

# Marine algae can sense the rainbow

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A new study published in *Proceedings of the National Academy of Sciences* has shown for the first time that several types of aquatic algae can detect orange, green and blue light.

Land plants have receptors to detect light on the red and far red of the spectrum, which are the common wavelengths in the air. These plants sense the light to move and grow as their environment changes, for example when another plant shades them from the sun. But in the ocean, the water absorbs red wavelengths, instead reflecting colours such as blue and green. As part of the study, a team of researchers including Canadian Institute for Advanced Research (CIFAR) Senior Fellow Alexandra Worden sequenced about 20 different marine [algae](#) and found they were capable of detecting not only red light, but also many other colours. Collaborators in the lab of J. Clark Lagarias performed the biochemical analyses that established the wavelength detection.

"It's an amazing innovation of these algae to sense the whole rainbow," says Dr. Worden, who leads a microbial ecology research group at Monterey Bay Aquarium Research Institute in California. She is a member of CIFAR's Integrated Microbial Biodiversity program, which uses interdisciplinary research to study how a diversity of microbial life shapes all ecosystems. Her lab selected and grew the algae for sequencing in a collaborative effort with CIFAR Fellow Adrián Reyes-Prieto, who she first met at the Institute's program meetings. They specifically targeted diverse but largely unstudied organisms that might reveal new evolutionary insights into photosynthetic organisms. The Gordon and Betty Moore Foundation accepted sequencing nominations

from Dr. Worden and provided sequencing funds in support of understanding [eukaryotic algae](#).

"The phytoplankton in the oceans are, of course, really important to regulating our climate, and we just never knew that they were able to sense our environment in this way," she says.

Dr. Worden says her collaborators are interested in understanding the origins of photosynthetic life, in part because it played a crucial role in allowing other life forms, including humans, to exist. The research could also help with food production by teaching us ways to engineer crops so they will grow in many [light](#) conditions.

**More information:** *PNAS* [DOI: 10.1073/pnas.1401871111](https://doi.org/10.1073/pnas.1401871111)

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