# Sequence of a ubiquitin carboxyl extension protein of *Nicotiana tabacum*

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Submitted May 21, 1990 EMBL accession no. X53011

A genomic library of tobacco *Nicotiana tabacum* L var. NK326 in λEMBL3 (Clontech) was screened with the coding region of a human ubiquitin cDNA probe (1). A selected recombinant phage was sequenced. The cloned DNA consisted of a single ubiquitin coding unit fused in-frame at the C-terminal site to a 72 aa long basic protein. The DNA and derived aa sequences are shown below (Fig. 1). The arrow indicates the end of the ubiquitin sequence. This protein has no analogies with the previously reported class of long (76–80 aa) ubiquitin carboxyl extension proteins (CEP) from Dictyostelium (2) and yeast (3) but exhibits important homologies with the class of short (52 aa) CEPs (Fig. 2) from yeast (3), Arabidopsis and Chlamydomonas (4), Dictyostelium (5), human (6) and Trypanosoma (7). As in these proteins i) four cysteine residues (boxed) could be involved in a putative DNA-binding motif and ii) a consensus sequence (underlined) could be a nuclear translocation signal. Nevertheless the size of this CEP is different in that an additional sequence of 20 aa is present after residue 27. Thus, this unusual structure is different from the classical DNA-binding zinc-finger motif, but presents rather some analogies with the recently reported zinc-finger domain (8) of the multifunctional chromatin-associated enzyme, poly (ADP-ribose) polymerase. This may be an indication of a possible role of this particular ubiquitin CEP in chromatin modification.

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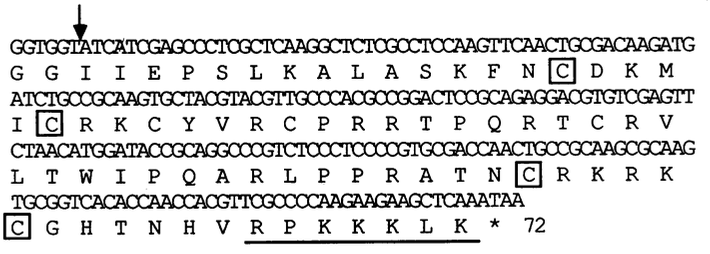


**Figure 1.** Nucleotide sequence and deduced amino acid sequence of the ubiquitin carboxyl extension protein from *N. tabacum*.

| | |
|---|---|
| IIEPSLKALASKFNCDKMICRKCYVRCPRRTPQRTCRVLTWIPQARLPPRATNCRKRKCGHTNHVRPKKKLK | (Tabacum) |
| .....MM..R.Y.Q.....A.L H...V....KS...S.QL..... | (Arabidopsis) |
| .....Y....SV.....A.L .....QL..... | (Yeast) |
| .....RQ..Q.Y.....A.L H...V....K.....NL.....V. | (Human) |
| .....Q...R.YNQQ.....A.L H...K....KS.....QL..... | (Chlamydomonas) |
| .....VI..R.YK.....A.L H...V....K....S.N.....LK | (Dictyostelium) |
| VM..T.E...K.Y.WE.KV..R..A.L .V..S....KA...CSNL.M..... | (Trypanosoma) |

**Figure 2.** Alignment of the ubiquitin carboxyl extension protein from *N. tabacum* with those of other species.

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