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Between order and disorder

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Structure of this thesis

This study focuses on the supramolecular organization of photosynthetic membrane. Chapters 2 and 3 present polarised spectroscopy data on native bacterial chromatophores while chapters 4, 5 and 6 present atomic force microscopy images of grana and flat bacterial membranes. The aim was to pinpoint conditions of specific ordering of photosynthetic complexes and circumstances of its exhibition. In particular, chapter 3 focuses on dependence of long-range crystalline-like arrangement of RC-LH1 on presence of and alterations in PufX, the protein in the bacterial core complex of *Rba. sphaeroides*. Chapter 2 is dealing with the conditions in the polarized spectroscopy experiment, to investigate possibility that orientation technique might change morphological properties of photosynthetic membrane and thus influence its spectral properties. The subject of chapter 4 is the organization of grana from higher plants that are known to exhibit crystalline like arrangements of PSII complexes in certain conditions that might be related to photo protective mechanism and in chapter 5 we discuss the methodology of atomic force microscopy that has been employed in chapter 4. Finally, in chapter 6 by means of polarized spectroscopy and atomic force microscopy we investigate supramolecular organization of another purple bacterium *Rps. palustris* which has chromatophores similar to thylakoids but lacks crystalline arrangements of photosynthetic complexes.