The Potential Use of the Hydra vulgaris Toxin Hydramacin-1 as an Antibiotic Agent Against the Coral Bacterium Vibrio coralliilyticus

Palmer, Jessica (School: Joel E. Ferris High School)

Severe coral bleaching can have bacterial causes, including the highly pathogenic Vibrio coralliilyticus. Unfortunately, there are currently no viable methods of treatment or prevention of infection by this species of bacteria. Hydra vulgaris, a relative of coral, produces antimicrobial peptides including hydramacin-1 as elements of its innate immune system. The purpose of this project is to determine if these antimicrobial peptides can kill V. coralliilyticus cultured on agar. I could not work with V. coralliilyticus because of the threat it poses to marine environments nor get my hands on isolated hydramacin-1 without access to a high-performance liquid chromatography machine. Thus, I homogenized hydra after attempting to induce hydramacin-1 production with pure lipopolysaccharide isolated from E. coli. Vibrio fischeri, a non-pathogenic marine invertebrate symbiote, was used in place of its close relative, V. coralliilyticus. After culturing the V. fischeri on Good Vibrio Medium (GVM) agar and E. coli on Mueller-Hinton agar as a positive control, I applied the serial dilutions of these hydra lysates to filter paper disks placed on the agar. 48 hours later, no zone of inhibition could be measured for the control or hydra homogenate-treated disks. This project is far from complete as I hope to continue working at the Gonzaga University microbiology lab in order to rectify any errors and truly understand the potential for hydramacin-1 to combat the destruction of corals by Vibrio coralliilyticus.

Awards Won: