Rapid Communication: Nucleotide Sequence of the Coding Region for the Porcine β1-Adrenergic Receptor Gene

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Name of the Sequence. Porcine β1-adrenergic receptor gene.

Genus and Species. Sus scrofa.

Origin of Clone. A 243-bp β1-adrenergic receptor (β1AR) coding region cDNA was amplified from pig adipose tissue mRNA by reverse transcriptase-polymerase chain reaction using the following primers: forward 5′-TGTGACMGCTGTTGGCCATC-3′; reverse 5′-GAGGARCCGCTGTCAGC-3′. The cDNA probe was used to screen a pig genomic DNA cosm id library and identify restriction enzyme fragments containing the coding sequence by Southern blot analysis. A 4.6-kb Hindlll restriction fragment was subcloned into pBluescript ll SK+ for generation of nested deletions. A 2.31-kb nested deletion product was subcloned into pcDNA3.1(+) for DNA sequencing. Both strands of the subcloned fragment were sequenced using SequiTherm EXCEL (EpIcentrTechnologies, Madison, WI).

Comparison with Related Sequences. The nucleotide sequence of the porcine β1AR coding region (Figure 1) was 92% identical to human (Frielle et al., 1987) and 91% identical to rat β1AR (Shimonura and Terada, 1990) but only 48 to 51% similar to pig or human β2AR (Emorine et al., 1987, 1989), confirming the β1AR character of this clone. The putative amino acid sequence of the porcine β1AR was 90% similar to human and rat β1AR but only 52% similar to pig or human β2AR (Emorine et al., 1987; Liang et al., 1997), human β3AR (Emorine et al., 1989), or the turkey β1AR (Yarden et al., 1986). The coding region for pig β2AR is two amino acids longer than rat and nine amino acids shorter than human β3AR. This cosmid-derived sequence was 98.5% similar to an 878-bp partial cDNA reported for pig β1AR (GenBank accession no. U56425).

Sequence Data. A 2.31-kb nested deletion fragment from a 4.6-kb Hindlll fragment contains the complete porcine β1AR gene sequence. The pig β1AR gene contains no introns and has an open reading frame of 1,407 nucleotides that encodes a protein of 468 amino acids.

Figure 1. The protein coding sequence from a 2.31-kb nested deletion product of a 4.6-kb Hindlll fragment is given. The amino acid translation is shown below the sequence and the stop codon is indicated (*). Conserved amino acids for glycosylation (N15), ligand binding (D138, S228, S231, and F331), disulfide bond formation (C131 and C208) are boxed.