

Nucleotide sequence of a cDNA encoding the ribulose-1,5-bisphosphate carboxylase/oxygenase from sunflower (*Helianthus annuus*)

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Ribulose -1,5- bisphosphate carboxylase/oxygenase (RuBisCO) (E.C. 4.1.1.39) is a bifunctional enzyme which catalyses the carboxylation and the oxygenation of the ribulose -1,5- bisphosphate. This chloroplast enzyme is the most abundant protein in plants (1). The holoenzyme is composed of eight large subunits (LSU) encoded by chloroplast DNA and synthesized in the chloroplast and eight small subunits (SSU) encoded on free cytoplasmic poly-somes, transported to the chloroplast, matured and assembled with the LSUs to form the active enzyme. Nucleotide sequences from 4 SSU cDNAs have been reported (2). Here we present the complete nucleotide sequence of the cDNA encoding the RuBisCO SSU from sunflower. A sunflower cDNA library has been prepared (3) and screened with corresponding cDNA from pea (a gift from N.H. CHUA, Rockefeller University). The longest cDNA was sequenced on each strand by the chain termination method (4) : see figure below. The nucleotide sequence includes 21 bp of the 5' - untranslated region, 534 bp of the coding region and 116 bp of the 3' - untranslated region. The transit and mature peptides have respectively 55 and 123 amino acids. Comparison with the coding region of pea RuBisCO reveals 68 % homology at the nucleotide level (5) (mature peptide only) and, at the amino acid level, 62 % for the transit peptide and 76 % for the mature peptide.

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M A S I S S S V A T V S R T A P A Q
CGAAGACAGAAGATTATCGTAATGGCTTCGATCTCCTCCTCAGTCGCGACCGTTAGCCGGACCGCCCTGCTCAG
10      20      30      40      50      60      70
A N H V A P F T B L K S N A A F P T T K K A N D F
GCCAACATGATGGCTCCGTTACCGGCTTAAGTCCAACGCCGCTTCCCACCAAGAAGGCTACGACTTC
85      95      105     115     125     135     145
S T L P S N G G R V Q C M K V W P P L G L K K Y E
TCCACCCCTCCCAGCAACGGTGGAAAGTTCATGCATGAAGGTGTGGCCACCACTTGGATTGAAGAAGTACGAG
160     170     180     190     200     210     220
T L S Y L P P L T E T Q L A K E V D Y L L R G K W
ACTCTCTCATCTTACCACCACTAACTGAACTCAGTTGCGTAAGGAAGTCGACTACTTCTCCGCAAAAATGG
235     245     255
V P C L E F E L E H G F V Y R E N A R S P G Y Y D
GTTCCTTGTTTGGAATTCGASTTGGAGCACGGTTTTGTCTACCGTGAGAACCAGCAGATCCCCGGATACTATGAC
310     320     330     340     350     360     370
G R Y W T M W K L P M F G C T D S A Q V M K E L A
GGAAGATACTGGACAATGTGAAATTCCTATGTCGGTTGCACCGACTCAGCCCAAGTGATGAAGGAGCTTGCT
385     395     405     415     425     435     445
E C K K E Y P Q A W I R I I G F D N V R Q V Q C I
GAATGCAAGAAGGASTACCCAGGCTGGATCCGATCATCGGATTTGACAAATGTCGTCAGTTCATGATATC
460     470     480     490     500     510     520
M F I A S R P D G Y ***
ATGTTTCATTGCTCCAGGCCAGATGGTACTAAGCAAATTCGAGAATATTCGATCAACCTATATGATGGT
535     545     555     565     575     585     595
CGAGTTTGTTTGAATCTTTAGGTTCTTCGTCTTCTTTTTCAAATTTGAAATTTCTTTTCATGAAATTC
610     620     630     640     650     660     670

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Figure Legend : Nucleotide sequence of the cDNA and the corresponding amino acid sequence from sunflower RuBisCO SSU.

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