

Exploring neuroprotective effects of curcumin in ischemic stroke: A molecular and cellular study

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Background : Ischemic stroke remains one of the leading causes of death and long-term disability worldwide. Neuroinflammation and oxidative stress are significant contributors to the pathophysiology of stroke. Curcumin, a natural compound derived from *Curcuma longa*, has been suggested to possess potent antioxidant and anti-inflammatory properties.

Objective : This study aims to investigate the neuroprotective effects of curcumin on ischemic stroke-induced neuronal damage in both in vitro and in vivo models. The study utilized a middle cerebral artery occlusion (MCAO) rat model to simulate ischemic stroke. Rats were treated with curcumin (100 mg/kg) for 7 days post-occlusion. In vitro, SH-SY5Y neuroblastoma cells were subjected to oxygen-glucose deprivation (OGD) and treated with curcumin (10 μ M). Neurological function, infarct volume, cell viability, oxidative stress markers, and expression of inflammatory cytokines were assessed using TTC staining, MTT assay, ELISA, and qRT-PCR techniques.

Results: Curcumin significantly reduced infarct volume and improved neurological scores in MCAO rats. In vitro, curcumin-treated cells showed increased viability and reduced ROS generation. Additionally, curcumin suppressed the expression of pro-inflammatory cytokines such as TNF- α , IL-1 β , and IL-6 in both models.

Conclusion: Curcumin demonstrates promising neuroprotective effects in ischemic stroke by modulating oxidative stress and inflammation. These findings support further clinical investigation into curcumin as an adjunct therapeutic strategy for stroke management.

Biography

Ayşe Demir is a postdoctoral researcher at the Department of Neurology, Hacettepe University, Ankara, Turkey. She holds a Ph.D. in Neuroscience and has published multiple peer-reviewed articles focusing on neurodegenerative disorders, stroke pathophysiology, and neuroprotective agents. Dr. Demir's research interest lies in translational neuroscience, particularly in exploring the therapeutic potential of natural compounds in central nervous system injuries. She has received several young investigator awards and is actively involved in collaborative research projects across Europe. Her current work centers on uncovering molecular mechanisms that could pave the way for novel stroke treatments.

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