Acta Biochim Pol. 2011;58(4):513-20. Epub 2011 Dec 6.

Neuroprotective effects of dehydroepiandrosterone (DHEA) in rat model of Alzheimer's disease

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PMID: 22146133

Abstract

The current study was undertaken to elucidate a possible neuroprotective role of dehydroepiandrosterone (DHEA) against the development of Alzheimer's disease in experimental rat model. Alzheimer's disease was produced in young female ovariectomized rats by intraperitoneal administration of AlCl(3) (4.2 mg/kg body weight) daily for 12 weeks. Half of these animals also received orally DHEA (250 mg/kg body weight, three times weekly) for 18 weeks. Control groups of animals received either DHAE alone, or no DHEA, or were not ovariectomized. After such treatment the animals were analyzed for oxidative stress biomarkers such as hydrogen peroxide, nitric oxide and malondialdehyde, total antioxidant capacity, reduced glutathione, glutathione peroxidase, glutathione reductase, superoxide dismutase and catalase activities, antiapoptotic marker Bcl-2 and brain derived neurotrophic factor. Also brain cholinergic markers (acetylcholinesterase and acetylcholine) were determined. The results revealed significant increase in oxidative stress parameters associated with significant decrease in the antioxidant enzyme activities in Al-intoxicated ovariectomized rats. Significant depletion in brain Bcl-2 and brain-derived neurotrophic factor levels were also detected. Moreover, significant elevations in brain acetylcholinesterase activity accompanied with significant reduction in acetylcholine level were recorded. Significant amelioration in all investigated parameters was detected as a result of treatment of Al-intoxicated ovariectomized rats with DHEA. These results were confirmed by histological examination of brain sections. These results clearly indicate a neuroprotective effect of DHEA against Alzheimer's disease.

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