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Toward an Understanding of Alzheimer's Disease VI: A Comparison of the Effects of Bilateral Injections of βA (1-42) and βA (25-35) into Hippocampus on the Acquisition of a Spatial Task in the Male Rat

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TOWARD AN UNDERSTANDING OF ALZHEIMER'S DISEASE VI: A COMPARISON OF THE EFFECTS OF BILATERAL INJECTIONS OF ßA (1-42) AND ßA (25-35) INTO HIPPOCAMPUS ON THE ACQUISITION OF A SPATIAL TASK IN THE MALE RAT

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Alzheimer's disease (AD) is a neurodegenerative condition which presently affects more than 4 million Americans. Cognitively, AD manifests itself through gradual memory loss, learning disruption, and dementia. The neuropathology of AD is not completely understood though it is generally agreed that the neurons of the hippocampus are among the neuroanatomical structures selectively targeted in the disease. Extracellular neuritic plaques and intracellular neurofibrillary tangles have been identified as characteristic neurohistological features that may play a role in AD etiology. Accumulating evidence suggests that the aggregation of the 39-43 amino acid protein, beta amyloid (ßA), may exhibit neurotoxicity either individually or synergistically with excitotoxins in the brain. Dornan, Kang, McCampbell, and Kang (Neuroreport, 1993) reported that bilateral injections of ßA (25-35) in combination with a subthreshold dose of ibotenic acid (IBO) produced a dramatic disruption in acquisition of spatial learning in the rat. This deficit was accompanied by cell death in the hippocampus that mimicked the degeneration observed in AD. In that study, however, injections of ßA (25-35) alone had no effect on the acquisition of spatial learning. At present, whether fragments of ßA or the full protein produce neurotoxicity in neurons remains somewhat controversial. Therefore, in this study the effects of bilateral injections into the hippocampus of ßA (1-42) on the acquisition of spatial learning in the rat were compared with ßA (25-35), saline, and a subthreshold dose of ibotenic acid. Comparisons were made using a partially baited 8-arm radial arm maze. To assess the effects of these injections on spatial learning, the following parameters were recorded: session latency, latency to first choice, total number of choices, total correct choices, reference memory errors, working memory correct and incorrect errors, and choice accuracy. The results of this study will be presented at the conference.