인지예비능의 뇌신경기전

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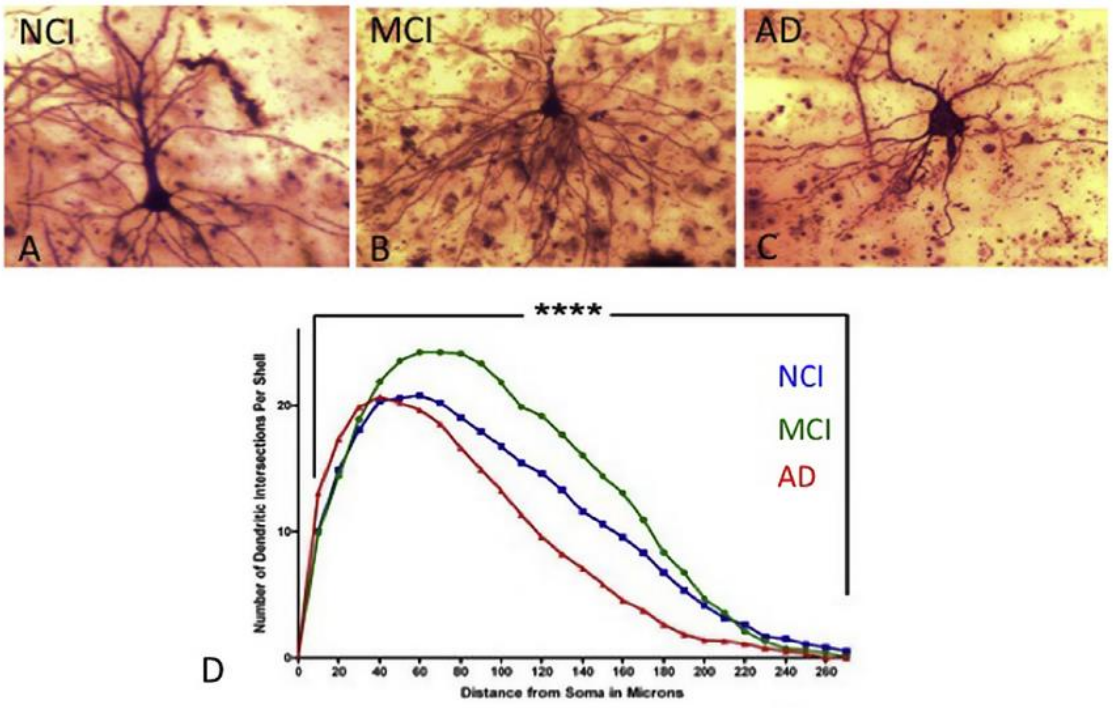
Cognitive reserve is a hypothetical concept introduced to explain discrepancies between individuals in susceptibility to age-related brain changes or pathology related to Alzheimer's disease. Reserve can conveniently be divided into two types: brain reserve, which refers to differences in the brain structure that may increase tolerance to pathology, and cognitive reserve, which refers to differences between individuals in how tasks are performed that might enable some people to be more resilient to brain changes than others. Katzman, first introduced the concept of the brain reserve to explain hippocampal structural and biochemical plasticity in the course of AD. Post-mortem examinations in 137 elderly persons revealed a discrepancy between the degree of AD neuropathology and the clinical manifestations at the time of death. Neuroplasticity is the ability to adapt and reorganize the

structure or function to internal or external stimuli and occurs at the cellular level and is reflected in the cytological and network architecture. The hippocampus has long been considered a classic model for the study of neuroplasticity as many examples of synaptic plasticity such as long-term potentiation. Early CA1 reorganization, a significant increase in dendritic length and complexity in MCI compared to NCI, is one example of neuroplastic compensatory response to loss of afferent input from entorhinal cortex. (Figure 1) Conversely, there was a significant reduction in branch length and arbor complexity during the progression from MCI to AD. Epidemiological studies suggest that lifelong experiences, including educational and occupational attainment, and leisure activities in later life, can increase this reserve. Evidence support an understanding of cognitive reserve as a balance between positive life course activity-driven experiences and the negative effects of brain pathologies including cerebrovascular disease and total and regional brain volume loss. The emphasis is driven to seven major modifiable negative effect of low education, sedentary lifestyle, midlife obesity, midlife smoking, hypertension, diabetes, and midlife depression. Hippocampal neuroplastic pathways provide compelling substrates for therapeutic intervention, wherein mechanisms of brain reserve might be harnessed to modify

disease progression in MCI as a molecular switch to counteract or to suppress select pathogenic pathways that drive the disease.



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