

## **Abstract**

The differential transcriptional activity of the genome is provided by epigenetic modifications, which include DNA methylation, alteration of histone N-terminal amino acids and changes in histone variants. RNA interference is a regulatory process, in which transcriptional or post-transcriptional silencing of exogenous or endogenous sequences is mediated by the action of small RNAs derived from these sequences. The 24-nucleotide siRNAs, forming a fraction of small RNAs, direct *de novo* DNA methylation and participate in the maintenance of DNA methylation (RNA-directed DNA methylation; RdDM), which facilitates transcriptional silencing of heterochromatin and transposable elements representing a large part of plant genomes. The presence of two RNA polymerases involved in this pathway is characteristic for flowering plants, which were discovered for the first time in the genome of *Arabidopsis thaliana*, which has also become the main plant model for the study of RdDM. Polymerase IV transcribes siRNA precursors; siRNAs are subsequently associated with AGO4 proteins and guide methylation enzymes to the target sequences via complementarity with polymerase V transcripts.