

# SPOTLIGHT ON

## Ross University Veterinary Medicine

Advancing animal health and welfare through research

### Diving off the veterinary campus to study a highly contagious marine epidemic

Anne A. M. J. Becker, DVM, PhD, and Mark A. Freeman, PhD\*

School of Veterinary Medicine, Ross University, Basseterre, St. Kitts and Nevis

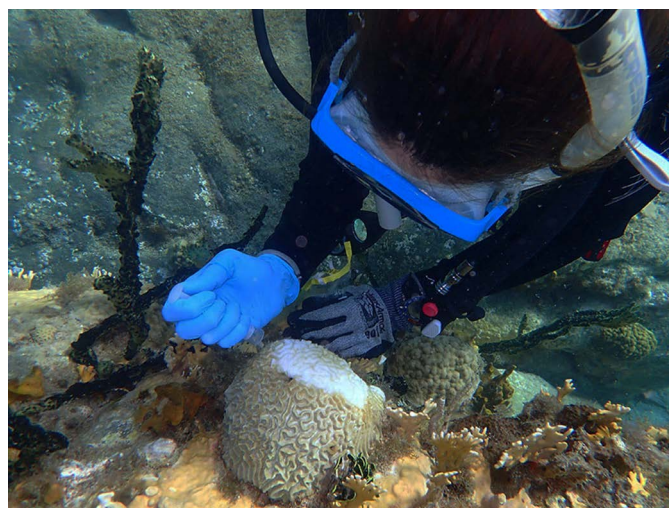
\*Corresponding author: Dr. Freeman (mafreeman@rossvet.edu.kn)

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**S**tony coral tissue loss disease (SCTLD) is currently rampaging through reef-building corals across the Caribbean region, with colony mortality rates as high as 99%, affecting nearly 30 different coral species. Scientists have yet to pinpoint the exact etiology, but multiple hypotheses have been proposed, including abiotic stressors, viruses, bacteria, or a combination of these. On the reefs surrounding the island of St. Kitts, home to Ross University School of Veterinary Medicine (RUSVM), the disease was first confirmed in January 2020. Following a government permit, researchers at the university's Research Center for Conservation Medicine and Ecosystem Health (CoMEH) started multiple longitudinal studies that contribute to surveillance and disease investigation. These include a combined holistic diagnostic approach including in-field monitoring and sampling, histopathology, and microbiome sequencing.

Clear and consistent differences between healthy and diseased coral microbiomes were identified, regardless of location and species of coral. These coral microbiomes could be indicative of some level of microbial dysbiosis associated with disease. At RUSVM, researchers set out to further identify potential bioindicators and tissue markers for SCTLD in space and time. Assessing relative magnitudes of spatial versus temporal change across different coral host species shows at which scales microbial perturbations emerge. Repeated sampling of affected colonies has allowed for monitoring lesion progression in SCTLD-affected colonies. Sampling diseased colonies included both the collection of noninvasive syringe samples of coral mucus/tissue slurry for sequencing and core samples drilled at lesion margin and macroscopically unaffected sites for light and electron microscopic examination.

The perturbations observed in diseased corals should be evaluated in light of the regular host-microbiome dynamics that underlie a coral animal's health and resilience. As the Research Center CoMEH focuses on ecosystem health to sustain biodiversity, another study has been developed to assess the microbial dynamics of healthy coral species over time, identifying biomarkers that can be used to predict a coral's resilience and health. This may complement other tools and approaches in coral conservation and restoration.



Collection of mucus and tissue from a symmetrical brain coral affected by SCTLD.

Uniquely situated at the border of the Caribbean Sea, the RUSVM campus offers the potential for regular sampling of tagged coral colonies and immediate laboratory analysis of samples, thereby providing hands-on field or lab experience for veterinary students to address this marine epidemic. Collaborations across the university and with local government and regional partners (Department of Marine Resources St. Kitts, Association of Marine Laboratories of the Caribbean) add to what can be achieved. Other work at the Research Center CoMEH includes a revised diagnostic approach to sea fan aspergillosis, setting up larval cultures of invertebrates (urchin, conch, and king crab) to repopulate reefs and promote sustainable commercial aquaculture initiatives.

Value is gained when students and faculty are challenged to examine veterinary diagnostics through the lenses of marine conservation and ecosystem health. It is the Research Center's mission, through innovative and dedicated teaching and research, to strengthen and expand our understanding of population ecology and disease epidemiology in marine ecosystems, as veterinarians have a fundamental role to play in addressing aquatic animal health challenges and opportunities.