Session: 2. Type II reaction centers

On the isolation of chlorophyll-containing protein complexes from *Acaryochloris marina*

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Acaryochloris marina is a marine cyanobacterium that mainly contains chlorophyll *d* as its antenna and photochemically active pigment. When grown under iron-rich conditions, the cells only express the constitutive PcbA antenna protein, which has been demonstrated to associate with photosystem (PS) II *in vivo*. The other main Pcb protein (the product of the *pcbD* gene) is only expressed under iron limitation, when it associates with PS I trimers. In this study, we solubilised thylakoid membranes from Fe-rich grown *A. marina* with *β*-dodecyl-D-maltoside and performed anion exchange chromatography as well as 2D Blue native (BN)/SDS PAGE, both followed by immunoblotting with PS I and PS II specific antibodies, in order to assess the presence and distribution of chlorophyll-containing protein complexes. The 2D BN/SDS PAGE analysis demonstrated that PS II is present in monomeric and dimeric forms, but mainly associated with variable amounts of Pcb antenna proteins to form so-called PS II 'supercomplexes'. Furthermore, it became apparent that the isolation of photochemically active PSII using a purification approach that is based on the separation by molecular mass (e.g. separation by size exclusion or sucrose density gradient centifugation) might prove complicated, because there is a mixing of the variously sized PSII complexes with monomeric and trimeric PSI protein complexes. However, a homogeneous population of trimeric PSI protein complex could be isolated by sucrose density centrifugation fractionation followed by anion exchange chromatography. Overall, these findings will be discussed in relation to using a biochemical approach to explore electron transport in PS II and PS I in this unusual oxygenic organism.

Keywords: *Acaryochloris*, PSII, PSI, chlorophyll *d*, Pcb