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Neuroprotective mechanisms of *Amalaki Rasayana* (Ayurvedic medicine): A study on a genetic mouse model of neurodegenerative disorder

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Neurodegenerative disorders have attracted a lot of attention due to their complex origin (genetic and environmental), irreversible disease progression and their increasing incident rate due to increased life expectancy as most of them are late onset disorders. Emerging concepts suggest that the neurodegeneration results from perturbations in a number of cellular processes, including the proteolytic, inflammatory, pro-survival and metabolic pathways, that they share similarities with the aging process and that restoring the homeostasis of critical cellular processes might protect the neurons. Indeed the Ayurvedic formulations, known as "*Rasayanas*" and "*Bhasmas*", are thought to provide such holistic protection on the central nervous system, but the underlying mechanisms have not been dissected using appropriate model systems and their mode of actions are yet to be fully understood. Our group has been working on the Lafora disease (LD), a monogenic, progressive and fatal form of neurodegenerative disorder and the symptoms include epilepsy, ataxia, dysarthria, psychosis and cognitive deficits. The neuropathology of LD includes the formation of glycogen inclusions as Lafora bodies in the neurons, muscle and liver tissues. The LD animals replicate most of the phenotypic traits and studies have shown that perturbations in glycogen metabolic pathways, proteolytic pathways and mitochondrial homeostasis underlie the LD symptoms. The current work was to evaluate the effect of prolonged feeding of *Amalaki Rasayana* (a formulation with extracts of *Emblica officinalis*) on the disease phenotype (viz., epilepsy, ataxia and cognitive abilities), disease pathology (viz., Lafora bodies, neurodegeneration, neuronal growth and maturation) and on the cellular physiology (viz., glycogen metabolism, autophagy and proteasomal function, neuroinflammation and synaptic functions). We find that feeding of animals with *Amalaki Rasayana* significantly reduced the neuroinflamation, increased autophagy and decreased the severity of the drug-induced epilepsy in this LD model.

Biography

Subramaniam Ganesh is an Endowed Chair Professor at the Indian Institute of Technology Kanpur, has made pioneering contribution in the field by choosing to work on the fatal neurodegenerative disorder Lafora disease (LD), characterized by abnormal glycogen accumulation in neurons. His recent research interests are in elucidating the molecular basis of therapeutic properties of the Ayurvedic formulations; one of the traditional medicinal systems of India.

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