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Identification of proteins differentially expressed by quercetin treatment in a middle cerebral artery occlusion model - a proteomics approach

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Quercetin is a bioflavonoid substance that acts as an antioxidant agent and exerts a neuroprotective effect against cerebral ischemia. Cerebral ischemia is the major cause of death and neurological disability. It also leads to severe brain tissue damage by excessive generation of oxidative stress. We performed this study to elucidate the neuroprotective effect of quercetin and detect specific proteins that are differentially expressed in response to quercetin treatment in focal cerebral ischemia. Adult male rats were injected intra-peritoneally with vehicle or quercetin (10 mg/kg), 30 min prior to right middle cerebral artery occlusion (MCAO). Brain tissues were collected 24 h after MCAO surgical operation and used for morphological study and proteomic approach. Right cerebral cortices proteins were identified by two-dimensional gel electrophoresis and mass spectrometry. MCAO induced degeneration of neurons in cerebral cortices, quercetin treatment diminished the injury-induced neurodegeneration. We identified specific proteins with differentially expressed between vehicle- and quercetin-treated animals. Among these detected proteins, γ -enolase and thioredoxin were decreased in the vehicle-treated animal, and quercetin administration alleviated the MCAO-induced decrease of these proteins. However, collagen response mediated protein 2 and 60 kDa heat shock protein were increased in the vehicle-treated animal, and quercetin treatment attenuated increase in these proteins. These proteins are associated with cellular differentiation, metabolism, and stress activation. This study showed the neuroprotective effect of quercetin in stroke animal model, the results of this study suggest that quercetin reduce the ischemic injury by modulating the expression of various proteins in focal cerebral ischemia.

Biography

Phil Ok Koh has completed her PhD degree from Gyeongsang National University, College of Veterinary Medicine and Post-doctoral studies from the University of Maryland at Baltimore, USA. She has published more than 140 papers in reputed journals and has been serving as an Editorial Board Member of *Laboratory Animal Research*.

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