

Potential of Osthole as Alternative Medicine in Alzheimer Disease

Siranjeevi Nagaraj*

Polish Academy of Sciences, Warsaw, Poland

Editorial

Received date: 26/09/2017
Accepted date: 28/09/2017
Published date: 30/09/2017

*For Correspondence

Siranjeevi Nagaraj, Polish Academy of Sciences, Warsaw, Poland, Tel: +48 (22) 182-60-00.

E-mail: siranjeevinathan@gmail.com

Keywords: Alzheimer disease, Neurodegenerative, Plague, Osthole, Antiparasitic

Alzheimer disease (AD) is a complex neurodegenerative disease that leads to the decline in the cognition in elderly people (>65 years of age). Deposition of senile plaques (of amyloid β) and neurofibrillary tangles (of hyperphosphorylated tau) are the typical hallmarks of the disease. AD significantly contributes to the worldwide dementia, which is 46.8 million in 2015 and estimated to 131.5 million in 2050. A better understanding of the pathology and early diagnosis is needed to delay or prevent AD ^[1,2].

Osthole, which is chemically described as 7-methoxy-8-(3-methyl-2-butenyl)-2H-1-benzopyran-2-one is naturally available coumarin. Osthole is rich in plants such as Cnidium, Angelica, Archangelica, Citrus, and Clausena. Osthole exhibits nootropic and neuroprotective, osteogenic, hepatoprotective, vasorelaxant, antioxidant, anticancer, anti-inflammatory, antimicrobial, antiparasitic and immunomodulatory properties that make it a versatile bioactive compound. Recently studies investigated the effect of osthole in AD conditions ^[3].

In AD model rats, intraperitoneal injection of osthole improved cognitive impairment and increased synaptic plasticity by regulating glutamate ^[4]. In AD APP/PS1 transgenic mice, intraperitoneal injection of osthole improved neurogenesis via stimulating BDNF/TrkB/CREB signaling in the dentate gyrus of the hippocampus ^[5]. Also, osthole treatment to neural stem cells (NSC) from C57BL/6 mice leads to activation of Wnt/ β -catenin signaling to enhance NSC proliferation and differentiation ^[6]. Intriguingly, studies demonstrated that osthole mediates the neuroprotective effect via miRNA regulation. In primary mouse cortical neuronal and SH-SY5Y cells, osthole treatment induces upregulation of miR-107 that inhibits BACE1 and also injection of osthole in APP/PS1 mice improved learning and memory which associated with decrease in the A β load in the hippocampal and cortex region ^[7]. Similar study in primary mouse cortical neuronal and SH-SY5Y cells, osthole treatment induces upregulation of miR-9 that confers neuroprotective effect on the synapse by reversing the reduced levels of synaptic proteins such as synapsin-1, synaptophysin, and postsynaptic density-95 ^[8]. Another study in primary mouse cortical neurons, osthole treatment induces upregulation of miR-9 inhibiting the Notch signaling pathway and also osthole treatment in APP/PS1 mice restored cognitive functions, reduced A β plaque production and rescued functional impairment of hippocampal neurons ^[9]. To this end, these studies demonstrate the potential of osthole in ameliorating AD conditions and suggest it as promising bioactive compound in the alternative medicine in AD.

REFERENCES

1. Prince M, et al. World Alzheimer report 2016: Improving healthcare for people living with dementia: coverage, quality and costs now and in the future, Alzheimer's Disease International (ADI), London; 2016.
2. Aisen PS, et al. On the path to 2025: Understanding the Alzheimer's disease continuum. *Alzheimers Res Ther.* 2017;9:60.
3. Zhang ZR, et al. Osthole: A review on its bioactivities, pharmacological properties, and potential as alternative medicine. *Evidence-Based Complementary and Alternative Medicine.* 2015;13.
4. Dong X, et al. Osthole improves synaptic plasticity in the hippocampus and cognitive function of Alzheimer's disease rats via regulating glutamate. *Neural Regen Res.* 2012;7:2325-2332

5. Liu H, et al. Osthole upregulates bdnf to enhance adult hippocampal neurogenesis in APP/PS1 transgenic mice. *Biol Pharm Bull.* 2015;38:1439-1449.
6. Yao Y, et al. Osthole promotes neuronal differentiation and inhibits apoptosis via Wnt/ β -catenin signaling in an Alzheimer's disease model. *Toxicol Appl Pharmacol.* 2015;289:474-481.
7. Jiao Y, et al. Osthole decreases beta amyloid levels through up-regulation of miR-107 in Alzheimer's disease. *Neuropharm.* 2016;108:332-344.
8. Li S, et al. Neuroprotective effect of osthole on neuron synapses in an alzheimer's disease cell model via upregulation of micro RNA-9. *J Mol Neurosci.* 2016;60:71-81.
9. Li SH, et al. Osthole stimulated neural stem cells differentiation into neurons in an Alzheimer's disease cell model via upregulation of microRNA-9 and rescued the functional impairment of hippocampal neurons in APP/PS1 transgenic mice. *Front Neurosci.* 2017;11:340.