Characterization of the Early Events Leading to Totipotency in an Arabidopsis Protoplast Liquid Culture by Temporal Transcript Profiling

Titre	Characterization of the Early Events Leading to Totipotency in an Arabidopsis Protoplast Liquid Culture by Temporal Transcript Profiling
Type de publication	Article de revue
Auteur	Chupeau, Marie-Christine [1], Granier, Fabienne [2], Pichon, Olivier [3], Renou, Jean-Pierre [4], Gaudin, Valérie [5], Chupeau, Yves [6]
Editeur	American Society of Plant Biologists
Type	Article scientifique dans une revue à comité de lecture
Année	2013
Langue	Anglais
Date	2013/07/01
Numéro	7
Pagination	2444 - 2463
Volume	25
Titre de la revue	The Plant Cell Online
ISSN	1040-4651
Résumé en anglais	The molecular mechanisms underlying plant cell totipotency are largely unknown. Here, we present a protocol for the efficient regeneration of plants from Arabidopsis thaliana protoplasts. The specific liquid medium used in our study leads to a high rate of reentry into the cell cycle of most cell types, providing a powerful system to study dedifferentiation/regeneration processes in independent somatic cells. To identify the early events in the establishment of totipotency, we monitored the genome-wide transcript profiles of plantlets and protoplast-derived cells (PdCs) during the first week of culture. Plant cells rapidly dedifferentiated. Then, we observed the reinitiation and reorientation of protein synthesis, accompanied by the reinitiation of cell division and de novo cell wall synthesis. Marked changes in the expression of chromatin-associated genes, especially of those in the histone variant family, were observed during protoplast culture. Surprisingly, the epigenetic status of PdCs and well-established cell cultures differed, with PdCs exhibiting rare reactivated transposons and epigenetic changes. The differentially expressed genes identified in this study are interesting candidates for investigating the molecular mechanisms underlying plant cell plasticity and totipotency. One of these genes, the plant-specific transcription factor ABERRANT LATERAL ROOT FORMATION4, is required for the initiation of protoplast division.
URL de la notice	http://okina.univ-angers.fr/publications/ua7865 [7]
DOI	10.1105/tpc.113.109538 [8]
Lien vers le document	http://dx.doi.org/10.1105/tpc.113.109538 [8]

Liens
[1] http://okina.univ-angers.fr/publications?f[author]=12658
[2] http://okina.univ-angers.fr/publications?f[author]=12040
[3] http://okina.univ-angers.fr/publications?f[author]=12659
[4] http://okina.univ-angers.fr/publications?f[author]=11747
[5] http://okina.univ-angers.fr/publications?f[author]=12041
[6] http://okina.univ-angers.fr/publications?f[author]=12660
[7] http://okina.univ-angers.fr/publications/ua7865
[8] http://dx.doi.org/10.1105/tpc.113.109538