

**OA1.1 - Characterizing the light harvesting apparatus of *Nannochloropsis gaditana***

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*Nannochloropsis* is a unicellular photosynthetic microalga, which belongs to the class Eustigmatophyceae of the Heterokontophyta (a diverse algae group that also includes diatoms). Strains from this genus are known for their high lipid accumulation and have been studied in recent years for their potential in biofuel production. It is predicted that increases in the productivity of algal cultures could be achieved through higher light utilization efficiency, which requires a detailed understanding of the organization of the light harvesting antenna. While the overall structure of the photosynthetic apparatus of *Nannochloropsis* resembles that of green algae, the function of individual light harvesting complexes (LHCs) is still unclear. It has been shown that *Nannochloropsis* LHCs bind only chlorophyll a and could be divided into several LHC families, including: violaxanthin-chlorophyll a binding proteins (VCPs), LHCs, and LHCs related to Red-CLH of *Chromera velia*. To dissect the role of individual and multiple LHCs in light harvesting and photoprotection, we performed systematic mutagenesis and screens followed by detailed photophysiological and biochemical analysis of *Nannochloropsis gaditana*. Here we describe these approaches and present our findings, including the discovery of key regulators of light harvesting capacity, confirmation of the LHC involved in non-photochemical quenching (NPQ), the role of VCP LHCs in light harvesting and NPQ, and evidence for substantial redundancy among light harvesting polypeptides in *Nannochloropsis*.