

Future Research on Healthy Brain Aging

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EDITORIAL NOTE

Future research may shed light on the best clinical strategies regarding how and what the information dissemination to all adults toward reducing the incidence and prevalence of dementias and increasing healthy brain aging. The authors believe that the future lies in advances in basic research, technological developments and progress in clinical research. Neuroscience may soon realize the promise of detecting neurodegenerative processes and processes involved in cerebrovascular disease, before they are behaviourally observable, thus realizing the promise for early intervention. Discovering and targeting the pathways mediating aging and disease susceptibility and developing therapeutic agents will allow more of the population to age with intact cognition. Some elderly persons whose brains have high densities of lesions that indicate neurodegenerative disease do not have dementia. It is of utmost importance to find out how common such cases are and their relationship to healthy brain aging to help prevent treatment of presymptomatic in older adults who have low likelihood of developing dementia. Dementia is not an event but the end stage of several pathophysiologic processes. The focus needs to be shifted from the extreme category of dementia to the continuum of cognitive functioning that includes milder forms of cognitive impairment and brain at risk. Also neurodegenerative and cerebrovascular pathologies are not mutually exclusive, but interact in their contribution to cognitive impairment and dementia. Cognitive impairment is also not always the first alarm signal. These interactions need to be acknowledged when planning secondary prevention trials. The most prevalent activity throughout life is work. Future studies need to clarify whether retirement has detrimental effects on cognitive and emotional health especially for individuals who do

not have resources to maintain a high level of activity and social participation. Identifying convergent mechanisms such as insulin resistance, hypoperfusion and cerebral ischemia that may underlie comorbid VRFs and thereby increase dementia risk will provide important insight into the causes and interdependencies of late life dementias and may also identify novel strategies for treating and preventing these disorders.

As understanding of risk factors improves it may be possible to personalize dementia prevention. A tool that looks simultaneously at several genetic variants, family history, life style, VRFs and vascular disease might more accurately predict who is at risk for dementia and who could benefit from more aggressive prevention efforts. Phenotypes that reflects healthy brain aging need further refinement to better understand their genetic, lifestyle and environmental basis. This refinement must be done before we can begin to understand the complex array of factors affecting healthy brain aging and brain health span. Only in the last few years has attention been paid to studying preserved cognition as an outcome in older adults. Future research needs to identify validated instruments to measure these outcomes.

Most studies to date have not concluded the whole spectrum of successful brain aging despite the fact that the relationship between cognitive, emotional and physical health is complex, intertwined and may have common underlying processes. There is also an emerging realization that whenever two pathologies occur together, they accelerate diseases. Thus in the future there may be a shift away from relying on clinical categorization to make diagnoses to using sophisticated biomarkers to make diagnoses based on accumulation of various types of toxic proteins while simultaneously detecting cerebrovascular ischemia.

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