Theorical study for the treatment of Alzheimer's disease with combined therapy: development and innovation.

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Abstract

Neurodegenerative diseases pose a big problem globally, with no effective treatments for their treatment. These diseases are usually linked to age, being one of the main risk factors for them. Every time we find a more globally aged population thanks to advances in Medicine, and the prevalence of these pathologies increases at an exorbitant rate. One of the main diseases within this group is Alzheimer's. This pathology implies a great social (due to the incapacity it produces) and health (due to the care and treatment of these patients) cost and some authors consider it the great pandemic of the 21st century (with 5-7 million new cases per year and 44 million people affected). Alzheimer's disease affects the CNS, characterized by the loss of synapses and memory progressively. However, the biggest problem today is that there are no techniques that help us with early diagnosis and its etiology is unknown. Although numerous hypotheses have been raised to explain its origin (highlighting the Tau, amyloid and cholinergic hypothesis), none of them has been able to explain the real etiopathogenesis of the disease. After an exhaustive study of the signaling pathways and routes involved in Alzheimer's disease, our group has decided, in a completely new way, to address the treatment of this disease from two different points, carrying out a theoretical study of the result of the combined therapy and presenting the experimental design to follow for the development of a new drug that helps these patients. Our strategy is the design of peptides analogous to reticulon 3 (RTN-3), which is a little studied protein whose function is beta-secretase binding (BACE-1, responsible for the formation of amyloid plaques that damage the neuronal tissue and which is counted overexpressed in this pathology) and inhibit it. The other protagonist of the combination therapy is a GSK-3B inhibitor molecule in a non-competitive ATP form (enzyme causing phosphorylation of Tau and its aggregation, forming the characteristic neurofibrillary tangles of Alzheimer's). Our work shows in detail the screening process (High Throughput Screening) to be followed, with all the techniques to be used, for the development of the peptide analogous to RTN-3, in a totally scientific, documented and analyzed way after reviewing the literature, applying Cellular, molecular and animal biology techniques, presenting the expected results in a theoretical way, and showing the process of selecting cell lines, animal models, techniques, instruments and molecules truthfully and totally analogous to reality.

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