

## **Genome analysis of a symbiotic cyanobacterium in a dinophysialean dinoflagellate, *Ornithocercus magnificus***

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Many dinoflagellate species belonging to Dinophysiales are known to be in symbiotic relationship with cyanobacteria. Members of a dinophysialean genus *Ornithocercus* possess characteristic chambers enclosed by developed cingular lists for their cyanobacterial symbionts, implying that this partnership is not trivial for both host and symbiont. To our knowledge, there is no laboratory culture of any dinophysialeans harboring cyanobacterial symbiont, and the dinoflagellate–cyanobacterium interaction has been studied mainly by microscopic observations on the cells isolated from sea water samples. To obtain deeper insights into the cyanobacterial symbiosis in dinophysialeans, we amplified and sequenced the genome of symbiotic cyanobacteria isolated from a single *O. magnificus* cell. By comparing to the genomes of free-living cyanobacteria, we detected a reductive trend in the genome of the *O. magnificus* symbiont, which is likely an outcome from the adaptation to a symbiotic lifestyle. Nevertheless, the magnitude of gene loss appeared to be less severe in the genome of the *O. magnificus* symbiont than those of other cyanobacterial symbionts, suggesting metabolic independence of the symbiont. The genome data from the cyanobacterial symbiont in *O. magnificus* is consistent with the hypothesis of the host growing cyanobacteria in the chamber as preys.