Abstract

Psalteriomonadidae is a small family of anaerobic amoeboflagellates belonging to Heterolobosea. So far, 16 species have been described and there are also at least another 17 putative species which are yet to be formally described. Their anaerobic lifestyle is associated with a modification of the mitochondria into hydrogen-producing hydrogenosomes. The main focus of this thesis is on methanogenic symbionts of this family. The presence of prokaryotic symbionts has been observed in three species of *Psalteriomonas*, namely *P. lanterna*, *P. vulgaris* and *P. magna*. In *P. lanterna*, and *P. vulgaris* the symbionts were identified as *Methanobacterium formicicum* on the basis of their morphology and biochemical properties. For this thesis, 37 new freshwater isolates of psalteriomonadids were collected, identified, sequenced, and together with older isolates in culture, were investigated for the presence of prokaryotic symbionts. The UV autofluorescence of the symbionts of *P. lanterna P. magna* and Psalteriomonadidae sp. 5 indicates that they are methanogenic Archaea. No traces of methanogens were found in three isolates of *Sawyeria marylandensis* and three isolates of different *Harpagon* species. The symbionts were identified as *Methanoregula* sp. based on the 16S rRNA gene sequence. The symbionts were divided into ten groups, each representing unique genotype. A comparison between the phylogenetic tree of symbiont genotypes with that of their hosts is consistent with notable host specificity. Two of the 37 psalteriomonadid strains sequenced represent new species. Host morphologic and phylogenetic studies focused mainly on the most abundant species, *P. lanterna*. This species was divided into four genetic lineages, based on their 18S rRNA gene sequences and their unique symbiont genotypes. The in vivo morphology of the amoeba form was documented for each of the *P. lanterna* lineages. In four of the strains morphology of the rarer flagellate form was documented by light microscopy, both in vivo and using two different protargol staining methods.