

BACTERIAL COMMUNITIES HELP SURVIVALS OF DIATOM POPULATIONS FROM VIRAL ATTACKS

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A number of field studies and laboratory experiments showed that diatom dynamics in nature are affected by various environmental factors (e.g., water temperature, salinity, light, nutrients, and water movement). During the last two decades, several studies reported that viral impacts are also important for disintegrations of phytoplankton bloom population. In bacterial free culture experiments, diatoms are completely crashed due to viral infections. The diatom populations in natural environments, however, are not completely killed by viruses and continuously grow under the viral pressure. There may be several strategies for the host population to reduce the viral impacts. In this study, we tried to analyze the survival mechanism of diatoms post viral infections, using a host-virus culture system, marine planktonic diatom *Chaetoceros tenuissimus* Meunier (Bacillariophyceae, Centrales) and its single-stranded RNA virus CtenRNAV, especially from the view point of bacterial affects.

In axenic conditions, *C. tenuissimus* cells were almost crashed due to viral inoculations and a regrowth of the population was not observed. The host populations inoculated with marine bacterial community also showed the rapid decreases of the cell concentration. After 7 days of post viral infection, however, a few cells survived and the population showed regrowth under a high viral concentration environment. This indicated that the some functions of the bacterial community or species might help for *C. tenuissimus* survivals from viral infections. The bacterial community was isolated from the same sea water used for the *C. tenuissimus* isolations. We prepared 96 bacterial isolates and added each of them to the host-virus system. The results showed that any bacterial isolates induces the survival of the host population. Under epi-fluorescent microscopy using SYBR-Gold staining, many bacteria were observed onto the *C. tenuissimus* cell surfaces, and which might be significantly related to the survival. In nature, many environmental factors and host strategies may affect the survival of the diatom populations from viral attacks. The host cell associated bacteria might be one of these factors, but the mechanisms are still unknown. Now, we are trying to clarify the bacterial functions affected to the host survival mechanism, by using physiological, molecular biological and cell biological analyses.