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D-GLYCERATE 3-KINASE, the last unknown enzyme in the photorespiratory cycle in Arabidopsis, belongs to a novel kinase family.

Boldt R, Edner C, Kolukisaoglu U, Hagemann M, Weckwerth W, Wienkoop S, Morgenthal K, Bauwe H

Plant Cell 2005 Aug **17**(8):2413-20 [abstract on PubMed] [citations on Google Scholar] [related articles] [FREE full text]

Selected by | Richard Leegood / Ulf-Ingo Flugge / Jurgen Soll
First evaluation 5 Aug 2005 | Latest evaluation 23 Sep 2005
Relevant Sections

Faculty Comments

Faculty Member	Comments
Richard Leegood University of Sheffield, United Kingdom PLANT BIOLOGY New Finding	**This is the first study to identify the gene for glycerate kinase and to use knock-out mutants to confirm its function as the last stage of photorespiration in plants.** Unexpectedly, the protein is not homologous to glycerate kinases in animals or bacteria. Instead the enzyme is a member of a novel group of kinases found in plants, fungi and some cyanobacteria. It is suggested that glycerate kinase may also have functions in addition to its role in photorespiration. **Competing interests:** None declared Evaluated 5 Aug 2005 How to cite this evaluation
Ulf-Ingo Flugge Universitat zu Koln, Germany PLANT BIOLOGY New Finding	**The isolation of glycerate kinase (GLYK) from Arabidopsis leaves made it possible for the authors to obtain peptide sequences that they used to identify the corresponding and so far unknown gene.** GLYK catalyzes the ultimate step of the C2-oxidative photosynthetic carbon cycle (also known as photorespiratory cycle), by which in a series of reactions, the product of the oxygenase reaction of RubisCO, 2-phosphoglycolate, is converted to glycerate and finally to 3-phosphoglycerate via GLYK. The authors report that Arabidopsis GLYK is encoded by a single copy gene that does not show any similarities to GLYKs in nonplant systems. As observed for other photorespiratory mutants, plants defective in GLYK are only viable in elevated carbon dioxide, i.e. if the oxygenase function of RubisCO is suppressed. **Competing interests:** None declared Evaluated 14 Sep 2005 How to cite this evaluation

Jurgen Soll
Ludwig-Maximilians-Universität München, Germany
PLANT BIOLOGY

New Finding

The last unknown enzyme in photorespiration - Glycerate-3-kinase - was identified by old fashioned protein purification and only afterwards characterized by reverse genetic methods. The enzyme identified belongs to a new class of metabolite-kinases found predominantly in plants, yeast and complex cyanobacteria, therefore the enzyme escaped genomic identification so far. While the description of the final enzyme in this multienzyme, multiorganellar pathway closes a long lasting gap, it provokes new questions concerning the specific requirements this enzyme had to fulfill in plant development, which could not be fulfilled by other Glycerate kinases, and where and when it evolved.

Competing interests: None declared

Evaluated 23 Sep 2005

How to cite this evaluation

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How to cite the Faculty of 1000 Biology evaluation(s) for this paper

1) To cite all the evaluations for this article:

Faculty of 1000 Biology: evaluations for Boldt R et al *Plant Cell* 2005 Aug 17 (8) :2413-20 http://www.f1000biology.com/article/id/1027264/evaluation

2) To cite an evaluation by a specific Faculty member:

Richard Leegood: Faculty of 1000 Biology, 5 Aug 2005 http://www.f1000biology.com/article/id/1027264/evaluation

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