Plant Gene Register

Nucleotide Sequence of an Arabidopsis thaliana Lhcb4 Gene

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PSII has a number of Chl a/b light-harvesting proteins (Green et al., 1991), including two polypeptides closely associated with the PSII core complex (Camm and Green, 1989). These two polypeptides were originally isolated together in one "green band" named CP29 (White and Green, 1987; Green, 1988). Modified solubilization techniques were used later to resolve the complex into two Chl protein "green bands," each containing one of the two polypeptides and designated, respectively, CP26 and, confusingly, CP29 (Bassi et al., 1990; Morishige and Thomber, 1992).

We previously isolated and sequenced cDNA and genomic clones of tomato Lhcb5, the gene that encodes one of the polypeptides found in the CP29 complex sensu Green (Pichersky et al., 1991). Its polypeptide was originally designated CP29 type I; this is the polypeptide found in the CP26 complex sensu Bassi (Bassi et al., 1990; Jansson et al., 1992). A barley cDNA sequence for Lhcb5 has also been obtained (Sorensen et al., 1992).

The sequence of a barley cDNA of Lhcb4, which encodes the second polypeptide of CP29 sensu Green and is the only polypeptide of CP29 sensu Bassi, has been reported (Morishige and Thomber, 1992). However, no genomic sequences of Lhcb4 have yet been presented. Here we report the isolation of a Lhcb4 gene from Arabidopsis thaliana (Table I). Previously, we presented evidence for the presence of nine other types of Lhca/b genes in A. thaliana (McGrath et al., 1992).

The A. thaliana Lhcb4 gene encodes a precursor polypeptide of 290 amino acids. It has a single intron of 287 nucleotides situated between codons 170 and 171. An intron at an equivalent position does not occur in any other Lhca/b gene. The deduced amino acid sequence of the A. thaliana protein is 82% identical (90% with conservative substitutions) with that of the barley protein, and it has four insertions of a single residue each, compared with the barley protein. The four insertions are all found in the first 50 positions, a region that includes the transit peptide and possibly the N terminus of the mature polypeptide. Because the N terminus of Lhcb4 is blocked (Pichersky et al., 1991), the precise location of the cleavage site of the transit sequence is not known.

In comparison with the Lhcb5 protein and the other Lhca/b polypeptides, the Lhcb4 protein has an insertion of 43 predominantly polar amino acids (Morishige and Thomber, 1992), which falls between a conserved stroma-exposed region and the conserved first transmembrane helix. The amino acid sequence of the Lhcb4 protein is more than 50% divergent from any other Lhca/b proteins, including the Lhcb5 protein.

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The EMBL accession number for the sequence reported in this article is X71878.

LITERATURE CITED


Camm EL, Green BR (1989) The Chl ab complex, CP29, is associated

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Table I. Characteristics of Lhcb4 gene from Arabidopsis thaliana

<table>
<thead>
<tr>
<th>Organism</th>
<th>Arabidopsis thaliana cv Columbia.</th>
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<tbody>
<tr>
<td>Location</td>
<td>Nuclear gene, found on a 3.0-kb EcoRI fragment.</td>
</tr>
<tr>
<td>Techniques</td>
<td>The gene was isolated from a CEM11 library of A. thaliana cv Columbia by screening with a barley Lhcb4 cDNA clone. The gene was subcloned into the plasmid Bluescript SK+ and sequenced on both strands by single-stranded dideoxynucleotide chain termination method. Specific and universal primers were used.</td>
</tr>
<tr>
<td>Feature of Amino Acid Sequence</td>
<td>The gene encodes a protein of 290 amino acids, including a transit peptide of undetermined length.</td>
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<tr>
<td>Antibodies</td>
<td>No specific antibodies for the A. thaliana protein are available.</td>
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<tr>
<td>Subcellular Location</td>
<td>The protein is found in the thylakoid membranes of chloroplasts.</td>
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with the photosystem II reaction centre core. Biochim Biophys Acta 974: 180–184


