

Pomegranates Attenuates Cognitive and Behavioural Deficits and reduces inflammation in a Transgenic Mice Model of Alzheimer's Disease

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Abstract : Objective: Transgenic (tg) mice which contain an amyloid precursor protein (APP) gene mutation, develop extracellular amyloid beta (A β) deposition in the brain, and severe memory and behavioural deficits with age. These mice serve as an important animal model for testing the efficacy of novel drug candidates for the treatment and management of symptoms of Alzheimer's disease (AD). Several reports have suggested that oxidative stress is the underlying cause of A β neurotoxicity in AD. Pomegranates contain very high levels of antioxidants and several medicinal properties that may be useful for improving the quality of life in AD patients. In this study, we investigated the effect of dietary supplementation of Omani pomegranate extract on the memory, anxiety and learning skills along with inflammation in an AD mouse model containing the double Swedish APP mutation (APPsw/Tg2576). Methods: The experimental groups of APP-transgenic mice from the age of 4 months were fed custom-mix diets (pellets) containing 4% pomegranate. We assessed spatial memory and learning ability, psychomotor coordination, and anxiety-related behavior in Tg and wild-type mice at the age of 4-5 months and 18-19 months using the Morris water maze test, rota rod test, elevated plus maze test, and open field test. Further, inflammatory parameters also analysed. Results: APPsw/Tg2576 mice that were fed a standard chow diet without pomegranates showed significant memory deficits, increased anxiety-related behavior, and severe impairment in spatial learning ability, position discrimination learning ability and motor coordination along with increased inflammation compared to the wild type mice on the same diet, at the age of 18-19 months. In contrast, APPsw/Tg2576 mice that were fed a diet containing 4% pomegranates showed significant improvements in memory, learning, locomotor function, and anxiety with reduced inflammatory markers compared to APPsw/Tg2576 mice fed the standard chow diet. Conclusion: Our results suggest that dietary supplementation with pomegranates may slow the progression of cognitive and behavioural impairments in AD. The exact mechanism is still unclear and further extensive research needed.

Keywords : Alzheimer's disease, pomegranates, oman, cognitive decline, memory loss, anxiety, inflammation

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