# Diplonemids – new flagellates on the oceanic block

Microorganisms shape the chemical composition of our planet: the air, land, and seas, through their trophic activities as primary producers, grazers, predators or detritivores. The world’s oceans represent by far the largest biome, crucial to the global cycling of nutrients, including carbon, nitrogen, iron, sulfur and phosphorus (1). The vast majority of ocean biomass and biodiversity is composed of plankton, a universe of floating and swimming organisms ranging from prokaryotes to small animals. A significant part of the plankton in the upper sunlit layer of the ocean is represented by an understudied group of heterotrophic excavate flagellates called diplonemids, the 6th most abundant eukaryotic group, and one of the most diversified in terms of 18S-V9 variability (2). Diplonemids are generally considered to be predatory eukaryotes, although parasitic and possibly also symbiotic life strategies are described for species (3). However, we only have few molecular and morphological data available regarding diplonemids (4,5), and our knowledge about the adaptation to environmental changes and their life strategy is limited, as well. The model species *Paradiplonema papillatum* is the best studied representative of the diplonemid group. Based on the KEGG-mapped metabolism, we predicted the most plausible energetic sources, which these protists may use in the wide ecological niche they occupy. The complexities of transcriptome, proteome, and metabolome reveal unusual flexibility of *P. papillatum* and likely other diplonemids, allowing them to survive under a wide range of conditions. Although not a true anaerobe, the extensive set of anaerobic enzymes allows the dissected flagellate to face nutrient and/or oxygen deprivation and even survive hypoxia, awaiting the improvement of conditions. *P. papillatum* seems to gain flexibility by retaining alternative metabolic pathways and to be able to switch among them efficiently (6).

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