

Metals could reveal corals' past lives

February 6 2024, by Nathaniel Scharping



A new study analyzes how metal isotopes may increase scientists' understanding of how corals like these in Australia's Great Barrier Reef respond to stress.

Credit: Toby Hudson/Wikimedia Commons, CC BY-SA 3.0

Coral reefs worldwide face dire threats from ocean warming, increasing acidification, pollution, and other stressors. Understanding how corals respond to stress and how they evolved along with their environments is critical for designing interventions to protect reef ecosystems.

One way to study this is to examine the stable metal isotopes, such as iron, calcium, magnesium, copper, and zinc, found in various parts of corals, including their [calcium carbonate](#) exoskeletons. Like [tree rings](#), these skeletons grow in layers and can serve as a record of health and environmental changes over time.

It is particularly useful to examine metal isotopes because they are used in many of corals' biological processes, such as nucleic acid metabolism, photosynthesis, and major ion transport. This makes these isotopes potential proxies for coral biological activity.

In a [perspective paper](#), published in the *Journal of Geophysical Research: Biogeosciences* Xuefei Chen and colleagues provide an overview of how metal elements can offer insight into corals' biological responses to [climate change](#) and possibly provide directions for future research.

Previous studies have shown that skeletal calcium and magnesium isotopic ratios could be a proxy for temperature, whereas zinc and copper isotopic ratios might reveal insights into feeding conditions. But questions remain at both the biological and ecological levels. For example, how does metal isotope behavior differ between coral tissues and skeletons? How are other elements of the coral ecosystem, such as symbiotic algae, involved?

The researchers call for more comprehensive studies of the role of stable [metal](#) isotopes in corals and their surrounding ecosystems. This future work, they say, should include multidisciplinary collaborations across biology, geochemistry, and ecology and should span multiple levels of biological organization. Continuing experiments involving coral cultivation are also essential, as well as comparative studies with inorganically created calcium carbonate.

More information: Xuefei Chen et al, A Perspective on Probing Coral

Resilience to Climate and Environmental Changes Using Stable Isotopes of Bio-Utilized Metal Elements, *Journal of Geophysical Research: Biogeosciences* (2024). [DOI: 10.1029/2023JG007656](https://doi.org/10.1029/2023JG007656)

This story is republished courtesy of Eos, hosted by the American Geophysical Union. Read the original story [here](#).

Provided by Eos

Citation: Metals could reveal corals' past lives (2024, February 6) retrieved 27 April 2024 from <https://phys.org/news/2024-02-metals-reveal-corals.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.