Genistein inhibition of OGD-induced neuronal death in vitro experiment

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In the present study, we established an in vitro model of hypoxic-ischemia via exposing PC12 cells and primary neurons of newborn rats to oxygen-glucose deprivation (OGD) and observing the effects of genistein, a soybean isoflavone on hypoxic-ischemic neuronal viability, apoptosis, voltage-activated potassium (Kv) and sodium (Na) currents and glutamate receptor subunits expression. The results indicated that OGD exposure reduced the cell viability, increased apoptosis, decreased the GluR2 expression and decreased the voltage-activated potassium currents in PC12 cells and genistein partially reversed the effects induced by OGD. In primary neurons, OGD exposure reduced the viability and increased the apoptosis of brain neurons. Meanwhile, OGD exposure caused changes in the current-voltage curves and current amplitude values of voltage-activated potassium and sodium currents. OGD exposure also decreased GluR2 expression and increased NR2 expression. However, genistein at least partially reversed the effects caused by OGD in primary neurons. The results suggest that hypoxic-ischemia caused neuronal apoptosis/death is related to an increase in K+ efflux, a decrease in Na+ influx, a down-regulation of GluR2 and an up-regulation of NR2. Genistein may exert some neuroprotective effects via the modulation of Kv and Na currents and the glutamate signal pathway mediated by GluR2 and NR2.

Biography

Yan-qiang Liu has completed his PhD in Nanjing Agricultural University and Postdoctoral study in Chinese Military Medicine Academy, also visiting and cooperative studies in Pisa University. He is also the Professor of College of Life Sciences Nankai University, China. He has published more than 80 papers in reputed journals and has been serving as an Editorial Board Member of Acta Nutrimenta Sinica and the referee of many academic journals.

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