REVIEW

NEUROPROTECTIVE ROLE OF TESTOSTERONE IN THE NERVOUS SYSTEM

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Testosterone – the gonadal sex steroid hormone plays an important role in the central nervous system (CNS) development. One of the less known testosterone actions is neuroprotection. There are some evidences supporting the hypothesis that testosterone may act protectively in neurodegenerative disorders, e.g. Alzheimer’s disease (AD), mild cognitive impairment (MCI) or depression. Androgens alter also the morphology, survival and axonal regeneration of motor neurons. These hormones accelerate the regeneration of hamster facial nerve and anterior tibialis sciatic nerve in rabbits following crush axotomy. Androgens exert trophic action in laryngeal motor nucleus of Xenopus laevis. Testosterone is linked to an increase in neuron somal size, neuritic growth, plasticity and synaptogenesis in both motoneurons of the spinal nucleus of the bulbocavernosus and several populations of pelvic autonomic neurons. The hormone reduced the extent of spinal cord damage in vitro. There are also evidences against the neuroprotective action of testosterone. Testosterone does not protect against methamphetamine-induced neurotoxicity of the dopaminergic system in mice and does not provide significant neuroprotection against glutamate-induced neurotoxicity. Androgens do not prevent striatal dopamine depletion induced by 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) in mice. Although the role of testosterone in the CNS is still poorly understood, accumulating evidence suggests that testosterone may create a future treatment for MCI and related cognitive diseases, including dementia and may influence motor neuron regeneration in adulthood. Androgen replacement therapy in selected male populations may hold therapeutic promise for the prevention and/or treatment of age-related disorders associated with neuronal injury.

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