

STMYBATV, A R3-MYB INTERFERING WITH CELL FATE AND SHAPE DETERMINATION IN POTATO

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Previous studies in *Arabidopsis* indicated a shared molecular regulation of specialized metabolites and specific plant developmental aspects. For example, the transcriptional complex that regulates anthocyanin biosynthesis is known to interfere with the trichome development. In *Solanaceae*, these mechanisms have been suggested to diverge from the model plant and the molecular players involved are still completely undiscovered. Within this alluring research topic, we investigated the effect of some anthocyanin regulators in potato cell cultures. We focused on the *StMYBATV*. It encodes for an R3-MYB, a transcription factor potentially able to interfere with the formation of diverse plant regulatory R2R3-MYB-bHLH complexes. We carried out a knock-out editing of *StMYBATV*, by means CRISPR/Cas9 technology and in cell cultures of two potato varieties. Through spectrophotometric and microscopic analysis, we observed that, besides to increase phenylpropanoid accumulation of 80%, edited cells showed significant elongation and shape changes with respect to wild types.

They also exhibited an elongated conical shape, with a 2-fold increase of cell diameter in contrast to rounded wildtype cells. This shape, along with the presence of multiple nuclei, is characteristic of cells undergoing endoreduplication and trichome initiation and suggested an involvement of *StMYBATV* in this developmental pattern. This hypothesis was further confirmed by RNAseq analyses in which about 20 cell wall modification and cell wall conformation-related genes were significantly differently expressed in edited cells compared to wild types. Summing up the results, it can be concluded that *StMYBATV* may interfere not only with the

anthocyanin MYB/bHLH complex but also with others involved in plant developmental processes in potato. Currently, we are validating the role of *StMYBATV* by overexpressing it in a heterologous system (tobacco) as well as by analysing regenerated whole potato plants in which *StMYBATV* function has been impaired by the editing.