

An alfalfa cDNA encodes a protein with similarity to human snRNP-E

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Small nuclear ribonucleoproteins (snRNPs) are complexes composed of discrete sets of proteins associated with the small nuclear RNAs U1, U2, U5 and U4/U6. These snRNAs have been shown to be required for a variety of RNA processing reactions in eukaryotic cells (1, 2). U1 snRNP acts at the 5' splice site, U2 snRNP interacts with the branch point and U5 snRNP probably associates with the 3' splice site (3). The specific roles of the individual snRNA associated proteins in RNA processing are still unclear. However, at least some of the snRNA associated proteins appear to be necessary for specific interaction of the snRNA with the pre-mRNA. A subset of these proteins is recognized by autoantibodies from patients with the autoimmune disease systemic lupus erythematosus (SLE) (4, 5). These autoantibodies react with the Sm epitope and can precipitate U1, U2, U4, U5 and U6 snRNPs from cell extracts (6). This indicates that these proteins must have been highly conserved during evolution. Therefore, investigation of the primary structure of the proteins from distantly related organisms should yield valuable information on important protein domains and contribute to an understanding of the function of these proteins in RNA processing.

We have isolated an alfalfa cDNA whose predicted protein sequence shows homology to the human snRNP-E protein (7). The 375 nucleotide long cDNA sequence putatively encodes a protein of 81 amino acids. Comparison with the SWISS PROT data bank revealed 37% identity to the human snRNP-E protein. When conservative amino acid exchanges were taken into account, the two proteins were found to be 74% homologous to each other. Alignment of the plant and human protein sequences (Figure 1) revealed that the two proteins are conserved over their entire length with the exception of a block of 18 amino acids which is completely missing in the plant sequence.

Taken together, the putative alfalfa protein is clearly related to the human snRNP-E protein. However, since the protein is only 37% identical to snRNP-E, we propose that it is not encoding the homologous protein to human snRNP-E but might represent a novel class of snRNA-associated proteins.

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c29  MSTSGQPPDLKKYMDKQLQINL-----KARNMIVGTLRGFDQFMNLVV
      :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :
sn   MAYRGQGQKVKQVM-VQ-PINLIFRYLQNRSRIQVWLYEQVMNRIEGCTIGFDEYMNLVL
RNP-E

c29  DNTVEVNGNEK--NDIGMVVIRG-NSVVTVEALEPVVNRIG
      :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :  :
sn   DDAEEIHSKTKSRKQLGRIMLRGDN--IT--LLQSVSN
RNP-E
    
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Figure 1. Alignment of predicted alfalfa protein sequence and human snRNP-E. Identical amino acids are indicated by double dots. Conservative amino acid changes are denoted by single dots. The absence of amino acids in the alignments is shown by dashes.