ATP-dependent chromatin remodeling is one of the most important elements of chromatin-based regulation of gene expression. Discovered over 20 years ago, conserved complexes belonging to the SWI/SNF class are probably the most comprehensively studied ones and in many studies they have been shown critical for transcriptional control of key biological processes in both animals and plants, including cell proliferation, differentiation and development. Based on the *in vitro* studies it was established that the mechanism of SWI/SNF- dependent chromatin remodeling is changing nucleosome positions or structure. However, this mechanism does not explain some *in vivo* studies, and therefore it has recently been questioned. **This project proposal is aimed to elucidation of the *in vivo* mechanisms and regulation of the SWI/SNF complexes using a model plant, *Arabidopsis thaliana.*** This organism has several features that increase feasibility of the proposed studies: it gives great availability of genetic tools (e.g. mutant analysis) and genome-wide approaches like mapping of nucleosome positions and chromatin remodeling proteins. Realization of the project will consist mainly of elucidation whether nucleosome movement is indeed the mechanism responsible for transcriptional control of SWI/SNF - dependent genes, and identifying ne mechanisms and novel factors influencing chromatin remodeling process catalyzed by SWI/SNF.

Realization of this project will greatly improve our understanding of the mechanisms of Arabidopsis SWI/SNF complexes by verifying the importance of nucleosome movement, and will give the opportunity to discover new mechanisms and novel factors that influence the activity of the complex. This extended knowledge will help to answer important questions about how SWI/SNF works to trascriptionally regulate plant growth and development. Importantly, given high evolutionary conservation of this complex, the project may also add new knowledge about biology of chromatin remodelers in general. In animals, SWI/SNF complexes are also involved in the control of developmental processes, and highly frequent occurence of mutations in SWI/SNF subunits in human cancers was found. Therefore, development strategies enabling modulation of SWI/SNF activity will be of great importance for both new therapies and crop improvement. This will firstly need better understanding of how these complexes work.