SAIP2015



Contribution ID: 237

Type: Oral Presentation

Ultrafast energy transfer and photoprotection in the light-harvesting complexes of the diatom Cyclotella meneghiniana

Friday, 3 July 2015 11:10 (20 minutes)

Abstract content
 (Max 300 words)
Formatting &
Special chars

Diatoms are unicellular marine photosynthetic organisms characterized by their silica shell. Their light harvesting complexes are named fucoxanthin-chlorophyll protein (FCP). Besides efficient absorption and rapid subsequent transfer of photoenergy to the photochemical reaction centre, FCP complexes are also strongly involved in photoprotection, a complex series of events known as non-photochemical quenching (NPQ) by which plants and algae dissipate excess absorbed energy that would otherwise damage the photosystems. Diatoms exhibit considerably stronger NPQ than plants. The diatom Cyclotella meneghiniana possesses two types of light-harvesting complexes, known as FCPa and FCPb, which differ primarily in their protein compositions. In this study we used femtosecond transient absorption spectroscopy to investigate the energy transfer dynamics and thermal energy dissipation pathways in FCPb at the last energy transfer stage. Two different pump energies at 680 nm excitation were used. The effect of the environment surrounding the protein was investigated by comparing the behavior of solubilized FCPb (sFCPb) with that of FCPb incorporated into proteoliposomes (plFCPb), the latter of which serve as a model system for the study of membrane-bound enzymes and transport proteins. The results show that, while the fluorescence of the plFCPb sample is quenched relative to sFCPb, it appears to exhibit less annihilation than sFCPb, suggesting that the proteoliposome samples may be a new model system to study NPQ mechanisms in these complexes.

Apply to be
 considered for a student
 award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
 PhD, N/A)?

PhD

Main supervisor (name and email)
and his / her institution

Dr. Tjaart Kruger, Tjaart.Kruger@up.ac.za, University of Pretoria

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Please indicate whether
this abstract may be
published online
(Yes / No)

No

Primary author: Mr ELNOUR, Huzifa (University of Pretoria)

Co-authors: Dr RAMANAN, Charusheela (VU University, Amsterdam); Prof. VAN GRONDELLE, Rienk (VU University, Amsterdam); Dr KRUGER, Tjaart (University of Pretoria)

Presenter: Dr KRUGER, Tjaart (University of Pretoria)

Session Classification: Photonics

Track Classification: Track C - Photonics

No