

Neurogenesis Meditation and the Mission of NGVIF

Authored by Dr. Ralph Greenlee Jr. retired Neurologist serving on NGVIF Board. Dr. Greenlee graduated from Tulane Medical School and completed his Neurology Residency at UT Southwestern Medical Center in Dallas TX. He spent a 25 yr career on the faculty of UTSWMC where he held joint appointments as Tenured Professor in the Departments of Neurology and Neurosurgery. He was Board Qualified in Neurology and in Clinical Neurophysiology. Following his retirement in Dallas he spent 5 yrs as Clinical Professor of Neurology at the UT Health Science Center San Antonio with appointment at Audie Murphy VA Neurology Clinics.

I entered medical school in 1962 and early on developed a fascination as to how the anatomy and physiology of the brain related to human behavior. The functional clinical tools to study patients at that time were radiologic studies and EEG. The dogma about the number of neurons and their neural connections in the brain were static after the age of two. Psychiatric conditions were primarily descriptive of the symptoms as there were no tools to scientifically explore if there were neuroanatomical changes in the brain accompanying depression or psychological trauma in early childhood. Since that time spectacular technological advances have made it possible to image the brain and record its activity down to the level of a singular nerve cell. MRI coupled with isotopic blood flow studies reveal the regional activation of brain activity in various emotional states.  Studies such as these are routinely safely performed in both a research laboratory and clinical settings as well.

Perhaps the most astonishing discovery which has revolutionized the understanding of brain functions has been the discovery that single neurons routinely die and new ones actively regenerate throughout our lifetime. This process of regeneration of new neurons is known as neurogenesis. It plays an important role in the formation of the neural networks of the brain which change through growth and reorganization. There are several types of neuroplasticity results in learning new information, improving physical abilities and psychological stress. Repetitive cognitive and physical activity strengthens the neural network through neurogenesis and firming synaptic connections. Neurogenesis is very active in childhood but lessen with age. Several EEG and imaging based studies have shown that consistent practice of meditation induces increase in neuroplasticity and neurogenesis with resultant improvement in cognitive functions such as working memory, sustained attention and long-term memory. Imaging studies have validated increased increase in the thickness of the cerebral cortex of the hippocampus and orbito-frontal cortex.

In 1975 Harvard physician Dr. Herbert Benson and Miriam Klipper wrote a book called The Relaxation Response. He described how the autonomic nervous system was altered by mental states such a rise in blood pressure with anger which be altered by adopting a passive attitude such as those of various Eastern religious traditions. This resulted in a popularization of the practice of meditation in the US and scientific understanding of its neurophysiological basis which is still ongoing. I became interested and learned how to practice mindfulness meditation which made me feel relaxed and peaceful. I began to recommend the benefits of meditation to patients with unremitting migraine headaches and witnessed the benefits of reduction of frequency and intensity in their headaches. During my practice at the Audi Murphy Veterans Hospital I routinely encouraged patient’s with PTSD and those with post-concussion headache to avail themselves of a VA Group Therapy program which supported meditation. Those who actively pursued a regular practice of meditation significantly improved from their trauma related symptoms. There are different traditions as to the practice of meditation but the benefits of regular practice are most often positive. However, it may take several weeks to months of practice to be consistently competent.

The learning curve for meditation is greatly facilitated with aid of EEG biofeedback. A portable EEG head band paired by Bluetooth to an app on a smart phone has been developed at McGill University in Canada and is commercially available from the company InteraXon whose main office is in Toronto Canada. The Muse EEG headband currently is extensively being used by neuroscientists in research institutions as well as clinically by psychologists and psychiatrists in private practice. It is the most essential tool in carrying out the mission of NGVIF..

Information relating to the availability and use of the EEG headband online at <https://www.choosemuse.com/>. Scientific articles relating to meditation, neurogenesis, imaging and electrophysiology documentation validating the Muse headband are available under [choosemuse.com/research](http://choosemuse.com/research).

Neurogenesis for Veterans, the Incarcerated, and their Families

902 S Ayers St, #3425

Corpus Christi, Texas 78463

361-857-5261