7. **Summary**

This thesis addressed the function of the chloroplast homologs Alb3 and Alb4 in the biogenesis of thylakoid membranes in *Arabidopsis thaliana*. The production of specific antibodies against Alb3 and Alb4 was crucial to detect those homologous proteins independent from each other in biochemical analyses. The specificity of the antibodies was shown by detailed antibody tests against the antigen, *in-vitro* translation products and thylakoid membrane proteins.

The first part of the thesis addressed the question whether the docking-process of the transit complex at the thylakoid membrane is based on a direct interaction of the proteins of the cpSRP transport pathway with the translocase Alb3. *In-vivo* interaction studies carried out by the yeast split-ubiquitin system and the bimolecular fluorescence complementation studies revealed a direct interaction between cpSRP43 and Alb3, whereas there was no interaction of cpSRP54 and cpFtsY with Alb3. Pull-down analyses also indicated an interaction of cpSRP43 with Alb3 when in a complex with cpSPR54. The interaction of cpSRP43 and Alb3 may indicate that cpSRP43 has an influence on the membrane associated processes of the LHCP insertion by the translocase Alb3 in addition to its function in transit complex formation. Detailed analyses carried out by bimolecular fluorescence complementation studies, peptide-scanning, pull-down analyses and peptide inhibition studies identified two binding sites of Alb3 for the cpSRP43. The binding motif within the fifth transmembrane domain of Alb3 consists of the amino acids 314-318 (LVFKF) whilst the binding domain in the C-Terminus comprises the amino acids 374-388. Furthermore the binding domain of cpSRP43 for the interaction with Alb3 was narrowed down. Thylakoid membrane binding studies suggested an essential role of ankyrin repeat 4 for thylakoid membrane binding of cpSRP43.

The aim of the second part of the thesis was to provide an indication of the function of the thylakoid membrane protein Alb4 by protein interaction studies. Crosslinking studies, bimolecular fluorescence complementation studies and gelfiltration analyses revealed a direct interaction and association of Alb4 with the chloroplast ATP-synthase. In addition gelfiltration analyses and coimmunoprecipitation studies indicated that Alb4 is not associated in the same complex as Alb3 and cpSecY. According to this contention, Alb4 seems to have an independent function of Alb3 and the cpSec-translocase in the insertion and assembly of the ATP-synthase.