
ROLE OF ROOTS IN HYPOCOTYL ELONGATION

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ABSTRACT

There are many factors influencing hypocotyl elongation like light, temperature or hormones. It is known that light induces de-etiolation of seedlings while low light irradiance or dark leads to etiolation and produces yellowish seedlings with long hypocotyls and unopened cotyledons. We were interested whether light applied to roots have any impact on hypocotyl elongation and thus whether the shoot is influenced by irradiance of roots. Plants cultivated on MS are ordinarily exposed to light with all their surface including roots so we performed our experiments with roots exposed to low light and/or covered. We have found roots to play an important role in hypocotyl elongation in a light dependent manner comparable to the role of hormones in this process. Analysis of *Arabidopsis* mutants in hormone signalling reveal a potential role for cytokinins and ethylene in root-dependent hypocotyl elongation. The double mutant *ahk3ahk4* showed that cytokinins could support effects of roots while *etr1* mutant indicates that ethylene is more likely an inhibitor of this effect. We show that hypocotyl elongation correlates with elongation of cells in the hypocotyl. Moreover, we would like to highlight the importance of light quality applied to roots. Response of the hypocotyl is colour dependent. These results indicate the importance of light falling on roots on shoot development and open questions about other processes which could be influenced in a similar way. Thus, we could probably begin to re-consider the experimental conditions routinely used in investigating early plant development.

Key words: light, hypocotyl elongation, root, hormones

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