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Novel mechanisms of neuroprotective effects of Quercetin on human striatal neuroblasts

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Human striatal precursor (HSP) primary cell cultures were isolated from ganglionic eminence of 9-12 week old human fetuses and extensively characterized in vitro (1). Our studies demonstrated that these cultures consists of a mixed population of neural stem cells, neuronal-restricted progenitors and striatal neurons that express and are responsive to many trophic factors, as BDNF and FGF2, and possess an adaptive response to stress conditions as nutrient deprivation and hypoxia through mechanisms involving different factors and neurotrophins (1,2). In the last decades, several in vitro and in vivo studies have provided evidence for neuroprotective effects by Quercetin, a polyphenol widely present in nature, passively absorbed in the small intestine and able to traverse the blood brain barrier (3). However, the mechanisms through which Quercetin exerts its neuroprotective effects are not fully delucidated. Our study was aimed at investigating the effects of Quercetin on HSP cells and its contribution to cell survival in nutrient deprivation condition, obtained replacing culture medium with Phosphate Buffer Saline (PBS). Quercetin treatment significantly promoted cell survival and strongly decreased apoptosis induced by nutrient deprivation condition, as evaluated by MTT assay, Trypan Blue staining and western blot analysis of cell death and proliferation markers. Moreover, since the adhesive capacities of cells are essential for cell survival, we next analysed the expression of some adhesion molecules such as Pan-cadherin and Focal Adhesion Kinase; our results interestingly showed that PBS exposure determined a strong decrease in all the analysed adhesion molecules, while in presence of Quercetin the expression was significantly increased. Our results add new mechanicistic insights into the comprehension of neuroprotective action of Quercetin treatment, thus suggesting possible implications in sustaining striatal neuron survival during neurodegenerative disorders, such as Huntington Disease.

References

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Keywords

Quercetin; human striatal neuroblasts; neuroprotection.