

## Abstract

The evolution of life on Earth is closely connected to the ability of some organisms to oxidise water and reduce carbon dioxide using solar energy in a process called oxygenic photosynthesis. Substantial part of the photosynthetic reactions is located in the thylakoid membrane inside of chloroplasts and cyanobacteria. The main photosynthetic complexes in the thylakoid membrane are photosystems I and II with their light harvesting antennas, cytochrome complex and ATP synthase. All higher plants form grana (stacks of appressed thylakoid membranes) that are interconnected by stroma lamellae. Proper distribution of certain processes between grana and stroma lamellae seems to be crucial for smooth flow of photosynthesis. First part of this thesis is focused on the major photosynthetic complexes while the second part focuses on grana structure, dynamics and stabilising forces as well as proteins essential for grana formation. The last part of the thesis describes some differences between granal and agranal organisms and summarises hypotheses about grana functions.