

TITLE: Genome mapping of a giant bacteriophage isolated from the coral species *Pocillopora damicornis* that infects the coral pathogen *Vibrio coralliilyticus*

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ABSTRACT:

In addition to the fundamental interaction between corals and their associated photosynthetic algae, other symbiotic interactions are also capable of modulating the coral holobiont health. Global warming, and consequently rising ocean temperatures, intensifies the frequency of mass bleaching events, both directly by thermal stress and expulsion of algae, and indirectly by the selection of opportunistic pathogenic microorganisms capable of inducing bleaching as well. For example, the increase in temperature causes the association of coral with *Vibrio coralliilyticus*, a temperature-dependent coral pathogen, resulting in expulsion of zooxanthellae, tissue lysis and, eventually, coral's death. A well-known process of bacterial pathogen control is the inoculation of bacteriophage viruses, called phage therapy. Although it is a promising technique, already used in humans and other mammals, phage therapy is still very incipient for the control of environmental pathogens. In this context, our group isolated a phage from the family *Myoviridae* presenting a 288650 kb genome size. This phage has the potential to be used in phage therapy due to the short-time peak of bacterial lysis around 115 minutes (1×10^8 PFU / mL) and its lytic capacity in several different temperature ranges tested. Thus, the isolated phage has the potential to minimize the pathogenic action of *V. coralliilyticus*, promoting the maintenance of the holobiont health, even under conditions of thermal stress. Phage genome sequencing was performed and the analysis and annotation of the phage using RAST, PROKKA, PATRIC, and HMMER against viral RefSeq and pVOGs databases, are still ongoing. In addition, this work aimed to identify possible CRISPRs/Cas 9 regions in the *Vibrio*'s genome, which could inhibit viral infection. The genome map is being built using Artemis and DNA Plotter.

Keywords: Coral Bleaching, Phage Therapy, Marine Probiotics, *Pocillopora damicornis*, *Vibrio coralliilyticus*, Microbial Molecular Ecology