Scope of the Present Investigation
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Brain aging has become an area of intense research and a subject of much speculation fueled largely from the widely recognized fact that age is the biggest risk factor in most neurodegenerative diseases.

Oxidative stress has risen to the top of the heap of biochemical pathways that may influence brain aging in general and neurodegenerative diseases in specific. The brain is particularly vulnerable to oxidative processes for several reasons: neurons of the CNS are almost completely dependent on the oxidative phosphorylation reactions in order to generate ATP as energy source; for the normal adult brain, glucose is the major nutrient and, therefore, the brain has a high glucose metabolism and respiratory turnover; neuronal membranes of the brain consist of high concentration of polyunsaturated fatty acids, which are potential substrates for the peroxidation by hydroxyl radical; the brain has an overall high concentration of catalytic iron; and the brain has only low levels of antioxidant defense enzymes compared to other tissues.

Therefore, the identification of neuroprotective component is one strategy to facilitate healthy brain aging. Also, the intervention strategy should delay aging and extend life span through a mechanism that involves alterations in oxidative damage, which is consistent with the free radical/oxidative stress theory of aging.

Several lines of evidence suggest that free radical scavenger, especially certain antioxidants, may offer an anti-aging effect. However, there is lack of consensus in supporting the use of natural plant products, in particular, herbs
as scavenging interventions for scavenging free radicals. Thus, a study of the most commonly used medicinal plant, *Centella asiatica*, in combating age related oxidative stress appears to be of interest. The current investigation follows two directions

- The first direction is to evaluate the possible role of oxidative stress as an intermediate mechanism for the adverse effects of aging and to identify the neuroprotective role of *Centella asiatica* against the incidence of oxidative stress, facilitating healthy brain aging.

- The second focus is to evaluate the possibility that oxidative stress can interact with the mechanisms by which aging alters intercellular signaling molecules, the neurotrophic factors and neurotransmitters, impairs cognition and compromises neuroplasticity. To test this possibility, the antioxidant power of *Centella asiatica* is used.