

Description for the general public

MicroRNAs have been identified in representatives of almost all groups of eukaryotic organisms and are considered fundamental, sequence-specific regulatory elements in eukaryotic gene expression. MicroRNA biogenesis is a multistep process and many proteins are involved in this pathway. One of them, DRB1 protein, binds double stranded RNAs and interacts with DCL1, the main RNase which releases mature microRNAs from their precursors. Additionally, it was demonstrated by others that a DRB1 protein has to be dephosphorylated by a CPL1 protein for its optimal activity. On the other hand, CPL1 also dephosphorylates a CTD domain of RNA Pol II. These observations suggest that DRB1 protein is involved in early steps of microRNAs biogenesis, probable at a transcription level.

Obtained by us preliminary results confirmed our hypothesis. Results showed that expression of the reporter gene that was under control of the microRNA gene promoter in lack of DRB1 is downregulated. Moreover, we observed higher occupancy of total RNA Pol II in regions of initiation and termination of transcription of protein coding genes. This suggest a completely a new role of DRB1 in RNA metabolism. Realization of this proposal using modern in molecular biology high-throughput methods will allow us to propose a model of action of DRB1 protein. Identification of new unknown role of the DRB1 will shed a light on our understanding of RNA processing in plants.