

Timing of establishing symbiosis during the re-infection of *Chlorella* sp.
in *Paramecium bursaria*

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SUMMARY

White cells of *P. bursaria* can be quickly restored to green by re-infecting them with *Chlorella* isolated from green cells. Six hours after re-infection, host cells contain about 450 *Chlorella* per cell. After washing, the number of *Chlorella* decrease to about 100 per cell, 1 day after re-infection. They then increase gradually for 3 to 7 days. The survival rate of re-infected cells exposed to H₂O₂ was assayed at the same time as *Chlorella* proliferation was monitored. Their survival rate increased gradually to the level of the original green cells 3 to 4 days after re-infection. When white cells entrained to a LD 12:12 h cycle were re-infected with *Chlorella* isolated from green cells entrained to a reverse-phase LD cycle, they retained the same mating reactivity rhythm as the original white cells during the first 2 days, but began to shift to the phase of the *Chlorella* 3 days after re-infection, when kept in continuous light. A similar shift was observed 4 days after re-infection, when white cells entrained to a LD cycle at 25°C were re-infected with *Chlorella* isolated from green cells entrained to a different temperature cycle. The time for establishment of symbiosis was demonstrated to be 3–4 days after re-infection.