This project is intended to elucidate potential relationship between a Polycomb group protein, LHP1 and linker histones H1 in model plant *Arabidopsis thaliana*. As a key elements of chromatin, Polycomb complexes in eukaryotic organisms are responsible for gene silencing, providing one of the most crucial epigenetic regulatory systems existing in both plants and animals. Transcriptional silencing prevents the expression of a certain genes which allows to regulate key developmental processes as well as to develop responses to the environment. Activity of Polycomb group proteins (PcGs) is based on postranslational modifications of histone proteins tails (DNA binding proteins forming nucleosome, a basic unit of chromatin) and includes activity of two complexes: PRC1 (polycomb repression complex 1) and PRC2 (polycomb repression complex 2). PRC2 is considered to bind to chromatin as first allowing PRC1 association and consequently, transcriptional silencing. Plant PRC1 contains LHP1 protein showing significant structure similarity to animal HETEROCHROMATIN PROTEIN 1 (HP1). Although the mechanism of LHP1 action within PRC1 complex has been described, the exact regulatory pathways of LHP1 are still unknown. Studies in animals suggested a functional relationship between HP1 and linker histones H1, small proteins, which in eukaryotic organisms bind to the nucleosome and to the "linker DNA" between nucleosomes. In plants both LHP1 and the linker histones H1 participate in various developmental processes and stress responses. Based on literature data and our preliminary results, it is likely that their functions are interrelated. However, in plants this connection has not been demonstrated yet.

The aim of this project is to characterise on both phenotypic and molecular level the link between LHP1 and linker histones H1. The most important tasks in this proposed project are to determine whether and how LHP1 and linker histones are functionally coupled, which processes are regulated by this mechanism, and whether this mechanism can be modulated by environmental changes. The project will be performed using model plant *Arabidopsis thaliana*, which allows to use many methods of genetics and molecular biology. Proposed project will allow to discover a new potential regulatory mechanism of epigenetic regulation. Giving the possible contribution of LHP1 and H1 in regulation of the stress responses and hormonal pathways, it is possible that the results obtained in these project will also be important for plant biotechnology and agriculture research.