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Primary structure of a human protein which bears structural similarities to members of the rhodopsin/β-adrenergic receptor family

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A human placental lambda gt11 cDNA library was screened with an antisera directed against a peptide of the first intracellular loop of the G-protein linked photoreceptor bovine rhodopsin (1). A clone, $pHPS_1$-2 was identified and a 1788 bp *EcoR I* restriction fragment sequenced. The putative open reading frame encodes a protein that is similar to other membrane receptor proteins by a variety of criteria (Table I). Immunoblot analysis of a lambda lysogen of $pHPS_1$-2 indicates that the determinant of antibody recognition does not lie in the predicted open reading frame. This determinant arose as a fusion product of beta-galactosidase and the extreme 5′ region of $pHPS_1$-2. The nature of this putative protein is undetermined.

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1    GAATTCGGGCGGGGAGCTGCAGGAACCAGACTGGGGGCGAGCTGAGCACCTGTAGTCAATCACACGCAGCTTTTAGGTTTGTTTGAATAAGAGATCTGACCTGACCGGCCCAACTGTACAACT
                                                                M N A M L E T P E L P A V F D G V K L A A V A A
124  CTTCAAGGAAAATTCGTATTTGCAGTGGGAAGAATAAGTAACATTGATCAAGATGAATGCCATGCTGGAGACTCCCGAACTCCCAGCCGTGTTTGATGGAGTGAAGCTGGCTGCAGTGGCTGC
     V L Y V I V R C L N L K S P T A P P D L Y F Q D S G L S R F L L K S C P L L T K E
247  TGTGCTGTACGTGATCGTCCGGTGTTTGAACCTGAAGAGCCCCACAGCCCCACCTGACCTCTACTTCCAGGACTCGGGGCTCTCACGCTTTCTGCTCAAGTCCTGTCCTCTTCTGACCAAAGA
     Y I P P L I W G K S G H I Q T A L Y G K M G R V R S P H P Y G H R K F I T M S D G
370  ATACATTCCACCGTTGATCTGGGGGAAAAGTGGACACATCCAGACAGCCTTGTATGGGAAGATGGGAAGGGTGAGGTCGCCACATCCTTATGGGCACCGGAAGTTCATCACTATGTCTGATGG
     A T S T F D L F E P L A E H C V G D D I T M V I C P G I A N H S E K Q Y I R T F V
493  AGCCACTTCTACATTCGACCTCTTCGAGCCCTTGGCTGAGCACTGTGTTGGAGATGATATCACCATGGTCATCTGCCCTGGAATTGCCAATCACAGCGAGAAGCAATACATCCGCACTTTCGT
     D Y A Q K N G Y R C A V L N H L G A L P N I E L T S P R M F T Y G C T W E F G A M
616  TGACTACGCCCAGAAAAATGGCTATCGGTGCGCCGTGCTGAACCACCTGGGTGCCCTGCCCAACATTGAATTGACCTCGCCACGCATGTTCACCTATGGCTGCACGTGGGAATTTGGAGCCAT
     V N Y I K K T Y P L T Q L V V V G F S L G G N I V C K Y L G E T Q A N Q E K V L C
739  GGTGAACTACATCAAGAAGACATATCCCCTGACCCAGCTGGTCGTCGTGGGCTTCAGCCTGGGTGGTAACATTGTGTGCAAATACTTGGGGGAGACTCAGGCAAACCAAGAGAAGGTCCTGTG
     C V S V C Q G Y S A L R A Q E T F M Q W D Q C R R F Y N F L M A D N M K K I I L S
862  CTGCGTCAGCGTGTGCCAGGGGTACAGTGCACTGAGGGCCCAGGAAACCTTCATGCAATGGGATCAGTGCCGGCGGTTCTACAACTTCCTCATGGCTGACAACATGAAGAAGATCATCCTCTC
     H R Q A L F G D H V K K P Q S L E D T D L S R L Y T A T S L M Q I D D N V M R K F
985  GCACAGGCAAGCTCTTTTTGGAGACCATGTTAAGAAACCCCAGAGCCTGGAAGACACGGACTTGAGCCGGCTCTACACAGCAACATCCCTGATGCAGATTGATGACAATGTGATGAGGAAGTT
     H G Y N S L K E Y Y E E E S C M R Y L H R I Y V P L M L V N A A D D P L V H E S L
1108 TCACGGCTATAACTCCCTGAAGGAATACTATGAGGAAGAAAGTTGCATGCGGTACCTGCACAGGATTTATGTTCCTCTCATGCTGGTTAATGCAGCTGACGATCCGTTGGTGCATGAAAGTCT
     L T I P K S L S E K R E N V M F V L P L H G G H L G F F E G S V L F P E P L T W M
1231 TCTAACCATTCCAAAATCTCTTTCAGAGAAACGAGAGAACGTCATGTTTGTGCTGCCTCTGCATGGGGGCCACTTGGGCTTCTTTGAGGGCTCTGTGCTGTTCCCCGAGCCCCTGACATGGAT
     D K L V V E Y A N A I C Q W E R N K L Q C S D T E Q V E A D L E U
1354 GGATAAGCTGGTGGTGGAGTACGCCAACGCCATTTGCCAATGGGAGCGTAACAAGTTGCAGTGCTCTGACACGGAGCAGGTGGAGGCCGACCTGGAGTGAGGCCTCCGGACTCTGGCACGCTC
1477 CAGCAGCCCTCCTCTGGAAGCTGCGTCCCCTCACCCCCTGTTTCAGGTCTCCCATCTCCCTCAGTGACCTGGATCTGACCTCACACCATCAGCAGGGGGCACCCACCATGCACACCTGTCTCG
1600 GAGTAGGCAGCTCTTCCTGGGAGCTCCAGGCTATTTTTGTGCTTAGTTACTGGTTTTCTCCATTGCATTGTTAGGCATGGTGACAAGTGACAGAGTTCTTGCCCTCTGTCCAGTTTCAGCATC
1723 TGGTTGCTTTTAAGCCAAGTACATCTAGTTTCCCTATTAAAAATGTGTCTGAATCCCCCCGAATTC
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Table I

Membrane Receptor Protein	Number of Residues	Percent Cysteine	Percent Hydrophobic	N-GYL	Memb Span	Ref.
Bovine Rhodopsin	348	2.9	43	3	7	2
β_2-adrenergic	418	3.8	38	2	7	3
Muscarinic M_1	460	3.3	34	2	7	4
G-21 protein	421	3.3	36	3	7	5
$pHPS_1$-2	425	3.3	37	1	7	-

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