

## **A link between alternative splicing and nonsense-mediated mRNA decay in the control of THIC gene expression in arabidopsis**

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### **Abstract**

The THIC gene involved in thiamin biosynthesis in arabidopsis (*Arabidopsis thaliana* (L.) Heynh) encodes two mRNAs produced by alternative splicing; the ratio between these mRNAs is controlled by the changing thiamine pyrophosphate (TPP) concentration in the plant. One of produced splicing isoforms (THIC-III) is subjected to rapid degradation, which is the basis for the regulation of THIC gene expression. THIC-III comprises long 3'-untranslated region (UTR) and an intron in the pre-mRNA at a distance more than 55 nucleotides after stop-codon. This indicates a possibility of this isoform degradation by nonsense-mediated decay (NMD). In this study, we tried to check this supposition. It was established that the process of protein biosynthesis, i.e., translation is required for rapid THIC-III degradation. In mutant plants with blocked NMD, THIC-III degradation was retarded, and thus the feedback between endogenous concentration of TPP and expression of THIC gene involved in thiamin biosynthesis was disturbed. These data indicate the involvement of NMD in degradation of THIC-III transcript and in the control of THIC gene expression. Thus, we established a relation between NMD process and the control of expression of the gene subjected to alternative splicing: when the TPP concentration in the cell increases and alternative splicing is switched to the formation of THIC-III isoform, NMD is involved in its degradation, thus reducing the total expression of the THIC gene. © Pleiades Publishing, Ltd., 2010.

<http://dx.doi.org/10.1134/S1021443710020159>

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### **Keywords**

*Arabidopsis thaliana*, NMD-alternative splicing, Thiamine pyrophosphate