Sequence of the rabbit whey acidic protein cDNA

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Two overlapping cDNA clones were isolated from a rabbit lactating mammary gland cDNA library (1) using a mouse whey acidic protein (WAP) cDNA as a probe (2). The clones were sequenced by the method of Sanger et al. (3).

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   ATCCGACACCTGCCTGCTGCCCACCACCAGCCTACCACCTGCCACC  ATG CGC TGT CTC ATC AGC CTG GCC CTC GGC CTG CTC GCC CTG GAG GCG GCC    97
                                                    M  R  C  L  I  S  L  A  L  G  L  L  A  L  E  A  A
CTC GCT CTG GCC CCC AAG TTC ATC GCT CCA GTG CAG GTC ATG TGC CCC GAG CCC AGC TCT TCC GAG GAG ACG CTC TGC CTC AGT GAC AAC   187
 L  A  L  A  P  K  F  I  A  P  V  Q  V  M  C  P  E  P  S  S  S  E  E  T  L  C  L  S  D  N
   -1 +1
GAC TGT CTC GGC AGC ACC GTG TGC TGT CCC AGC GCC GCC GGC GGC TCC TGC AGA ACC CCC ATC ATC GTC CCT ACC CCC AAG GCT GGC CGC   277
 D  C  L  G  S  T  V  C  C  P  S  A  A  G  G  S  C  R  T  P  I  I  V  P  T  P  K  A  G  R
TGC CCC TGG GTG CAG GCG CCA ATG CTG TCC CAG TTG TGT GAG GAG CTG AGC GAC TGT GCC AAC GAC ATC GAG TGC AGG GGC GAC AAG AAG   367
 C  P  W  V  Q  A  P  M  L  S  Q  L  C  E  E  L  S  D  C  A  N  D  I  E  C  R  G  D  K  K
TGC TGC TTC AGC CGC TGC GCC ATG CGC TAT CTG GAA CCC ATC CTA GAG AGC ACT CCC CAG TGAGCCGCCTACCCAGGAGTCCCTGGCTGCCAGGAGAGTT   467
 C  C  F  S  R  C  A  M  R  Y  L  E  P  I  L  E  S  T  P  Q
                                                    *108
GGGCCTGAGTTCCCCCTCTTGGACCCAGAGAGCTTGTGACGCGTCCTCCCTGCTGCTAATAAAACTACTCAGCTTCAAAA                                   547
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The full length cDNA consists of 547 nucleotides encoding a 127 amino acid polypeptide of M_r = 13528. The protein shows the expected high content in cystein residues characteristic of the mouse and rat WAP (2). Between the three species the position of the 14 cystein residues is conserved, while the other residues show at best 64 % similarity. In contrast, the similarity between the signal peptide sequences of the three species is higher (89%). Furthermore, the WAP signal peptide sequences show 50 to 75 % similarity with those of bovine, ovine, rat and rabbit α and β caseins. This suggests that these sequences favor an efficient translocation across rough endoplasmic reticulum and secretion of milk proteins.

The rat WAP is phosphorylated (4) and a potential phosphorylation site for casein kinase : Asp-Ser-Ser-Ser-Glu (residues 18-22) has been proposed (2). The sequence Ser-Ser-Glu-Glu (residues 36 to 40) in the rabbit WAP is likely to be a phosphorylation site.

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