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GENE REGULATION DURING SEED DEVELOPMENT IN BARLEY: THE ROLE OF DOF TRANSCRIPTION FACTORS

Cristina Barrero
Sara Hernando-
Amado
Ester García-Manjón
Miguel Angel
Moreno-Risueño
Pilar Carbonero

Centro de Biotecnología y
Genómica de Plantas
(UPM-INIA). Escuela
Técnica Superior de
Ingenieros Agrónomos.
Universidad Politécnica
de Madrid, E-28040
Madrid (Spain)

Seed storage protein (SSP) accumulation through endosperm development in cereals is mainly regulated at the transcriptional level. Although this regulation implies many transcription factors (TFs) interacting with conserved *cis*-motives in the promoters of SSP genes, three TFs are the most relevant in barley^{1,2}:

- BLZ2, a bZIP protein of the Opaque-2 subfamily that binds to the GCN₄-like motif (GLM; 5'-ATGA(G/C)TCAT-3').
- BPBF, besides three other DOF proteins, SAD, HvDOF 19 and HvDOF17, interacting with the prolamins-box (PB; 5'-TGTAAG-3').
- GAMYB that recognizes the 5'-AACAAAC-3' box.

The regulation of SSP genes by the DOF TFs is investigated in *Hordeum vulgare* cv Bomi and in its mutant Riso 1508. This mutant is affected in the *Lys3a* locus in chromosome 5H that is inherited as a single Mendelian gene, but presents pleiotropic effects. In the Riso 1508 mutant, a drastic depletion of expression of seed genes encoding B-, C-, and γ -Hordeins, β -amylase, trypsin-inhibitor CMe, protein Z, etc, is observed^{3,4}.

We have analyzed the global differential expression (GDE) of genes expressed in the developing endosperm of the wild type Bomi and in the mutant Riso 1508, through hybridization of DNA micro-arrays (Gene-Chip Barley Genome Array, Affimetrix) representing 25.500 genes. These expression studies have been validated by RT-qPCR analyses. A significant difference between the wt and the mutant in the expression of two of the DOF TFs implicated in the transcriptional control of SSP genes has been found. Implications of these data together with a phylogenomic *in silico* analysis of the promoters of down-stream genes putatively regulated by these TFs are discussed.

¹Vicente-Carbajosa J. and Carbonero P. (2005). *Int. J. Dev. Biol.* 49: 645-65.

²Moreno-Risueño M.A., Barrero C., Díaz I., García-Manjón E., Martínez M., Fuentes R. and Carbonero P. (2009; submitted)

³Royo J., Díaz I., Rodríguez-Palenzuela P. and Carbonero P. (1996). *Plant Mol. Biol.* 31: 1051-1059.

⁴Rodríguez-Palenzuela P., Royo J., Gómez L., Sánchez-Monje R., Salcedo G., Molina-Cano J.L., García-Olmedo F. and Carbonero P. (1989). *Mol. Gen. Genet.* 219: 474-479.



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