

Neuro-Preservation Potential of Resveratrol Against High Fat High Fructose-Induced Metabolic Syndrome

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Abstract : The metabolic syndrome is an important public health concern often related to obesity, improper diet, and sedentary lifestyles and can predispose individuals to the development of many dangerous health conditions, disability and early death. This research aimed to investigate the efficacy of resveratrol (RSV) to reverse the neuro-complications associated with metabolic syndrome experimentally-induced in rats using an eight weeks high fat, high fructose diet (HFHF) model. The corresponding drug treatments were administered orally during the last 10 days of the diet. Behavioural tests namely the open field test (OFT) and the forced swimming test (FST) were conducted. Brain levels of monoamines viz. serotonin, norepinephrine and dopamine as well as their metabolites were assessed. 8-hydroxyguanosine (8-OHDG) as an indicative of DNA-fragmentation, nitric oxide (NOx) and tumor necrosis factor- α (TNF- α) were estimated. Finally, brain antioxidant parameters namely malondialdehyde (MDA), reduced and oxidized glutathione (GSH, GSSG) were evaluated. HFHF-induced metabolic syndrome resulted in decreased activity in the OFT and increased immobility duration in the FST. Furthermore, HFHF-induced metabolic syndrome lead to a significant increase in brain monoamines turn over as well as elevation in 8-OHDG, NOx, TNF- α , MDA and GSSG; and reduction in GSH. Ten days daily treatment with RSV (20 and 40 mg/kg p.o) dose dependently increased activity in the OFT and decreased immobility duration in the FST. Moreover, RSV normalized brain monoamines contents, reduced 8-OHDG, NOx, TNF- α , MDA and GSSG; and elevated GSH. In conclusion, we can say that RSV showed neuro-protective properties against HFHF-induced metabolic syndrome represented by monoamines preservation, prevention of neurodegeneration, anti-inflammatory and antioxidant potentials and could be recommended as a beneficial daily dietary supplement to treat the neuronal side effects associated with HFHF-induced metabolic syndrome.

Keywords : antioxidants, DNA-fragmentation, forced swimming test, HFHF-induced metabolic syndrome, monoamines, nitric oxide (NOx), open field, resveratrol, tumor necrosis factor- α (TNF- α), 8-hydroxyguanosine (8-OHDG)