Translational bottleneck for stroke therapy: Impact of aging and co-morbidities

Old age is associated with an enhanced susceptibility to neurodegenerative diseases. Despite the initial hope that cell-based therapies may stimulate restorative processes in the degenerative brain, it is now recognized that aging processes may promote an unfavorable environment for such treatments. Alternatively, in the last several years, many groups have focused on exploiting brain plasticity that is preserved to some extent even in the old brains, to enhance endogenous repair mechanisms of the brain after insults such as traumatic brain injury or cerebral ischemia. The main opponent of brain plasticity in the aged brain is neuroinflammation. With increasing age, the brain It is becoming evident that subtle but continuous neuroinflammation can provide the ground for disorders such as cerebral small vessel disease (cSVD) and subsequently dementia. Moreover, advanced aging and a number of highly prevalent risk factors such as obesity hypertension, diabetes, and atherosclerosis are increasingly understood to act as “silent contributors” to neuroinflammation—not only establishing the condition as a central pathophysiological mechanism, but also constantly fueling it. Acute neuroinflammation, often in the context of traumatic or ischemic CNS lesions, aggravates the acute damage and can lead to a number of pathological illnesses, such as depression, post-stroke dementia and potentially neurodegeneration. All of those sequelae impair recovery and most of them provide the ground for further cerebrovascular events; thus, a vicious cycle develops. We also cover brain vasculature recent advances in signaling pathways that can potentially protect cells as well as treatment options for the maintenance of brain capillaries to prevent diseases associated with brain vasculature remodeling in response to aging and associated comorbidities.

This Special Issue will provide an up-to-date information on molecular, cellular, and behavioral events associated with neurodegenerative diseases and new therapeutic options.

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