Nucleotide sequence of the human nicotinic acetylcholine receptor $\beta 2$ subunit gene

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Neuronal nicotinic acetylcholine receptors (AChRs) are multisubunit, ACh-activated cation channels found in the peripheral and central nervous systems. They are composed of two kinds of subunits, α and β , with uncertain stoichiometry of $\alpha_{2-3}\beta_{2-3}$ (1, 2, 3). cDNAs for at least six AChR genes from chicken and rat brains have been isolated and termed $\alpha 2$ (4), $\alpha 3$ (5, 6), $\alpha 4$ (7) and $\beta 2$ (6, 8, 9), $\beta 3$ (10) and $\beta 4$ (11). We have determined the entire sequence of the human AChR $\beta 2$ subunit gene from two overlapping phage clones isolated by screening two human fetal brain libraries (Stratagene and Clontech), using the chicken cDNA homologue (9) as a probe. The coding region contains 1503 nucleotides encoding a protein of 501 amino acids with a signal peptide of 25 amino acids, as predicted by the method of von Heijne (12). The mature protein sequence shows 95% amino acid identity to the rat $\beta 2$ gene sequence, with the maximum nonidentity occurring within the large, putative cytoplasmic domain between the third and fourth putative transmembrane domains. The four putative transmembrane domains (TMD I-IV) are even more highly conserved, differing only by one amino acid from that of the rat $\beta 2$ sequence. Thus we conclude that we have cloned the human AChR $\beta 2$ subunit gene.

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