

Research Project

Regulation of Endogenous RNA Silencing Pathways of Plants

Third-party funded project

Project title Regulation of Endogenous RNA Silencing Pathways of Plants

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Project Website <http://plantbiology.unibas.ch/>

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Status Completed

RNA silencing refers to recently discovered RNA-dependent processes involved in controlling the expression and integrity of eukaryotic genomes. It includes major mechanisms that coordinate development, responses to biotic stresses, defence against pathogens or, that control genome stability. Small RNAs (e.g. microRNAs, siRNAs or piRNAs), 19-40 nucleotides in length, are the core component of these processes. They carry sequence-specificity for function of effectors. Several proteins involved in these processes have been identified. However, little is known about how these processes are themselves regulated in time, in space or in response to developmental and environmental signals.

The general aim of our research project is to gain insight into this layer of regulation. We are using the weed *Arabidopsis thaliana* as a model system. This is a proven genetic model that has provided insight into RNA silencing in diverse eukaryotes ranging from yeast to humans. Our genetic and molecular work will use a well-characterized *Arabidopsis* RNA silencing pathway with functions in hormonal and developmental regulation to elucidate general principles underlying the regulation of RNA silencing. We will generate an artificial reporter/sensor system for this regulation and study its functionality in informative mutants to determine the molecular basis for this regulation. This reporter/sensor system as well as a set of unpublished mutants will also be used to identify the components involved and to study the biological function of this regulation.

Our work will provide basic knowledge about how smRNA regulations important for plant development are regulated. These studies could reveal general principles for regulation of RNA Silencing that might apply more generally to epigenetic regulation in other eukaryotes including mammals.

Keywords RNA silencing, *Arabidopsis*, microRNA, development, trans-acting siRNA, transitivity

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