# LHC-LIKE SUPERFAMILY PROTEINS IN DIATOMS

Sabine Sturm*,[1], Johannes Engelken*,[1,2], Ansgar Gruber*,[1], Sascha Vugrinec[1], Iwona Adamska[1], Peter G. Kroth[1] & Johann Lavaud[1,3]

*equal contribution

[1]Fachbereich Biologie, Universität Konstanz

[2]Current address: Institute of Evolutionary Biology (CSIC-UPF), Pompeu Fabra University

[3]Current address: UMR CNRS 6250 'LIENSs', Institute for Coastal and Environmental Research, University of La Rochelle

The light harvesting complex-like (LHC-like) superfamily of proteins comprises different families of chlorophyll binding proteins with one to four transmembrane helices. We identified members of this superfamily in the genomes of the diatoms *Phaeodactylum tricornutum* and *Thallasiosira pseudonana* and found homologues of one helix protein 1 - like (OHP1-like), one helix protein 2 (OHP2) and stress enhanced Protein (SEP, two transmembrane helices) to be encoded on the nuclear genomes of the investigated diatoms. In addition, we found so far uncharacterised three helix LHC-like proteins. Phylogenetic analyses revealed that these proteins are not related to the three helix ELIPS (early light induced proteins) found in green algae and higher plants. Instead they form a distinct protein family that is exclusively found in red algae and algae with secondary plastids of red algal origin. Via presequence analyses and fusions with the green fluorescent protein (GFP) we found out that these proteins are plastid targeted in diatoms. Transcription patterns of the three helix LHC-like genes resemble those of FCP genes rather than those of ELIPS in higher plants as shown by quantitative reverse transcription PCR. This indicates that they might have a different function in diatoms than ELIPS in higher plants. Also the investigated OHP1-like, OHP2 and SEP genes showed different transcription patterns compared to their respective plant homologues. Taken together our results show that LHC-like genes in diatoms are distributed and transcribed in a different way than in green algae and plants, which might reflect the differences in high light protection between these groups.