

Transmission electron microscopic observations of the symbiotic algae in *Paramecium bursaria* treated with cycloheximide

Yuuki KODAMA<sup>1,2</sup>, Isao INOUYE<sup>1</sup> and Masahiro FUJISHIMA<sup>3</sup>

(<sup>1</sup>Grad. School of Life and Env. Sci., Tsukuba Univ., <sup>2</sup>Res. Fellow of JSPS PD, <sup>3</sup>Dept. Env. Sci. and Engineering, Grad. School of Sci. and Engineering, Yamaguchi Univ.)

SUMMARY

*Paramecium bursaria* cells harbor several hundred symbiotic algae in their cytoplasm. Each alga is enclosed in a perialgal vacuole derived from the host digestive vacuole, and the alga is thereby protected from digestion by lysosomal fusion. In a previous study, we reported that treatment of algae-bearing *Paramecium* cells with the protein synthesis inhibitor, cycloheximide, induces synchronous swelling of all perialgal vacuoles that are localized immediately beneath the host's cell surface. Subsequently, the vacuoles detached from beneath the host's cell surface, and the algae in the vacuoles were digested after host lysosomal fusion with the perialgal vacuole membrane. These phenomena are induced only under fluorescent light, and not under constant darkness. By transmission electron microscopy, it was revealed that the inner structure of symbiotic algae inside the perialgal vacuole membrane was destroyed immediately after treatment with cycloheximide. This change was observed before the swelling of the perialgal vacuole membrane. These results indicate that treatment with cycloheximide induces algal death even if the alga is enclosed within the perialgal vacuole membrane.