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Toward an Understanding of Alzheimer's Disease I: The Effects of Bilateral Injections of Beta Amyloid (1-42) on Spatial Learning in the Male Rat

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TOWARD AN UNDERSTANDING OF ALZHEIMER'S DISEASE I: THE EFFECTS OF BILATERAL INJECTIONS OF BETA AMYLOID (1-42) ON SPATIAL LEARNING IN THE MALE RAT

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Alzheimer's Disease is a neurodegenerative disorder that is characterized by neurofibrillary tangles (NFT) and neuritic plaques (NP). These NP are comprised of a 39 - 43 amino acid peptide : beta amyloid (βA), which seem to selectively target the basal forebrain and hippocampus of the brain. A recent study by Kang, Doman, McCampbell, Kang (Neuroreport, 1993) stated that βA(25-35), the hypothesized neurotoxic segment of the protein, plus a subthreshold dose of an excitatory amino acid, ibotenic acid (IBO), produced behavioral deficits on a visual-spatial task in a rat similar to the behavioral deficits in human Alzheimer's subjects. The same study reported that βA(25-35) alone did not produce any behavioral deficits. Presently there are several forms of βA that are suspected of forming NP. Research on the effects of these different fragments of βA is needed to discover their potential role in the etiology of Alzheimer's. Therefore, in this study, we assessed the behavioral effects of βA(1-42) following intracerebral injections into the dorsal blade (CA1 region) of the hippocampus in the male rat. We used three groups of animals in this study. One group consisted of animals injected with βA(1-42) in a dimethylsulfoxide vehicle (DMSO). The second group was comprized of animals that were injected with a scrambled βA(1-42) peptide in DMSO. The third group, the control group, consisted of animals injected with DMSO only. All of the injections were targeted at the dorsal blade of the hippocampus. The animals were pretested for two weeks on an eight arm radial arm maze, a task that tests for visual-spatial learning, in which five of the arms were always baited. We tested the animals for two weeks after the surgery and found no difference between any of the groups in their ability to learn a visual-spatial task. Another study is currently examining the effects of βA(1-42) with IBO.