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## Effect of curcumin on spatial memory deficit in male Wistar rat after global brain ischemia and reperfusion

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**Objectives:** Brain is the most complex organ of the human body. Brain tissue is sensitive to ischemic injury because of the limited oxygen and glucose reserves. Cognitive impairment is one of the most common symptoms of patients with brain injuries. Despite decades of intense research, the beneficial treatment of stroke remains limited. Curcumin is the major curcuminoid of turmeric, which belongs to a member of the ginger family. CUR is known to have a variety of neuroprotective properties. Hence, we aimed to investigate the effect of curcumin on spatial memory deficit and mitochondrial damages due to ischemia/reperfusion (I/R) in male Wistar rats.

**Materials & Methods:** In this research, 32 male Wistar rats were randomly divided into 3 groups (n=8 in each group) which are treatment, ischemia, control and vehicle groups. All rats underwent or did not undergo bilateral common carotid arterial ligation followed by reperfusion. In the treatment group, curcumin (300 mg/kg) were injected 30 minutes before ischemia. Spatial learning and memory abilities were evaluated using a Morris water maze (MWM) 7 days after recovery. Morphological changes of the hippocampus were assessed using Nissl staining. Mitochondria were extracted and level of reactive oxygen species (ROS), protein density, glutathione (GSH) content, mitochondrial membrane potential (MMP), swelling, cytochrome c release and ATP level was identified.

**Findings:** MVM testing revealed that ischemia significantly reduced the spatial memory performance. There was a significant difference between control group and ischemia and vehicle groups but no statistical significances were seen between the treatment group and control group neither in distance ( $P=0.141$ ) nor in time ( $P=0.866$ ). Data also showed that curcumin significantly ameliorated the CA1 pyramidal cell loss due to transient global I/R injury. We found that Curcumin could decrease mitochondrial damage through reducing oxidative stress, lipid peroxidation and augmented the activities of antioxidant enzymes studied in the brain of IR.

**Conclusion:** Our study demonstrates that curcumin had beneficial activity against ischemia induced cognitive deficits and played a neurotrophic role in the pathogenesis of I/R injury.

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