Short Communications

Sequence Homology between Tissue Polypeptide Antigen (TPA) and Intermediate Filament (IF) proteins

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Partial sequences of Tissue Polypeptide Antigen (TPA) a protein isolated from human carcinomas or human placenta has been published. Comparisons with other proteins did not show any homology or analogy.

B M A V L N D R L A Q Y L D E V R A L E A A N G - L E V L
64 T D L D D R L A K Y L D K V R A L E A A D G E L G V
118 A L L N D E L A E Y L A L V R A L E A A D G K L G V
7 R F A A F I D K V R

GPA M L N E F A R Y I E R V V F L E E Q K R A R A A L D E
V 89 L Q E L N D R F A D Y I D K V R F L E Q Q N K I L L A E L Q L

Fig. 1. The amino acid sequence of TPA BrCN:B fragment and synthetic peptides 64 and 118 aligned with IF proteins. TPA BrCN:B fragment (B), Synthetic peptides 64 (64) and 118 (118), sheep wool \( \alpha \)-keratin 7c (7), Sheep wool \( \alpha \)-keratin 8c-1 (8), human epidermal 50K keratin (E), chicken gizzard desmin (D), porcine vimentin (V), bovine glial fibrillary acidic protein (GFA). Sequences of IF proteins are from Ref. 5, where further references are found. Solid lines denote unknown sequences.

E1 M D - I I A E - V K A Q Y E D - A - R M
F M L E E F

8 219 D L N - - - R V L N E T R A Q Y E A L V E T N R D V E E W Y I R Q
E 216 D L S - - - R I L N E R D Q Y E K M A E K N R K D A E E W F F I K
D 260 D L T - - - A A L R D V R Q Q Y E S V A A K N L Q E A E E W Y K S K
V 246 D L T - - - A A L R D V R Q Q Y E S V A A K N L Q E A E E W Y K S K

Fig. 2. The amino acid sequences of TPA BrCN fragments E1 and F aligned with IF proteins. TPA BrCN:E1 (E1), TPA BrCN:F (F), sheep wool \( \alpha \)-keratin 7c (7), sheep wool \( \alpha \)-keratin 8c-1 (8), human epidermal 50K keratin (E), chicken gizzard desmin (D), porcine vimentin (V). Sequences for IF proteins are from Ref. 5, where further references are found.

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The amino acid sequences of TPA BrCN:C and synthetic peptides 107, 255 and 269 aligned with IF proteins. TPA BrCN:C (C), peptides 107 (107), 255 (255), and 269 (269), sheep wool α-keratin 7c (7), sheep wool α-keratin 8c-1 (8), human epidermal 50K keratin (E), chicken gizzard desmin (D), porcine vimentin (V), porcine neurofilament 68 K protein (NF). Sequences of IF proteins are from Ref. 5, where further references are found. Double headed arrow denotes the approximate location of the epitope in TPA BrCN:C.
heptade structure is retained.

The earlier ideas about a triple stranded architecture of the IF proteins has been doubted by Weber\(^3\) who found evidence for a double stranded coiled coil.\(^2\) The sedimentation analysis of TPA\(^1\) confirms this observation as TPA forms a rod like dimer at high and low pH (2.1S, \(ff_{0}=2.4\)). Around pH 7 soluble 4S aggregates are formed, which however, easily precipitate, properties intermediate between those observed for the desmin rod and the complete desmin molecule.\(^3\)

Based on sequence homology between various parts of the TPA molecule and a number of IF proteins TPA should belong to that group and immunological cross reactions can be expected. However chemical differences in at least one epitope may explain immunological differences between TPA and other IF proteins.

Experimental conditions for the preparation of TPA and its antibody, as well as the testing of antibody-antigen binding have been presented\(^1,2,6\). Peptides were synthesized by Merrifield technique.\(^7\)

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**Note added in proof.** A recently published Type II human epidermal cytoskeletal keratin [Hanukoglu, I. and Fuchs, E. *Cell* 33 (1983) 915] shows a high homology (60 %) with the TPA BrCN:C fragment although TPA is a Type I cytokeratin.


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