# Effects of Germinated Brown Rice on the Expression of Alzheimer's Disease Biomarkers in High Fat/Cholesterol Diet-Induced Neurodegenerative Changes


## ABSTRACT

Excessive amyloid-β (Aβ) accumulation has been strongly implicated in Alzheimer's disease (AD). Various experiments utilized diet-induced animal models of atherosclerosis/hypercholesterolemia and diabetes to investigate the convergent mechanisms between metabolic disorders and sporadic AD. While saturated fats and high cholesterol levels are associated with an increased risk of AD, consumption of certain dietary components may exert a protective role. Herewith, the effects of germinated brown rice (GBR) extract in a high fat/cholesterol diet (HFCD)-induced sporadic model of AD were investigated for 24 weeks in adult Sprague-Dawley rats. Rats were divided into 7 groups (n=70): Normal control, HFCD, HFCD with Donepezil (1.5 mg/kg BW), HFCD with Simvastatin (10 mg/kg BW), HFCD with Probucol (25 mg/kg BW), HFCD with GBR-100 (100 mg/kg BW), and HFCD with GBR-200 (200 mg/kg BW). Biochemical assays, mRNA levels of inflammatory-related genes and markers of neurodegeneration in the hippocampus and frontal cortex were analyzed. GBR regulated inflammatory genes such as CRP, PPAR-γ and TNF-α, and the expressions were significantly different from HFCD group. HFCD-fed rats also exhibited increased Aβ levels and altered expressions of proteins involved in Aβ generation, degradation and clearance. In terms of these biomarkers, GBR groups exhibited significant differences when compared to HFCD group, and the effects were comparable with the normal and some of the drug control groups. Taken together, the results suggested that GBR had the potential to attenuate HFCD diet-induced neurodegenerative changes, likely due to reduced brain inflammation in addition to modulation of Aβ processing and metabolism pathway.