

VISUALIZATION OF THE MOLECULAR AND ELECTRONIC STRUCTURE OF PHOTOSYNTHETIC PIGMENT-PROTEIN COMPLEXES WITH SCANNING PROBE MICROSCOPY

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The photosynthetic apparatus is embedded in the intracytoplasmic membrane. The light-harvesting action of antenna complexes, the transfer of excitation energy, and electron transfer processes rely strongly on a tight organization of the light-harvesting system in the membrane. In order to get a better understanding of the spatial organization of the individual components of the photosynthetic apparatus of purple bacteria we apply a Tunneling Atomic Force Microscope. The objective of these experiments is to visualize the organization of the photosynthetic pigment-protein complexes, and also to study their electronic properties by STS measurements. Various methods are presented for the immobilization and imaging of the pigment-protein complexes on solid substrates, such as adsorption from detergent and detergent-free solutions and two-dimensional crystallization. Molecular resolution of light-harvesting complexes was obtained. With tunneling spectroscopy light-harvesting complexes displayed a semiconductor-like response, while reaction centers displayed diode-like behavior.