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Plant Gene Register PGR 98–032

Nucleotide Sequence of a *Eucalyptus globulus* cDNA Clone Encoding Cinnamyl Alcohol Dehydrogenase (Accession No. AF038561).

Linda E. De Melis, Filippa Brugliera, Silvia Pongracic, and Trevor W. Stevenson*.

Department of Applied Biology and Biotechnology, RMIT, G.P.O. Box 2476V, Melbourne, Australia 3001 (L.E.D.M., T.W.S.); Florigene Ltd., 16 Gipps Street, Collingwood, Victoria, Australia 3066 (F.B.); and Australian Paper Plantations Pty. Ltd., P.O. Box 220, Morwell, Victoria, Australia 3840 (S.P.).

* Corresponding author; e-mail trevor@rmit.edu.au; fax 61–3–9662–3421.

Plant Gene Register PGR 98–033

ZmUBC7–1, a Ubiquitin-Conjugating Enzyme from Maize Expressed in Mitotically Active Tissue (Accession No. AF032468).

Steven van Nocker¹, Miroslava Anderova, Julian I. Schroeder, and Richard D. Vierstra*.

Cellular and Molecular Biology Program and Department of Horticulture, 1575 Linden Drive, University of Wisconsin, Madison, Wisconsin 53706 (S.v.N., R.D.V.); and Department of Biology and Center for Molecular Genetics, University of California, San Diego, La Jolla, California 92093–0116 (M.A., J.I.S.).

¹ Present address: Department of Biochemistry, 420 Henry Mall, University of Wisconsin, Madison, WI 53706.

* Corresponding author; e-mail vierstra@facstaff.wisc.edu; fax 1–608–262–4743.

Plant Gene Register PGR 98–034

Isolation and DNA Sequence Analysis of an Aspartate Aminotransferase cDNA Clone (Accession No. AF029898) from *Lotus corniculatus*.

Julie M. Morlier and Robert G. Gregerson*.

Department of Biology, Lyon College, Batesville, Arkansas 72501.

* Corresponding author; e-mail rgregerson@lyon.edu; fax 1–870–698–4622.

Plant Gene Register PGR 98–035

Isolation and Characterization of a cDNA Encoding a Nonspecific Lipid-Transfer Protein (Accession No. AJ002958) from *Cicer arietinum* L. Epicotyls.

Silvia Romo, Berta Dopico, Francisco J. Muñoz, and Emilia Labrador*.

Departamento de Fisiología Vegetal, Facultad de Biología, Universidad de Salamanca, E-37007, Salamanca, Spain.

* Corresponding author; e-mail labrador@gugu.usal.es; fax 34–23–294682.

Plant Gene Register PGR 98–036

Cloning and Sequencing of the *psbU* Gene (Accession No. AF036250) from the Cyanobacterium *Cyanothece* sp. ATCC 51142.

Pascal C. Meunier, Hsiao-Yuan Tang, and Louis A. Sherman*.

Department of Biological Sciences, Purdue University, West Lafayette, Indiana 47907.

* Corresponding author; e-mail lsberman@bilbo.bio.purdue.edu; fax 1–765–494–0876.

Plant Gene Register PGR98-035

Silvia Romo, Berta Dopico, Francisco J. Muñoz and Emilia Labrador (1998) Isolation and characterization of a cDNA encoding a nonspecific lipid-transfer protein (Accession No. AJ002958) from *Cicer arietinum* L. epicotyls (PGR98-035). *Plant Physiol.* **116**: 1191

Isolation and characterization of a cDNA encoding a nonspecific lipid-transfer protein (Accession No. AJ002958) from *Cicer arietinum* L. epicotyls

Silvia Romo, Berta Dopico, Francisco J. Muñoz and Emilia Labrador

Departamento de Fisiología Vegetal, Facultad de Biología, Universidad de Salamanca, E-37007, Salamanca, Spain.

Corresponding author: Emilia Labrador
FAX: 34-23-294682
E-mail: labrador@gugu.usal.es

Lipid-transfer proteins (LTP) are basic, 9-kDa proteins present in high amounts in higher plants (reviewed in Kader, 1996). Plant LTPs exhibit strong structural homologies as revealed by sequence alignment and hydrophobic cluster analysis. LTPs can enhance the transfer of different kinds of lipids between membranes *in vitro*. Although LTPs were thought to participate in membrane biogenesis, a possible cytoplasmic role *in vivo* for LTP has been questioned by the presence of a signal peptide indicating that LTP could enter the secretory pathway. Their extracellular location has been described. It has been located in the cell wall in *Arabidopsis* (Thoma *et al.* 1993) and castor bean (Tsuboi, *et al.*, 1992). However it cannot be excluded that several LTPs are addressed to cytosolic compartments. Although their precise function is not established, it has been suggested their participation in cutin formation (Pyee and Kolattukudy, 1995), defence responses against pathogens (García-Olmedo *et al.* 1995) and the adaptation of plants to various environmental conditions (Hughes *et al.* 1992, White *et al.* 1994).

We report here the nucleotide sequence of a cDNA encoding a nonspecific lipid-transfer protein (LTP) from chickpea epicotyls (*Cicer arietinum* L cv castellana). This cDNA was isolated as a clone whose expression increased when epicotyls were grown under osmotic stress conditions using PEG. Chickpea LTP (CapLTP) is 116 amino acids in length. The protein is synthesized as a precursor containing a 23 N-terminal amino acids signal peptide sequence. As most plant LTPs, CapLTP lacks tryptophan, and eight cysteine residues are located at conserved positions. The cysteine residues are engaged in four disulfide bridges as determined in castor bean LTP (Takishima *et al.* 1986). The higher identity was found with nonspecific LTP from *Spinacia oleracea*, *Zea mays* and *Lycopersicon esculentum*. The increase in the expression of CapLTP under osmotic stress conditions supports one of the suggested role for plant LTP that is the adaptation of plants to environmental conditions. Other LTP genes respond to salt stress or drought stress. In tomato, a gene encoding a LTP-like protein is expressed, specifically in stems, only when plants are treated with NaCl, mannitol, ABA or high temperature (Hughes *et al.* 1992).

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Table I. Characteristics of CapLTP from *Cicer arietinum*

Organism:

Cicer arietinum L cv. castellana

Clone Type, Designation:
cDNA, full length, CapLTP

Source:
cDNA library in lambda-ZAP constructed from poly A+ RNA from *Cicer arietinum* 4-day-old epicotyls treated during the last 24 h with PEG.

Method of isolation:
Differential screening. Replicas of the library were hybridized to labelled cDNA prepared from 4-day-old chickpea epicotyls growing in water or 3-day-old chickpea epicotyls followed by 24 h of polyethylenglycol (PEG) treatment.

Gene identification:
Nucleotide and amino acid sequence comparisons to published sequences in GenBank and EMBL data bases and Swiss-Prot and Blitz data bases respectively.

Feature of the cDNA:
The clone is 638 bp in length, including a complete ORF of 348 bp, 60-bp 5' untranslated sequence and 230-bp 3' untranslated sequence. Two putatives polyadenilation signals were located at position 484 and 587.

Features of deduced protein:
The ORF encodes a 116 amino acid polypeptide. The first 23 amino acids of the ORF have the characteristic of a signal peptide. The encoded protein has a predicted molecular mass of 11688. It contains 8 Cys residues at conse rved positions for LTPs.

Gene product:
A nonspecific lipid transfer protein.

Literature cited

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