Scientists reclassify eukaryotic microorganisms

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One of the biggest scientific challenges is the classification of the natural world, especially the protists, which are eukaryotic microorganisms. While the classification proposed by Sina Adl et al. (2005) was

conservative enough to help keep erroneous or premature groupings at bay, an international team of researchers has revised the classification, incorporating latest advances in the use of phylogenomic-scale phylogenetic analyses and increased taxon sampling. The goal? To shed fresh light on the current state of protist diversity and categorisation, and of undiscovered species. The reclassification was presented in the *Journal of Eukaryotic Microbiology*.

'Protists include species traditionally referred to as protozoa and algae, some fungal-like organisms, and many other life-forms that do not fit into the old worldview that divided species between plants and animals,' said Professor Sina Adl of the University of Saskatchewan in Canada. 'By the 1960s, it had become clear that these species could no longer fit within such a narrow system, yet the first community-wide attempt to rationally categorise all the protists in the natural evolutionary groups was only made in 2005.'

This reclassification puts to rest the technological limitations observed seven years ago. It also introduces and recognises new super groups. 'With environmental genomics we are experiencing a renaissance of new protist discoveries,' explained Professor Adl. 'These new species allow us to better appreciate how little we know about the biodiversity around us and how they contribute to maintaining the planet's chemical balance.'

This new information helps boost our understanding of age-old relationships between protists, their shared ancestry and their links to animals and plants, according to the researchers.

They identified a group connecting animals, fungi and their protist relatives, such as marine choanoflagellates, to protists that are dominated by amoeboid cells, including slime moulds, algae and tiny crustaceans. The researchers also recognised Stramenopiles, Alveolates, and Rhizaria (SAR), a new supergroup that contains common and successful algae,

microbial predators and parasites on our planet. Giant kelp and other brown seaweeds belong to this group, as do living sand grains known as 'forams', and the parasite that causes malaria in people. Studies performed since 2005, namely large-scale deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) sequencing, have indicated that profoundly dissimilar forms are related to each other.

'This new classification, that better reflects how species are related, improves our ability to predict the number of species that remain to be discovered,' concluded Professor Adl. 'There is a huge unknown diversity in the deep sea, but probably even more in the soil we walk on.'

More information: Adl, S. et al., 'The Revised Classification of Eukaryotes', *Journal of Eukaryotic Microbiology*, 2012. doi:10.1111/j.1550-7408.2012.00644.x

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