Physiological and metabolic consequences of autophagy deficiency for the management of nitrogen and protein resources in Arabidopsis leaves depending on nitrate availability

Titre	Physiological and metabolic consequences of autophagy deficiency for the management of nitrogen and protein resources in Arabidopsis leaves depending on nitrate availability
Type de publication	Article de revue
Auteur	Guiboileau, Anne [1], Avila-Ospina, Liliana [2], Yoshimoto, Kohki [3], Soulay, Fabienne [4], Azzopardi, Marianne [5], Marmagne, Anne [6], Lothier, Jérémy [7], Masclaux-Daubresse, Céline [8]
Pays	France
Editeur	Wiley-Blackwell
Ville	Cambridge
Type	Article scientifique dans une revue à comité de lecture
Année	2013
Langue	Anglais
Date	Août 2013
Numéro	3
Pagination	683-694
Volume	199
Titre de la revue	New Phytologist
ISSN	1469-8137
Mots-clés	aminopeptidase [9], carboxypeptidase [10], leaf senescence [11], nitrate availability [12], nitrogen remobilization [13], selective autophagy [14]

Résumé en anglais	Autophagy is present at a basal level in all plant tissues and is induced during leaf ageing and in response to nitrogen (N) starvation. Nitrogen remobilization from the rosette to the seeds is impaired in autophagy mutants. This report focuses on the role of autophagy in leaf N management and proteolysis during plant ageing. Metabolites, enzyme activities and protein contents were monitored in several autophagy-defective (*atg*) Arabidopsis mutants grown under low and high nitrate conditions. Results showed that carbon (C) and N statuses were affected in *atg* mutants before any senescence symptoms appeared. atg mutants accumulated larger amounts of ammonium, amino acids and proteins than wild type, and were depleted in sugars. Over-accumulation of proteins in *atg* mutants was selective and occurred despite higher endopeptidase and carboxypeptidase activities. Specific over-accumulation of the ribosomal proteins S6 and L13 subunits, and of catalase and glutamate dehydrogenase proteins was observed. *atg* mutants also accumulated peptides putatively identified as degradation products of the Rubisco large subunit and glutamine synthetase 2 (GS2). Incomplete chloroplast protein degradation resulting from autophagy defects could explain the higher N concentrations measured in *atg* rosettes and defects in N remobilization. It is concluded that autophagy controls C : N status and protein content in leaves of Arabidopsis.
URL de la notice	http://okina.univ-angers.fr/publications/ua11653 [15]
DOI	10.1111/nph.12307 [16]
Lien vers le document	http://dx.doi.org/10.1111/nph.12307 [16]
Titre abrégé	New Phytol

Liens

[1] http://okina.univ-angers.fr/publications?f[author]=20575
[2] http://okina.univ-angers.fr/publications?f[author]=20576
[3] http://okina.univ-angers.fr/publications?f[author]=20577
[4] http://okina.univ-angers.fr/publications?f[author]=17279
[5] http://okina.univ-angers.fr/publications?f[author]=12055
[6] http://okina.univ-angers.fr/publications?f[author]=20578
[7] http://okina.univ-angers.fr/jeremy.lothier/publications
[8] http://okina.univ-angers.fr/publications?f[author]=12060
[9] http://okina.univ-angers.fr/publications?f[keyword]=17844
[10] http://okina.univ-angers.fr/publications?f[keyword]=17845
[11] http://okina.univ-angers.fr/publications?f[keyword]=17846
[12] http://okina.univ-angers.fr/publications?f[keyword]=17847
[13] http://okina.univ-angers.fr/publications?f[keyword]=11986
[14] http://okina.univ-angers.fr/publications?f[keyword]=17848
[15] http://okina.univ-angers.fr/publications/ua11653
[16] http://dx.doi.org/10.1111/nph.12307