Protective effects and mechanisms of rosmarinic acid against rotenone induced Parkinson’s disease models

Jun-Xia Xie
Qingdao University, China

Parkinson's disease (PD) is a common neurodegenerative disease characterized by the loss of dopaminergic neurons in the Substantia Nigra pars compacta (SNpc) and the appearance of fibrillar aggregates of α-synuclein called Lewy Bodies (LBs). Rosmarinic Acid (RA) is an ester of caffeic acid and 3, 4-dihydroxyphenyl lactic acid which is commonly found in various plant families. It has been demonstrated that RA has a number of interesting biological activities, e.g., antiviral, antibacterial, anti-inflammatory and antioxidant activities. However, the effect of RA on α-synuclein aggregation in PD models and the molecular mechanisms underlying this effect are still not elucidated. Therefore, in this study, we investigated the effects of RA against rotenone-induced α-synuclein aggregation in C57BL/6 mice and SH-SY5Y dopaminergic cells and to explore the possible mechanisms involved in this process. Results showed that mice which had orally received rotenone for 56 days showed a significant motor dysfunction; 50 mg/kg RA pre-treatment significantly improved the motor dysfunction. The number of TH-positive neurons and the expression of TH were both reduced in the SNpc of rotenone-treated mice. This could be significantly inhibited by RA pre-treatment. In addition, RA pre-treatment significantly inhibited rotenone-induced increase in α-synuclein expression. In vitro study showed that RA pre-treatment partially restored cell loss induced by rotenone and inhibited rotenone-induced increase in α-synuclein mRNA expression in SH-SY5Y cells. The mechanisms underlying this protection might be related to the antioxidation effect of RA by inhibiting ROS generation and increasing SOD expression. These results provide new findings and new strategies for the prevention and treatment of PD.

Biography

Jun-Xia Xie is currently a Professor of the Department of Physiology and Vice President of Qingdao University. She is the Principal of intensely-contributed subject in Physiology of Shandong Province and Chairman of Center for Neuroscience Research. She was awarded the title of 'Prominent Scientist in Shandong Province' and 'Top Person in Qingdao City'. She also serves as Standing Director of Chinese Society for Physiology, the Chinese Society for Neuroscience and as the Chairman of Shandong Physiological Society.

Notes: