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Exploring synaptic plasticity in the epileptic hippocampus in Epilepsy

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Temporal Lobe Epilepsy (TLE) is a neurological disorder that can be caused due to stroke, traumatic brain injury or meningitis and is characterized by spontaneous, recurrent seizures. Medications used to treat TLE are called Anti-Epileptic Drugs (AEDs) and can be associated with side-effects and refractoriness. It is important to better understand the changes that place in the brain that enable and sustain epileptic seizures in order to provide better therapies for people with epilepsy. The process by which a normal brain becomes 'epileptic' is called epileptogenesis and I have been studying epileptogenesis using experimental rodent models for the past ten years. All my studies have focused on the temporal lobe mainly the hippocampus because of its role in seizure generation and propagation. Using electrophysiology, we found differential regulation of synaptic plasticity by a neurotrophic factor called Neuregulin (NRG) in the epileptic brain as compared to the non-epileptic brain. In another project, we focused on a process called adult neurogenesis in the hippocampus. Using mice, we found that a reduction in adult neurogenesis increased susceptibility to seizures. Currently used AEDs are associated with substantial side-effects because they act on both the healthy non-diseased tissue and the epileptic tissue. Exploring differences between the epileptic and non-epileptic circuitry could ultimately lead to development of more efficacious therapies for people with epilepsy.

Biography

Sloka Iyengar received her PhD from the University of South Carolina, School of Medicine where she used electrophysiology to study synaptic plasticity in epilepsy. During her Postdoctoral work at the Nathan Kline Institute in New York, she studied the role of adult neurogenesis in seizures. Presently, she works as a Clinical Researcher and manages the brain tumor-related epilepsy research consortium. She is also a Science Writer and Advocate and regularly writes articles to make basic science more accessible to non-scientists.

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