

A novel medicine for alzheimer's disease

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Pomegranate, which contains very high levels of anti-oxidant polyphenolic substances, beta- secretase inhibitors and several other bioactive compounds is consumed all over the world without much knowledge of its medicinal properties. Polyphenols have been shown to be neuroprotective in different animal models. There are no proven ways to delay the onset or slow down the progression of Alzheimer's disease. This study was conducted to investigate the effects of pomegranate juice on memory deficits in mice and rats. A total of 216 Swiss mice and 72 Wistar rats were used in the present study. The exteroceptive behavioral models employed in the present study were elevated plus maze, passive avoidance apparatus and Hebb-William's maze. Pomegranate juice (10% v/v) produced significant improvement in the memory of young and aged rodents and reversed the amnesia induced by diazepam (1 mg/kg, i.p.) and scopolamine (0.4 mg/kg, i.p.). Furthermore, pomegranate juice inhibited significantly the brain acetylcholinesterase activity, diminished peripheral cholesterol and brain malondialdehyde levels. Pomegranate juice appears to be a useful anti-Alzheimer medicine on account of its multifarious beneficial effects such as memory improving effect, cholesterol lowering property, anti-cholinesterase and anti-oxidant activity. Therefore, pomegranate juice may be exploited clinically for the management of Alzheimer's disease.

Key words : Pomegranate, Memory, Amnesia, Alzheimer's disease

INTRODUCTION

When pregnant mice were fed with pomegranate juice in their diet, neuroprotective effect was observed in neonatal mice born to these mothers (West *et al.*, 2007). The pomegranate, *Punica granatum* L. (Family: Punicaceae), is consumed all over the world because of its delicious and pleasant taste. Pomegranate contains very high levels of antioxidant polyphenolic substances, beta- secretase inhibitors (Kwak *et al.*, 2005), mitogen activated protein kinase inhibitors and several other bioactive compounds.

Alzheimer's disease (AD) is a crippling, progressive, neurodegenerative heterogeneous brain disorder observed predominantly in senior citizens. Around 30 million patients are afflicted by AD all over the world. Presently, management of AD relies on nootropic agents, such as piracetam, nefiracetam, aniracetam, etc., anticholinesterases, such as donepezil, galantamine, rivastigmine and noncompetitive NMDA-receptor antagonists like memantine. However, it is worthwhile to explore new strategies for treating patients suffering from AD. In the light of above, the anti-Alzheimer potential of pomegranate juice was investigated in the present study.

The present study was undertaken to explore the anti-Alzheimer potential of pomegranate juice using elevated plus maze, passive avoidance apparatus and Hebb-William's maze in rodents. Furthermore, the effects

of pomegranate juice on brain acetylcholinesterase activity, total cholesterol and brain malondialdehyde levels were investigated in mice.

MATERIALS AND METHODS

Preparation of pomegranate juice:

The fresh fruits of pomegranate (Mridula variety) were purchased from local market of Hisar and got authenticated from Raw Materials Herbarium and Museum, National Institute of Science Communication and Information Resources, New Delhi (Ref.NISCAIR/RHMD/Consult/2008-09/1159/191). Fruits were washed with cold tap water and the outer leathery skin, which encloses hundreds of fleshy sacs was removed manually. The deep red coloured fruit juice was obtained using food grinder (Remi Anupam Mixie Ltd., Mumbai). Pilot study was conducted to determine the optimum dose of pomegranate juice (PJ) and duration of administration. Pomegranate juice was administered orally in mice and rats at the dose rate of 1 ml/100g body weight for a duration of 12 days.

Animals:

A total of 216 Swiss mice and 72 Wistar rats divided in 48 different groups were employed in the present study. Each group comprised of a minimum of 6 animals. Young (3-4 months old) and aged (12-15 months old) rodents