Decoding the Interplay Between FMO and PscB: Unveiling Their Role in Excitation Energy Transfer in *Chlorobaculum tepidum*, a Green Sulfur Bacterium

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Chlorobaculum tepidum, a Green Sulfur Bacteria (GSB), has three major pigment protein complexes involved in early events of light-harvesting and photochemical conversion: Chlorosome, Fenna Matthews Olson (FMO) and Reaction Centre (RC). Chlorosome captures the light energy which is transferred to RC through FMO trimer. On the other hand, PscB, a pigment-less iron-sulfur cluster protein and subunit of the reaction center (RC), terminally binds to FMO (Figure 1A) and contains intrinsically disordered regions, the structure and function of which remain unclear, leaving its precise role yet to be elucidated. This study aims to elucidate FMO-PscB interactions using biochemical and optical molecular spectroscopic methods as steady-state absorption (Figure 1B) and fs-time-resolved transient absorption. Our preliminary studies suggest a potential interaction between PscB and FMO, which could offer new insights into the photosynthetic pigment protein complex assembly in the GSB.

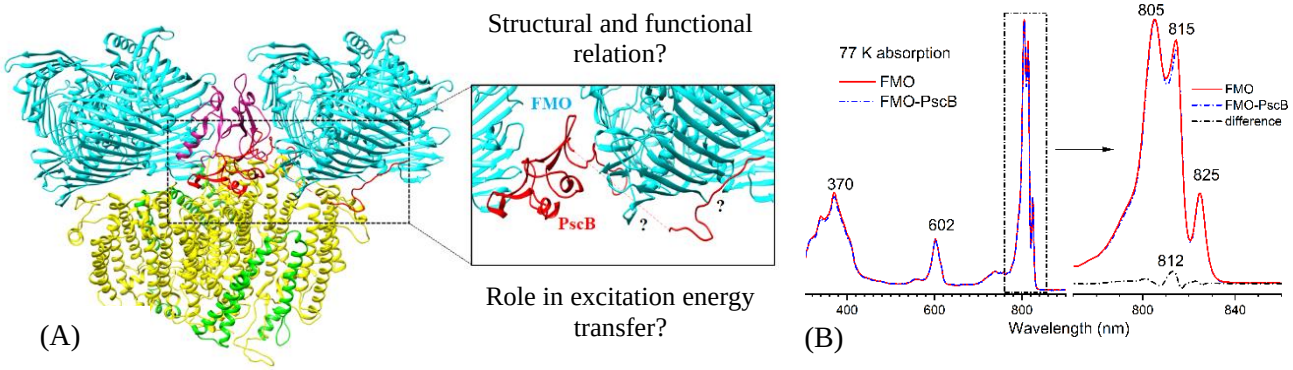

Figure 1: (**A**) Cryo-EM structure of the whole photosynthetic complex from the green sulfur bacteria (cyan-FMO, yellow/green-RC) (PDB: 7Z6Q, [1]) reveals unresolved N-terminal domain of PscB and highlights missing information. (**B**) 77 K absorption spectra of FMO and FMO-PscB complexes with highlight of BChl *a* excitonic bands where some spectral differences are seen.

Reference

[1] H. Xie, A. Lyratzakis, R. Khera, M. Koutantou, S. Welsch, H. Michel, G. Tsiotis, Cryo-Em Structure of the Whole Photosynthetic Reaction Center Apparatus from the Green Sulfur Bacterium *Chlorobaculum tepidum*, Proceedings of the National Academy of Sciences, 120 (2023) e2216734120