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In recent years, mass coral bleaching has been recognized around the world. Coral bleaching is a phenomenon that coral loses symbiotic algae “zooxanthellae” due to strong solar radiation and high water temperature, and white coral skeleton can be seen through the transparent its soft tissue. Coral bleaching is caused by a damage of photosynthetic system of zooxanthella by strong light and the damaged part is not repaired by the continuation of the high water temperature, leading to a generation of harmful reactive oxygen species by combining surplus electrons and surrounding oxygen.

Since a translocation of fixed carbon from zooxanthellae to coral decreases during bleaching event, corals are forced to consume the stored lipids in the tissues. Prolonged bleaching event eventually causes the death of coral. Corals that store enough energy by predation have more resistance against bleaching (Ferrier-Pages et al. 2010). An addition of a trace amount of inorganic metals to corals has shown an increase in antioxidant enzyme activity (Sasaki 2013). Feeding activity is not only energy supply for coral but also supply of trace metal elements that can be used for the active center of antioxidant enzyme as a cofactor. It is possible that heterotrophic feeding may improve a tolerance of coral bleaching. Therefore, the aim of this study is to investigate experimentally whether antioxidant capacity can be enhanced by heterotrophic nutrition.

Coral polyps of *Galaxea fascicularis* were incubated with and without a feeding condition for 20 days. Zooplankton was given to coral at the dawn when coral actively extends its tentacles and takes predatory behavior (AM 5: 00 - 8: 00). After 20 days, the water temperature was raised up to 31ºC within 3 days. Finally, all the coral polyps were sacrificed and separated into host tissues and zooxanthella. Superoxide dismutase (SOD) enzyme activity of the antioxidant and concentration of the metal element contained in the protein were measured, respectively.

As a result of feeding experiment, the SOD enzyme activity increased under feeding conditions of 27 ℃ and maintained the activity level after exposure to high water temperature, indicating the enhancement of the antioxidant activity of *G. fascicularis* by feeding process.

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