

## **ABSTRACT**

The aim of the present study was to explore whether the dual localization and function of the MED28 orthologue is also conserved in nematodes and to characterize its regulatory potential. The work showed that the protein denominated in databases as the orthologue of MED28 (W01A8.1) is in fact the sole orthologue of mammalian perilipins and identified the real MED28 orthologue in the *C. elegans* genome (F28F8.5), that was renamed MDT-28 with the approval from WormBase. MDT-28 was shown to be indispensable for several developmental and growth processes in *C. elegans*. It has, similarly as in mammals, a dual cytoplasmic and nuclear localization. Using bioinformatic tools, MDT-28 was identified as a likely target for lysine acetylation and this was then proven experimentally. Further, valproic acid, a known inhibitor of lysine deacetylases, increased MDT-28 acetylation and decreased MDT-28 nuclear localization, suggesting that the nuclear localization of MDT-28 can be regulated. The results indicate that the orthologues of MED28 have the evolutionarily conserved potential to integrate regulatory signals from cytoplasmic structural proteins with the regulation of gene expression at the level of the Mediator complex and suggest new roles of regulated lysine acetylation at the level of the Mediator.