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学位論文題名	緑色糸状性光合成細菌の滑走運動を促進するプロテアーゼを介した細菌間相互作用 (英文)
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【論文の内容の要旨】

The thermophilic photosynthetic bacterium, *Chloroflexus aggregans* has been widely found from microbial mats in hot springs in Japan. *C. aggregans* has been reported as a major component in the microbial mats developed at the temperature 50 to 70° C. *C. aggregans* shows gliding motility to form dense cell aggregation in a liquid medium. Interspecies interaction may occur in the microbial mats where bacterial cells of diverse species are densely packed. It has been reported that interspecies interaction causes various phenotypical changes including biofilm formation and motility. I studied the effect of coexisting bacteria on the cell aggregation of *C. aggregans*.

Heterotrophic bacteria were isolated from the microbial mats to evaluate effect on the cell aggregation of *C. aggregans*. Cell aggregation was promoted by the addition of culture supernatants of 5 isolates. Strain BL55a showed the most remarkable promoting effect on the cell aggregation and was closely related to *Bacillus licheniformis* by 16S rRNA gene sequences analysis. The promoting effect was completely suppressed after heating the culture supernatants at 105 ° C for 10 min. Size fractionation of the culture supernatant indicated that molecular weight of the promoting factor was above 10,000. From these results, a possible promoting factor was extracellular enzyme. Protease activity was detected from all of the isolates that showed the promoting effect on cell aggregation. A purified protease obtained

from *B. licheniformis* was also showed the promoting effect. These results indicates that a protease in the culture supernatant promoted cell aggregation of *C. aggregans*.

To examine the possible utilization of *C. aggregans* cells by the heterotrophic bacteria, Strain BL55a was spread on agar medium that contains *C. aggregans* without any other carbon source. After 2 days of cultivation, colonies of BL55a were detected and cell lysis of *C. aggregans* around the colonies was observed. These results indicate degradation and utilization of *C. aggregans* cells by BL55a.

Escape behavior of *C. aggregans* from protease was evaluated. *C. aggregans* cell-containing agar was placed next to protease containing agar in a glass cuvette. Fresh agar was placed on the other side of the protease containing agar. During the incubation at 55 ° C in the light, cells of *C. aggregans* were moved to the fresh agar layer.

This is a first report that protease produced by other bacteria stimulates bacterial cell aggregation. Strain BL55a shows predatory behavior through protease and *C. aggregans* moves away from the protease. Such escape behavior of prey from predator observed in this study has not been reported in bacteria.