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Involvement of the Lhcx protein Fcp6 of the diatom *Cyclotella meneghiniana* in the macro-organization and structural flexibility of thylakoid membranes

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Abstract

Diatoms possess special light-harvesting proteins involved in the photoprotection mechanism called non-photochemical quenching (NPQ). These Lhcx proteins were shown to be subunits of trimeric fucoxanthin-chlorophyll complexes (FCPa) in centric diatoms, but their mode of action is still unclear. Here we investigated the influence of Fcp6, an orthologue to Lhcx1 of *Thalassiosira pseudonana* in the diatom *Cyclotella meneghiniana*, by reducing its amount using an antisense approach. Whereas the pigment interactions inside FCPa were not influenced by the presence or absence of Fcp6, as demonstrated by unaltered spectra of circular dichroism, changes could be observed on the level of thylakoids and cells in the mutants compared to WT. This fits to recent models of NPQ in diatoms, where FCP aggregation or supramolecular reorganisation is thought to be a major feature. Thus, Fcp6 (Lhcx1) appears to alter pigment-pigment interactions inside the aggregates, but not inside (un-aggregated) FCPa itself.

Keywords

anisotropic circular dichroism, FCPa, LHCSR, Lhcx1, non-photochemical quenching