Advances of β--amyloid peptide as a Therapeutic Target in Alzheimer’s Disease

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Abstract Alzheimer’s disease (AD) is the most prevalent cause of dementia and memory loss among the elderly. It is characterized in part by the deposition of β--amyloid peptide in compact AD plaque formation. These structures can induce an innate immune response in the brain, which triggers progressive inflammation, neuronal loss, and further cognitive decline. This review focuses on the β--amyloid peptide as a therapeutic target in Alzheimer’s disease.

Key words Alzheimer disease; β--amyloid peptide; β--secretase; vaccine

1 Aβ

Aβ is a 40–42 amino acid residues (amyloid precursor protein, APP) product. APP is a transmembrane protein encoded by a single-copy gene. It is an integral component of the neuronal cell surface and is involved in the transfer of extracellular materials from the extracellular space to the intracellular space.

2 Aβ and AD

2.1 β--secretase Β--amyloid peptide

1999, Vassar et al. cDNA library of the AD brain, APP 42

2000, 501
APPβ c β-site APP cleaving enzyme, BACE), β- APP fragments containing amyloid β–peptide (five–amino–acid beta–sheet breaker peptide, iAbeta5p) or β–site APP cleaving enzyme (BACE, mRNA or genomic DNA) were transfected into rat C6 glioma cells, BACE mRNA or genomic DNA were introduced directly into the rat brain by using the lentivirus or adenovirus vector, BACE expression in the rat brain was examined by Western blotting, and the activity of the enzyme was determined using the amidolytic assay. Furthermore, this enzyme was also expressed in HEK293 cells, and the activity of the enzyme was determined using the amidolytic assay. The results show that the enzyme showed high activity towards the amyloid β–peptide, and the activity was inhibited by the inhibitor of the enzyme.

2.3. The Effect of the Enzyme on the Amyloid β–Peptide

The enzyme was also found to be able to inhibit the amyloid β–peptide production in vivo. The enzyme was found to reduce the amyloid β–peptide production in the rat brain, and this effect was inhibited by the inhibitor of the enzyme.

In conclusion, the enzyme is a potential therapeutic target for Alzheimer’s disease.


