Investigation of Antiapoptotic Effect of Pioglitazone in MPP+ - Induced Parkinson's Disease Model

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Parkinson's disease(PD) reduces the quality of life for several people. There isn’t exact treatment so it is important to increase the numbers of researches. In our project, we aimed to identify the anti-apoptotic effects of pioglitazone on SH-SY5Y human neuroblastoma cells. Firstly, dopaminergic neuronal damages were induced by MPP+. According to MTT cell viability test, it was determined that 50% of the cells died with 2mM,24hours of MPP+ implementation. It is also determined that pioglizatone doesn’t have an effect on cell proliferation; optimum dose and exposure time were identified as 5µM, 24hours.It was determined that the implementation of pioglitazone as pre-treatment reduced MPP+ damage. DCF-DA assay was used to measure the production of free radicals. MitoTrackerRed assay was used to measure changes in the mitochondrial membrane potential. It was determined that mitochondrial function was significantly reduced following MPP+ treatment. It was determined that pioglitazone caused significant reduction in ROS against MPP+ toxicity and it had an increasing effect on membrane potential. Western blot method was used to examine the changes in the levels of apoptotic and anti-apoptotic proteins such as Bax and Bcl-2.Apoptosis was triggered with decrease of Bcl-2 levels and increase of Bax levels following MPP+ treatment. Pioglitazone showed antiapoptotic effect with increase of Bcl-2 levels and decrease of Bax levels. The originality of our project is that antiapoptotic properties of pioglitazone are examined for the first time in in vitro PD model. We believe that our project will provide a new alternative in contrast to the expensive and invasive methods used for the treatment of PD and contribute to the literature in this regard.