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Developing an Animal Model of Alzeheimer's Disease: Multiple Hippocampal Injections of Beta-Amyloid (1-42) and the Effects on Spatial Learning and Memory in the Male Rat

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Poster Presentation 23

DEVELOPING AN ANIMAL MODEL OF ALZEHEIMER'S DISEASE: MULTIPLE HIPPOCAMPAL INJECTIONS OF BETA-AMYLOID (1-42) AND THE EFFECTS ON SPATIAL LEARNING AND MEMORY IN THE MALE RAT.

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Alzheimer's Disease (AD) is a neurodegenerative disorder which affects approximately four million people in the United States alone. A diagnosis of AD can be made only by performing a postmortem examination of the brain and confirming the presence of high numbers of neuritic plaques and neurofibrillary tangles, the pathological hallmarks of the disease. The neuritic plaque is composed primarily of the 39- to 43- amino acid protein ß-Amyloid (ßA), and is found in large quantities in structures such as the hippocampus, which is intimately involved with learning and memory. ßA has been hypothesized to play a role in the onset of AD, but studies which attempt to model the disease using single injections of the peptide fail to produce consistent behavioral impairments. A number of recent studies have suggested that chronic administration of ßA or one of its fragments may be more pathologically relevant to AD than single injections, and may also produce more consistent impairments of spatial learning and memory. In addition, our lab has demonstrated that multiple injections of the neurotoxic fragment ßA (25-35) into the septum, which projects to the hippocampus, produce a marginal impairment on a spatial task. A marginal depletion of cholinergic markers in the hippocampus was also produced. Since the ßA fragment has different chemical properties than the full length peptide, it is conceivable that more profound behavioral and neurochemical impairments may result from the use of ßA (1-42). It is also possible that injections into the hippocampus instead of the septum would produce a greater impairment on learning and memory. Therefore, this study examines the effects of multiple hippocampal injections of the full length ßA (1-42) peptide on spatial learning and memory in the rat.