Infectivity of *Chlorella* species for the ciliate *Paramecium bursaria* is based on their ability to localize beneath the host cell membrane after escaping from the host digestive vacuole in the early infection process

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Paramecium bursaria cells harbor several hundred symbiotic algae in their cytoplasm. Algae-free cells can be reinfected through their digestive vacuoles with algae isolated from algae-bearing cells or with cultivated *Chlorella* species. To determine the relationship between the infectivity of various *Chlorella* species and the nature of their cell wall components, algae-free *P. bursaria* cells were mixed with 15 strains of cultivated *Chlorella* and observed for the establishment of endosymbiosis. Only 2 free-living *Chlorella* strains were maintained in the host cells. Infection-incapable strains could escape from the host digestive vacuole but failed to localize beneath the host cell membrane and were eventually digested. Labeling of their cell walls with 3 lectins, with or without pre-treatment with 0.4 N NaOH, showed no relationship between their infectivity and stainability with these lectins. Our results indicate that the infectivity of *Chlorella* species for *P. bursaria* is not based on the sugar residues on their cell wall or the alkali-insoluble part of the cell wall components, but on their ability to localize just beneath the host cell membrane after escaping from the host digestive vacuole.