

Plant Gene Register

P-Protein of Glycine Decarboxylase from *Flaveria pringlei*¹

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GDC is the key enzyme of Gly catabolism in bacteria, animals, and plants. In plants this mitochondrial multienzyme complex is involved in the photorespiratory carbon oxidation cycle. Together with Ser hydroxymethyltransferase, it catalyzes the conversion of two molecules of Gly into Ser, CO₂, and NH₃, accompanied by the reduction of NAD⁺ to NADH (Sarojini and Oliver, 1983). The enzyme complex consists of four subunits: 100-kD P-protein (pyridoxal phosphate binding), 14-kD H-protein (lipoamide-containing carrier), 45-kD T-protein (tetrahydrofolate-dependent methylenetransferase), and 59-kD L-protein (lipoamide dehydrogenase), with a stoichiometry of 1 L-dimer:2 P-dimers:27 H:9 T (Oliver et al., 1990). The biosynthesis of the P-component has been shown to be light regulated, with the transcription controlled in a manner similar to the small subunit of Rubisco (Kim et al., 1991).

cDNA sequences for P-subunits from chicken and human (Kume et al., 1991) have already been published. Among plants it has been cloned and analyzed from pea only (Turner et al., 1992); however, it is known that, in C₄ species, most of the protein components of GDC are present only in the bundle sheath and not in the mesophyll. Using the genus *Flaveria* (Asteraceae) with its broad range of C₃ to C₄ intermediate species (Bauwe, 1984; Ku et al., 1991), we are investigating transcriptional regulation processes involved in the cell type-specific biosynthesis of several GDC components.

We have isolated and sequenced a full-length cDNA clone from a *Flaveria pringlei* total leaf cDNA library. The sequence shows 76.3 and 60.6% homology with the P-protein cDNAs from *Pisum sativum* and human, respectively. The derived amino acid sequence is 84.9% homologous in comparison with the pea P-subunit, and it contains some highly conserved regions when compared with the human P-protein. The cDNA was used as a probe for Southern blots of *Flaveria* genomic DNA. It appears that the P-protein is encoded by a multigene family in *F. pringlei* with four to five copies per genome.

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Abbreviation: GDC, glycine decarboxylase.

Table 1. Characteristics of the cDNA for the P-protein of the GDC multienzyme complex from *F. pringlei*

Organism:	<i>Flaveria pringlei</i> .
Isolation:	Screening of a whole-leaf cDNA library constructed in λUni-ZAP-XR with a partial cDNA from pea.
Sequencing:	First strand by nested deletions; second one with synthetic oligonucleotide primers.
cDNA:	3395 bp, open reading frame from position 95 to 3208.
Protein:	cDNA encodes a 1037-amino acid precursor protein of M _r 113,029. The mature protein consists of 971 amino acids with a molecular mass of 106 kD.
Cellular Localization:	Mitochondrial matrix.
Gene Localization:	Nuclear encoded, multigene family of four–five copies.

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The GenBank accession number for the sequence reported in this article is Z25857.

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