

Changes of the Brain Synapses During Aging. New Aspects

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Z. Naturforsch. **56c**, 921–929 (2001); received May 15/June 12, 2001

Brain, Aging, Synapses

The process of brain aging is an interaction of age-related losses and compensatory mechanisms. This review is focused on the changes of the synaptic number and structure, their functional implications, regarding neurotransmission, as well as the electrical activity of neuronal circuits. Moreover, the importance of calcium homeostasis is strongly emphasized. It is also suggested that many neuronal properties are preserved, as a result of adaptive mechanisms, and that a series of interdependent factors regulate brain aging. The “new frontier“ in research is the challenge of understanding the effects of aging, both to prevent degenerative diseases and reduce their consequences. New aspects are considered a) the role of nitric oxide, b) free radicals and apoptosis, c) impaired cerebral microcirculation, d) metabolic features of aging brain, e) the possible neuroprotective role of insulin-like growth factor-1 (IGF-1) and ovarian steroids and e) stress and aging. These numerous multifactorial approaches are essential to understand the process of aging. The more we learn about it, the more we realize how to achieve “successful” aging.