Enhancing algal research *via* flow cytometry

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Flow cytometry (FCM) has significant potential in various fields of algal research, yet its application is still in its infancy. Compared to studies on plants and animals, algal FCM is often more labour-intensive due to the challenges of obtaining a sufficient amount of biomass and of isolating protoplasts (due to the diversity of cell wall compositions), as well as interference from pigments and secondary metabolites during fluorescent staining. However, overcoming these issues enables FCM to assess chlorophyll content and cell viability, detect harmful algal blooms and identify life cycle stages. For example, by analyzing two distinct ploidy stages, both capable of independent mitotic propagation, we identified an isomorphic haploid-diploid life cycle in chrysophytes. Furthermore, unicellular microalgae represent promising models for studying genome size evolution, thanks to their rapid generation times, observable phenotypic shifts, and easy experimental manipulation.