Neuroprotective effects of glucomoringin-isothiocyanate against H2O2-Induced cytotoxicity in neuroblastoma (SH-SY5Y) cells

ABSTRACT

Neurodegenerative diseases (NDDs) are pathological conditions characterised by progressive damage of neuronal cells leading to eventual loss of structure and function of the cells. Due to implication of multi-systemic complexities of signalling pathways in NDDs, the causes and preventive mechanisms are not clearly delineated. The study was designed to investigate the potential signalling pathways involved in neuroprotective activities of purely isolated glucomoringin isothiocyanate (GMG-ITC) against H_2O_2-induced cytotoxicity in neuroblastoma (SH-SY5Y) cells. GMG-ITC was isolated from Moringa oleifera seeds, and confirmed with NMR and LC-MS based methods. Gene expression analysis of phase II detoxifying markers revealed significant increase in the expression of all the genes involved, due to GMG-ITC pre-treatment. GMG-ITC also caused significant decreased in the expression of NF-kB, BACE1, APP and increased the expressions of IkB and MAPT tau genes in the differentiated cells as confirmed by multiplex genetic system analysis. The effect was reflected on the expressed proteins in the differentiated cells, where GMG-ITC caused increased in expression level of Nrf2, SOD-1, NQO1, p52 and c-Rel of nuclear factor erythroid factor 2 (Nrf2) and nuclear factor kappa-B (NF-kB) pathways respectively. The findings revealed the potential of GMG-ITC to abrogate

Keyword: Glucomoringin isothiocyanate; Neuroblastoma; Neurodegeneration; Neuroprotection; SH-SY5Y differentiation; Signalling pathways