Cerebrospinal Fluid Research

BioMed Central

Oral presentation

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p73 isoforms expression in the cerebrospinal fluid and circumventricular organs of BPH mice and SHR rats

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from 51st Annual Meeting of the Society for Research into Hydrocephalus and Spina Bifida
Heidelberg, Germany. 27–30 June 2007

Published: 20 December 2007

Cerebrospinal Fluid Research 2007, **4**(Suppl 1):S26 doi:10.1186/1743-8454-4-S1-S26

This abstract is available from: http://www.cerebrospinalfluidresearch.com/content/4/S1/S26

Background

It has been reported that the blood pressure high (BPH) mouse shows an increase in blood pressure and alterations in the brain catecholaminergic system as well as normal ventricular size. However, spontaneously hypertensive rats (SHR) show ventricular dilation, changes in CSF proteins and variations in the brain angiotensin-vasopressin system. The subcommissural organ (SCO), the organum vasculosum of the lamina terminalis (OVLT), the subfornical organ (SFO) and the area postrema (AP) are circumventricular organs (CVO) located in the third and fourth ventricle which are rich in neuropeptides such as angiotensin II and catecholamines Variations in the SCO have been reported in hydrocephalus and hypertension. The SFO has connections with the brain regions involved in the central regulation of blood pressure and cardiovascular function. The p73 isoforms function as essential pro-survival molecules in both the CNS and PNS and are important not just during the period of developmental death but also for the maintenance of at least some populations of adult neurons. In the absence of p73, ventricular enlargement occurs as neurons degenerate and tissue mass decreases, a phenomenon also observed in the degenerating human brain. The purpose of the present work is to study the TAp73 and ΔNp73 expression in neuroepithelial structures such us: the CVO and their variations in ventricular dilatation and arterial hypertension.

Materials and methods

Brains from one year-old BPH mice, blood pressure normal mice (BPN), control Wistar-Kyoto rats (WKY) and spontaneously hydrocephalus rats (SHR) were used. The paraffin sections containing the SCO, OVLT and SFO were immunohistochemically processed with anti-p73 isoforms (TAp73 and ΔNp73). P73 band were identified in the CSF by western blot.

Results

The BPH mouse shows a slight dilation in the lateral ventricle while the SHR presents a greater increase in ventricle size compared to normal sized WKY rats. The TA p73 expression was higher in the SFO of the hypertensive rats than in the WKY rats. Although TA p73 was positively expressed in the SCO and OVLT of the WKY rats, this expression was scarce in this organ of the SHR rats; in the control mouse the reaction was more intensive in the AP. The ΔNp73 isoform was scarce or almost undetectable.

Conclusion

The DeltaNp73 is essential for survival of peripheral sympathetic neurons. DeltaNp73beta may have distinct functions under certain cellular circumstances. The present results and the fact that the deltaNp73 is essential for the survival of sympathetic neurons, could indicate that p73 is an essential survival protein in CNS catecholaminergic neurons in centres involved in cardiovascular regulation.