PROJECT TITLE: Effect of elevated water temperature and marine heatwaves on seaweed-human pathogen interaction

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Project keywords: (provide as required) Human diseases, Climate change, Seaweeds, heatwaves

Proposed start date: Late June 2023

Project description

Rising coastal water temperatures and marine heatwaves due to climate change is one of the major stressors on marine ecosystems, with the potential to increase prevalence of disease-causing pathogens due to their increased growth and survival. Human pathogens that are of specific interest are *Vibrios* and *E.coli*, which are globally an important cause of disease in humans, with *Vibrios* also causing disease in aquatic plants and animals.

Seaweeds underpin some of the most extensive and productive coastal ecosystems globally, providing a suite of ecologically valuable functions such as provision of habitat and carbon sequestration. Seaweeds are known to produce a rich diversity of bioactive compounds that can recruit and defend microbes including human pathogens. Our previous work has suggested that certain seaweeds can be hot-spots of pathogenic *Vibrios* while some can defend *Vibrios* in the field under ambient conditions. But we do not know how this relationship will change with increase in mean temperature or under extreme events.

This research aims to 1) investigate if climate change stressors such as increased mean temperature and heatwaves may enhance seaweed-pathogenic *Vibrio* association and 2) thus may threaten the coastal communities dominated by seaweeds.

Following a field work, the project will be conducted in climate controlled environmental chambers in PML where the student will be trained to design mesocosm studies investigating the effect of ambient (15°C) and elevated temperatures (25°C) on association of seaweeds and human pathogens. The student will also be trained to simulate marine heatwaves under laboratory settings. Following the mesocosm experiments, the student will be trained with the necessary microbiology and molecular biology skills to quantify the association of pathogens with seaweeds in different treatments. The data will then be analysed using different statistical tools to investigate the differences between seaweed-*Vibrio* association subjected to different treatments.

Overall, this project will allow the student to acquire first-hand research experience on...
a topic within the NERC remit. The student will not only be trained in diverse cutting-edge techniques but will learn to interpret and evaluate data results critically and will be encouraged to gain skills to work independently.

Candidate requirements

We seek a highly motivated student with suitable undergraduate degrees: Marine Biology, Biological Sciences, Marine and Environmental Sciences.

Background reading and references

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