P-E1-17

TRAPPING AND CHARGE STABILIZATION IN CHLOROSOME CONTAINING BACTERIA

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Purpose and Methods: The structure and organization of antenna systems in *Chloroflexus aurantiacus* and *Chlorobium limicola* is similar. Their reaction centers, however, belong to phylogenetically different types. Kinetics of trapping and charge stabilization were studied in whole cells of *Chloroflexus* and *Chlorobium* by means of picosecond photovoltage and fluorescence decay measurements.

Results and Conclusions: In *Chloroflexus* excitation into the chlorosomes leads to photovoltage kinetics with two phases (105 ps and 530 ps) after a delay of 55 ps. They reflect trapping from B808-866 and charge stabilization from $BPheo_L$ to Q_A. In *Chlorobium* photovoltage kinetics are also biphasic (95 ps and 650 ps) and show a similar delay. The second phase is ascribed to charge stabilization from A_0 to F_X. Fluorescence at 841 nm in *Chlorobium* decayed with less than 10 ps. We interprete this decay as the trapping time from the core-complex.

P-E1-18

ELECTRON TRANSFER ALONG THE B-BRANCH IN MODIFIED BACTERIAL REACTION CENTERS

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Purpose: Although the bacterial reaction center (RC) includes two almost symmetric branches A and B the electron transfer proceeds only along the A-branch. To measure the influence of the energetics on the unidirectionality, we exchanged the bacteriochlorophyll(BChl)-monomer on the A-branch B_A against 3-vinyl-13^2-OH-BChl and thus increased the energy level of the radical pair state $P^+B_A^-$ by ≈ 0.1eV.
Methods: The effect of this exchange was studied using transient absorption and fluorescence.
Results: Compared to native RCs the first electron transfer step is slowed down from 1 to ≈ 250ps at 90K. An additional bleaching in the difference absorbance at 535 nm indicates an electron transfer to the pheophytin on the B-Branch with a quantum yield of ≈ 10%. When both monomers are exchanged no shoulder is observed.
Conclusions: We have shown that an electron transfer along the B-Branch occurs when the energy level of $P^+B_A^-$ is raised by ≈ 0.1eV.

P-E1-19

COMPARISON OF PHOTOSENSITIVITY OF THE 02 EVOLVING PSII PARTICLES (OE PSII) IN PRESENCE AND ABSENCE OF Ca^{2+} AND Cl^- IONS.

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PURPOSE: 02 evolving processes need the presence of Ca^{2+} and Cl^- ions. We studied the role of these ions on OE PSII sensitivity to the donor side photoinhibition (PI).
METHODS: OE PSII lacked 16kDa; 16 and 24kDa; 16,24 and 33kDa peripheral proteins were obtained by high salt concentration treatment. PI was reached by the white light, 1000$_\mu$E/m^{2}s. The OEC activity was examined by 02 output and delayed fluorescence (DF) measurements.
RESULTS: The PI kinetics of $H_2O \rightarrow PpBQ$ reaction is not changed in PSII lacked 16kDa; 16 and 24kDa peripheral proteins. The direct correlation between fast component of DF and $H_2O \rightarrow PpBQ$ reaction rate decreasing at the ions presence was founded. The $DPC \rightarrow DCPIP$ reactions sensitivity to PI is not changed in any type of PSII by ions addition in opposite to $H_2O \rightarrow PpBQ$ reactions sensitivity increasing.
CONCLUSIONS: The presence of Ca^{2+} and Cl^- ions promotes the PI of electron transport between Mn-cluster and TyrZ. The involving of the acceptor side PI was not also excepted, caused, propably, by increasing of electron transfer reactions rates at the ions presence.

P-E1-20

Localization of the oxygen evolving complex of Photosystem II by electron microscopy

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A dimeric super complex of Photosystem II (PSII) and Light-harvesting complex II (LHCII) has been isolated from spinach in the presence of the zwitterionic compound betaine. This yielded largely intact particles, with dimensions in the membrane plane of 270 x 125 Å, which contained most of the PSII subunits, including the three extrinsic subunits. Over 5000 particle projections extracted from electron microscopical images were analysed. The three extrinsic subunits could be visualized, especially in side view projections. These show that the 17 and 23 kDa subunits stick out slightly farther (5-10 Å) than the more tightly bound 33 kDa subunit, giving the PSII particle a maximal height of about 95 Å. It is concluded that in the plane of the membrane the six copies of the three extrinsic proteins surround a central cavity in the shape of a tetramer. The two 33 kDa subunits are positioned 63 Å out of each other with their mass center. The other two tips of the tetramer are formed by two pairs of the 17 and 23 kDa subunits and are 88 Å separated.