

# The similar group I introns indicate previous contact between representatives of the paramecian symbiotic algae “American” and “European”

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## SUMMARY

Most *Paramecium bursaria* have chlorellacean symbiotic algae. These algae are called either “American” or “European”, depending on their origin. The algae differ genetically from each other at the species-level, and differ from known free-living *Chlorella* spp. We previously identified the insertion patterns of group I intron(s) in the SSU rDNAs of these algae as a method to distinguish them from each other. Here we determine the LSU rDNA sequence of *Chlorella* sp. PBSW1-ZK (“European”) and identify a further IE intron at position L2449 (numbered according to *E. coli* rRNA); this is the first record of an IE intron insertion in this position. We then constructed a phylogenetic tree of the IE introns that are commonly observed in both “American” and “European” rDNAs. The relationships between these introns were extremely peculiar in these analyses. The L2449 “European” intron was grouped together with the S516 position family (most of IE introns found in green algae are limited to this position), even though it does not have a common sequence, such as the internal guide sequence (IGS), necessary for intron infection via reverse splicing. The other “European” intron (S651) occurred as an independent clade together with all four “American” IE introns, even though they do not have common IGS (except “American” L1926 – L2184). These results suggest that there exists an unknown mechanism of intron infection inside the *P. bursaria* cell. The close relation found between the “American” and “European” introns implies that these two algae groups coexist in *P. bursaria* before.