovibrio* spp. isolated from corals as sources of bioactive marine natural compounds.

This work is supported by the Sea Grant, National Ocean Service (NOS), NIH's Initiative for Maximizing Student Diversity, and the National Science Foundation Biodiversity Surveys and Inventories Program (DEB0516347) to Dr. Pam Morris