Enhancement of cognitive functions by rice bran extract via regulation of PPARγ in neuroinflammatory Alzheimer’s disease mouse model

R. Abdel-kader, A. Mostafa, O. Heikal
Department Of Pharmacology and Toxicology, German University In Cairo, Egypt

Alzheimer’s disease (AD) is a neurodegenerative disease for which currently there exists no effective therapy. Recent clinical trials of PPARγ receptor agonists in AD patients revealed improvement in memory, representing a promising treatment for AD. Recent studies have demonstrated the protective effect of rice bran extract (RBE) on AD models. Moreover, Rice bran constituents, namely, polyunsaturated fatty acids and γ-oryzanol were recently considered as PPARγ modulators. Accordingly, the effect of RBE on memory and cognition in a neuroinflammatory AD mouse model was examined. Furthermore, this study tested whether RBE improves cognition through modulating PPARγ. Neuroinflammatory AD mouse model was developed by injecting LPS i.p (250 µg/kg) for 7 consecutive days. Mice were administered by oral gavage for 21 days RBE (100mg/kg) or the known PPARγ agonist pioglitazone (30mg/kg), or the PPARγ antagonist GW9662 (3mg/kg) followed by RBE or pioglitazone. Mice were subjected to object recognition test, y-maze and water maze test. Additionally, PPARγ DNA binding activity was measured in mouse brains. Results indicate a significant improvement of the spatial working and recognition memory by RBE in the LPS mouse model. Interestingly, the effect of RBE on memory was abolished in the group injected with PPARγ antagonist before RBE treatment, indicating the important role of PPARγ in the mechanism of action of RBE. Furthermore, PPARγ DNA binding was increased by RBE and this effect was reversed by PPARγ antagonist. These findings demonstrate that RBE improves cognition and its effects are correlated with its action on PPARγ.