# *Chlorella variabilis* incubated under constant dark condition loses an ability to avoid digestion by the host lysosomal enzymes in the digestive vacuoles of *Paramecium bursaria*

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**SUMMARY**

*Chlorella* spp.-free *Paramecium bursaria* cells can be experimentally reinfected with algae isolated from alga-bearing cells by ingestion into digestive vacuoles. To establish endosymbiosis with alga-free *P. bursaira* cells, some algae acquire temporary resistance to the host lysosomal enzymes in the digestive vacuoles, even when the digested ones coexist. This phenomenon is observed even if cloned algal cells were ingested into the digestive vacuoles. Although cloned algal cells were used for the reinfection experiments, we cannot exclude the possibility that some differences might have arisen among the algae in the donor host cells. For example, there may have been a difference in the photosynthetic activity of each symbiotic alga. To examine this possibility, we incubated isolated symbiotic algae under constant light or dark conditions before mixing them with alga-free cells. As a result, when the isolated algae were kept under constant dark condition for 24 h, almost algae were digested in the digestive vacuoles. This observation shows that algal photosynthetic activity before mixing with *P. bursaria* is needed to avoid digestion by the host lysosomal enzymes.