



## **A polyphasic approach to explore protistan diversity**

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Protists are mostly unicellular eukaryotes that are an essential component of microbial food webs and play key roles in global biogeochemical cycles. They are structurally and metabolically a highly diverse group of organisms and include autotrophs, heterotrophs, and mixotrophs and occur in virtually all habitats. In terms of phylogenetic diversity and abundance, they most likely outnumber all other eukaryotes known to date. Considering the important role protists play in our planet's ecosystems, it is remarkable that even experts in the field cannot agree on the extent of diversity in the kingdom protista. While the traditional view of protistan taxa presents them as fully documented, recent developments in environmental genomics suggest the existence of a tremendous diversity of previously unknown protists. This disparity fuels a major debate surrounding microeukaryote diversity regarding its definition, what, if any, biogeographical patterns it exhibits, and what ecological and evolutionary significance any novel forms might have. Major barriers to study protistan diversity are methodological shortcomings. I here present a polyphasic approach combining molecular, microscopy-based and statistical tools to address the nature of protistan diversity.