Abstract

Potato (*Solanum tuberosum*) is an essential component of food worldwide. The process of tuber formation is controlled by the interplay of external and internal conditions. Understanding of the molecular basis of tuberization, including the effect of photoperiod, pointed to a key role of mobile signals. Among these morphogenic signals *StBEL5* and *POTH1* transcripts are involved, which are translated in the stolon and form a heterodimer regulating target genes with TTGAC tandem motifs, further an FT homologue, StSP6A, mobile from leaves to stolons as a protein. BEL5/POTH1 and StP6A signaling pathways seem to overlap. Phytohormones also play an important signaling role, i.a. auxins. During tuber initiation, IAA levels in stolon tissues increase. PIN transporters are likely to be involved in the redistribution of auxin in the stolon, but also LAX and ABCB transporters and components of auxin signaling pathway, Aux/IAAs and ARFs are also involved in the process. Although auxins are proved to play an important role during stolon-to-tuber transition, their exact role in the process is not sufficiently clarified. Auxin signaling is interconnected with BEL5/POTH1 and SP6A-mediated tuber signaling, as its target genes in the stolon include those that encode proteins involved in auxin biosynthesis (YUCCA1), transport (PIN1/2/4) and signaling (ARF8). However, there is not yet enough literary data to sufficiently understand the relationships of individual signaling levels.

Key words: auxin, phytohormones, *Solanum tuberosum*, StBEL5, StSP6A, tuberization