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New Intervention Method for Halting Stony Coral Tissue Loss Disease

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Topical antibiotic treatment tested as a possible method to slow the rate of Stony Coral Tissue Loss Disease progression on infected corals in the wild.

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Stony Coral Tissue Loss Disease (SCTLD) is a highly virulent and transmittable disease diminishing coral populations along the southeast Florida reef track and into the Caribbean. Not much is known about the pathogen that is causing this disease, which makes slowing the spread difficult. However, recent successful antibiotic treatments administered to infected corals in a lab setting suggest there is a bacterial component to SCTLD. Neely et al. takes the next step by attempting application of antibiotic treatments to corals in the wild, using a specially formulated base that allows topical application.

The first confirmed observations of SCTLD were near Miami in 2014, appearing on scleractinian (reef building) corals as a white disease margin located between healthy coral tissue and fresh skeletal remains. Rapid transmission of the disease, through physical contact and seawater, resulted in SCTLD observations in the Caribbean only three years later. The progression of the disease lesion on an infected coral colony is much quicker than that of other known coral diseases, leading to rapid and complete colony mortality in just weeks to months. Currently, SCTLD is known to infect over 20 species of corals and is still rapidly spreading to new regions.

Many studies have attempted to fully understand the pathogen that is behind SCTLD, but none have been able to do so. Only recently has dosing with antibiotics in a lab proven successful at stopping the disease lesion from progressing further on live coral colonies. This indicates that there is a bacterial component to SCTLD. The challenge now is finding a way to administer antibiotic treatments to wild corals. While there are obvious difficulties to water dosing in the ocean, topical application of antibiotics is a viable option for the treatment of wild corals.

To understand how the disease progression responds to different treatments, Neely et al. tested two different base formulas (Base 2B and New Base) created by Ocean Alchemists both with and without amoxicillin. They tested the treatments on five different species of coral: *Colpophyllia natans*, *Montastraea cavernosa, Orbicella faveolata, Diploria labyrinthiformes* and *Pseudodiploria strigosa*. Diseased corals were located, treated, then monitored for 4 weeks while the number of effective and ineffective treatments were tallied.

Results demonstrated that, while there was variability between treatment type and species, both bases with amoxicillin were significantly more effective than the controls (no treatment) and treatments using only the base with no amoxicillin. The percent success of Base 2b and New Base without amoxicillin were 9% and 4%, respectively, whereas with amoxicillin they were 84% and 70%, respectively.

This study provides hope that topical amoxicillin treatments could become successful intervention techniques in halting SCTLD lesions on wild corals. However, monitoring efforts are still recommended since the treatments appear to only have localized effects, not preventing the possibility of new infections elsewhere on the colony. While follow up studies are needed on the physiological mechanisms and long

term health of treated corals, these intervention efforts can be used to protect high risk coral colonies and should be considered further in management response strategies.

Citation: Neely, K. L., Macaulay, K. A., Hower, E. K., Dobler, M. A. (2020), Effectiveness of topical antibiotics in treating corals affected by Stony Coral Tissue Loss Disease, *PeerJ*, **8**:e9289, DOI 10.7717/peerj.9289. Published on 9 June 2020.