ABC (ATP binding cassette) transporters form one of the largest protein family and are present across all of the known organisms. They transport various molecules through cell membranes by using energy from ATP hydrolysis. ABC transporters are engaged in various biological processes like: nutrition, development as well as reactions to biotic and abiotic stresses. Moreover, their presence/activity in certain cases contributes also to the so called multidrug resistance (MDR)- phenomenon in which e.g. cancer cells overproduce ABC transporters and extrude drugs used in chemotherapy. Multidrug resistance occurs also in microorganisms, being a major drawback in the fight against pathogens like for instance fungus *Candida albicans*. Notably plants are organisms especially rich in ABC transporters comparing to other organisms. What is more, in contrast to their initial context as nonselective Multi/Pleiotropic Drug Resistance proteins many plant ABC transporters turned out to be highly selective and specialized.

Despite their importance, plant ABC transporters haven't been extensively characterized at the enzymatic level (e.g. ATPase activity). Moreover, the difficulty of proving relationship between transporter and its endogenous ligands is one of the major drawbacks in this field. These proteins combine molecule recognition and translocation with ATP hydrolysis. For some of them it has been shown that ATPase activity of the transporter is stimulated by the presence of transported molecules. Due to latter ATPase stimulation has been proposed as an indirect method for identification of endogenous ligands of the transporter. Despite this, the correlation between ATPase activity stimulation by potentially transported molecules and translocation has not been tested sufficiently in the case of plant full size ABCGs.

The ABCG46 from *Medicago truncatula* - is one of the rare examples of biochemically characterized and selective plant ABCG transporters. It has been shown, that MtABCG46 distributes only certain precursors of medicarpin, the phenylpropanoid derived, phytoalexin of Medicago. Although MtABCG46 transports *para*-coumaric acid and liquiritigenin, it does not translocate other structurally similar molecules from the medicarpin pathway. This unique and model scenario allows addressing questions regarding ligand recognition/ATP hydrolysis/translocation.

In this project we want to investigate the relationship between enzymatic activity of a MtABCG46 and molecules that are transported and not transported by the latter. This will answer, whether only molecules to be transported are stimulating ATPase activity. Such observation could be then used as a method of searching for endogenous ligands of an ABCG proteins. We are hoping that results of this research will enable better understanding of plant ABC transporters which are crucial for cell functioning.