

Structural characterization of thylakoid membrane stacks

Thylakoid membranes (TM) are a vital part of the photosynthetic machinery in green plants, cyanobacteria and algae as most of the proteins taking part of the light capturing is embedded in this membrane system. TM's has a very striking organization on mesoscales as they arrange into stacked cylindrical domains, 'grana', surrounded by membrane sheets, 'stroma lamellae', connecting other grana (see Figure). Ultimately we are interested in the role of this organization in the process of photosynthesis and specifically the structural behavior in the grana stack.

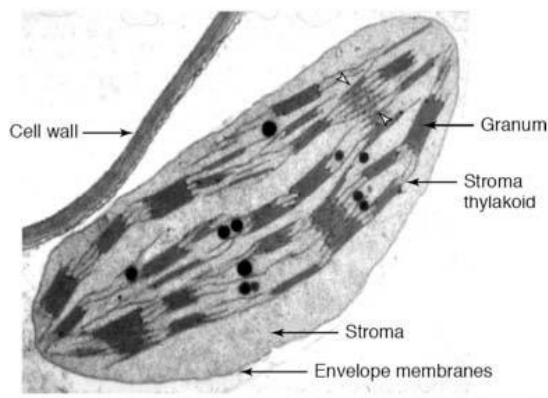


Figure: Electron microscopy image of green plant chloroplast showing the thylakoid membranes.

The project will be focused on structural characterization of well-defined TM's crosscharacterized by electron microscopy. This will be done performing detailed measurements using Small-Angle X-ray Scattering (SAXS). There are many possible directions for a project within this field - please come and discuss with the supervisors listed below.

As a student you will learn about:

✓ ultrastructure of plant organelles, membrane organization and molecular details of photosynthesis with special emphasis on bio/nano-technological applications ✓ small-angle scattering theory and applications

and you will get to:

✓ prepare samples in the photosynthesis group lab using various biochemical methods ✓ perform small-angle scattering experiments on the SAXS camera at NBI ✓ perform data analysis on the experimental data possibly complemented by theoretical model calculations using MATLAB (thus - you will learn to use MATLAB as well...) ✓ be a part of a cross-disciplinary research collaboration within KU

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Reference: Kirkensgaard et al. J. Appl. Cryst. 42, 2009, doi:10.1107/S0021889809017701