Arabidopsis A BOUT DE SOUFFLE is a putative mitochondrial transporter involved in photorespiratory metabolism and is required for meristem growth at ambient CO2 levels

Titre	Arabidopsis A BOUT DE SOUFFLE is a putative mitochondrial transporter involved in photorespiratory metabolism and is required for meristem growth at ambient CO2 levels
Type de publication	Article de revue
Auteur	Eisenhut, Marion [1], Planchais, Severine [2], Cabassa, Cécile [3], Guivarc'h, Anne [4], Justin, Anne-Marie [5], Taconnat, Ludivine [6], Renou, Jean-Pierre [7], Linka, Marc [8], Gagneul, David [9], Timm, Stefan [10], Bauwe, Hermann [11], Carol, Pierre [12], Weber, Andreas PM [13]
Editeur	Wiley
Type	Article scientifique dans une revue à comité de lecture
Année	2013
Langue	Anglais
Date	2013
Numéro	5
Pagination	836 - 849
Volume	73
Titre de la revue	The Plant Journal
ISSN	1365-313X
Mots-clés	Arabidopsis [14], meristem [15], metabolite [16], mitochondria [17], photorespiration [18], transport protein [19]

Résumé en anglais	Photorespiratory metabolism is essential in all oxygenic photosynthetic organisms. In plants, it is a highly compartmentalized pathway that involves chloroplasts, peroxisomes, mitochondria and the cytoplasm. The metabolic pathway itself is well characterized, and the enzymes required for its function have been identified. However, very little information is available on the transport proteins that catalyze the high metabolic flux between the involved compartments. Here we show that the A BOUT DE SOUFFLE (BOU) gene, which encodes a mitochondrial carrier, is involved in photorespiration in Arabidopsis. BOU was found to be co-expressed with photorespiratory genes in leaf tissues. The knockout mutant bou-2 showed the hallmarks of a photorespiratory growth phenotype, an elevated CO2 compensation point, and excessive accumulation of glycine. Furthermore, degradation of the P-protein, a subunit of glycine decarboxylase, was demonstrated for bou-2, and is reflected in strongly reduced glycine decarboxylase activity. The photorespiration defect in bou-2 has dramatic consequences early in the seedling stage, which are highlighted by transcriptome studies. In bou-2 seedlings, as in shm1, another photorespiratory mutant, the shoot apical meristem organization is severely compromised. Cell divisions are arrested, leading to growth arrest at ambient CO2. Although the specific substrate for the BOU transporter protein remains elusive, we show that it is essential for the function of the photorespiratory metabolism. We hypothesize that BOU function is linked with glycine decarboxylase activity, and is required for normal apical meristems functioning in seedlings.
URL de la notice	http://okina.univ-angers.fr/publications/ua7811 [20]
DOI	10.1111/tpj.12082 [21]
Lien vers le document	http://dx.doi.org/10.1111/tpj.12082 [21]

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