Volume 48(1-4):87, 2004
Acta Biologica Szegediensis
http://www.sci.u-szeged.hu/ABS

DISSERTATION SUMMARY

28D, a new component of the phytochrome B signal transduction, in *Arabidopsis thaliana*

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Phytochromes are regulatory photoreceptors that control plant growth and development in response to signals from the light environment. In *Arabidopsis*, the phytochromes comprise a five membered family, designated phyA to phyE. While the role of phytochromes is well described at the physiological level, the signal transduction pathways mediated by these photoreceptors are largely unknown. To identify possible elements of phytocrome B-mediated pathways, we conducted yeast two-hybrid screen. From this screen, a phytochrome B interacting factor was isolated and named 28D. This protein contains a pterin-4a-carbinolamin-dehydratase domain. We found homologus proteins in *Pseudomonas aeruginosa, Drosophila melanogaster* and in mammals. The mammalian pterin-4a-carbinolamine dehydratase is identical to the dimerization cofactor for hepatocyte nuclear factor 1 (DCoH), which suggested the possibility that this dehydratase may also regulate phenylalanin hydroxylase activity at the nucleic acid level by regulating the dimerisation of this factor.

In yeast two-hybrid experiments 28D forms dimers, binds to wild-type C- and N-terminal domain of PHYB, and the full length PHYB and PHYE.

We generated transgenic *Arabidopsis* plants expressing 28D fused to the yellow fluorescent protein (YFP) to describe intracellular localization of this protein. Surprisingly, it localizes almost exclusively to the chloroplast and shows a characteristic pattern.

Expression of sense or antisense 28D sequences in transgenic *Arabidopsis* perturbs photoresponsiveness in a manner indicating that 28D functions in phyB signaling pathways *in vivo*. Moreover, in these plants the circadian clock function is altered as well. This connection is strengthened by data obtained from yeast two-hybrid assays performed with 28D and certain molecules related to the circadian clock.

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