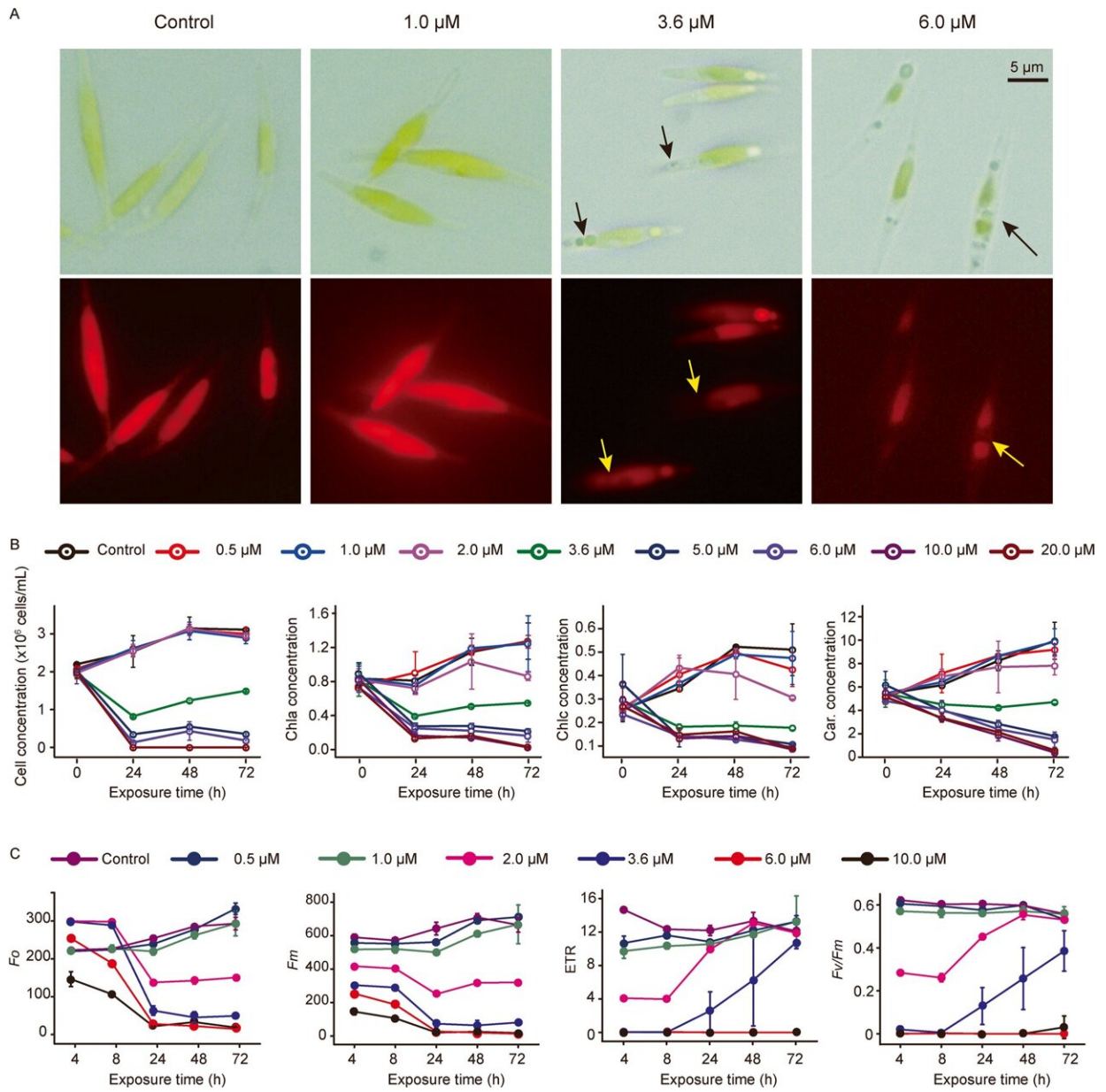


Study reveals how marine bacteria combat algae

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Morphology, amount of pigment and photophysiological response of *Phaeodactylum tricornutum* CCMP2561 to 4-BP. Credit: *The ISME Journal* (2023). DOI: 10.1038/s41396-023-01510-0

Algae and bacteria are inseparable in ocean ecosystems, with bacteria playing a crucial role in regulating the growth and metabolism of algae. In addition to mutualism, bacteria have developed various molecular-based strategies to combat algae.

Recently, researchers from the Qingdao Institute of Bioenergy and Bioprocess Technology (QIBEBT) of the Chinese Academy of Sciences (CAS) have discovered a novel chemical that is widely used by bacteria to combat [algae](#) in the ocean.

Their findings were published in *The ISME Journal* on Sept. 8.

The researchers isolated a marine bacterium with algae-killing activity against a variety of algae, including diatoms, green algae, and dinoflagellates. They revealed that the lethal effect on algae was determined by a small molecule called 3,3',5,5'-tetrabromo-2,2'-biphenyldiol (abbreviated as 4-BP) synthesized and released by the bacteria.

The synthesis of 4-BP is determined by a [gene cluster](#) that includes three genes encoding chorismate lyase, flavin-dependent halogenase and cytochrome P450.

The algae-killing function of 4-BP is achieved by inhibiting the synthesis of plastoquinone-9 in algae, which is a crucial component in the [electron transport chain](#) in the photosystem of algae. When 4-BP is introduced into simulated blooming seawater, algal abundance is effectively

suppressed.

Importantly, the researchers found that the synthesis genes for 4-BP are present in diverse bacteria in global oceans, suggesting that 4-BP is a bacterial tool widely used in global oceans to mediate antagonistic bacteria-algae relationships.

More information: Zenghu Zhang et al, Plastoquinone synthesis inhibition by tetrabromo biphenyldiol as a widespread algicidal mechanism of marine bacteria, *The ISME Journal* (2023). [DOI: 10.1038/s41396-023-01510-0](https://doi.org/10.1038/s41396-023-01510-0)

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