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## Diversity of symbiotic algae in Radiolaria

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Members of Acantharea, Polycystinea, and Phaeodarea are holo planktonic protists that are widely distributed in tropical, subtropical, and even polar marine environments. Many researchers use the conventional term Radiolaria to include these three classes. Recent molecular studies (e.g., Polet et al., 2004; Yuasa et al., 2005; Kunitomo et al., 2006) based on small-subunit ribosomal DNA (18S rDNA) sequences have resolved that these three classes branch off within the Rhizaria.

Various types of algae occur as intracellular symbionts in the polycystine Radiolaria; dinoflagellates, prasinophytes, and prymnesiophytes (e.g., Anderson, 1976). The acquisitions of the photo-symbionts have may have had their survival under low nutrient condition in the geologic time. Although dinoflagellates, prasinophytes, and haptophytes have been identified as endosymbionts of radiolarians by ultrastructural and molecular studies (e.g., Anderson, 1983; Gast and Caron, 1996), the accurate taxonomic affiliation of these symbionts has not been clarified by the lack of diagnostic morphological features, such as theca or flagella, during the symbiotic state. In this study, we report some new findings on molecular phylogeny and fine-structural studies of symbiotic algae in the polycystine radiolarians.

Keywords: Radiolaria, symbiosis, algae, Polycystinea, ultrastructure, 18S rDNA