VASOPRESSIN AND OXYTOCIN RELEASE INTO CSF AFTER SYMPATHETIC STIMULATION IN RAT

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Vasopressin and oxytocin are neurohormones of the posterior pituitary lobe released not only into the blood, but also into cerebrospinal fluid (CSF).

Posterior pituitary lobe has central and peripheral noradrenergic innervation; peripheral origins from superior cervical ganglia (SCG) (ALPER et al. 1980; SAAVEDRA 1986). It is known, that sympathetic nervous system is involved in vasopressin (AVP) and oxytocin (OXY) release from neurohypophysis into the blood (ROMEO et al. 1991; LIPINSKA et al. 1996). The factors which stimulate neurohormones release into the blood do not always cause their release into CSF (DOGTEROM et al. 1977; SZCZEPANSKA-SADOWSKA et al. 1983). The aim of this study was to elucidate the question whether the stimulation of preganglionic fibers of the SCG could influence the release of AVP and OXY into CSF.

Key words: Vasopressin – Oxytocin – CSF – Sympathetic system – Superior cervical ganglion

Materials and Methods

Among 46 male rats anesthetized by i.p. injection of urethane-chloralose 24 animals were controls and 22 animals were subjected to cyclic electric stimulation of preganglionic fibers of superior cervical ganglia (30 sec "on" and 30 sec „off") which lasted for 30 min (20 Hz, 3 msec, 10 V). In all animals, CSF samples were collected from the cerebellospinal cistern. Vasopressin and oxytocin concentration in CSF was determined by radioimmunoassay.

Results

Electric stimulation of the SCG preganglionic fibers did not change significantly the AVP and OXY release into CSF (Table 1).

The same stimulation parameters caused an increase in the number of synaptic vesicles in superior cervical ganglion and in neurosecretory granules in the posterior pituitary lobe (KARASEK et al. 1980a, 1980b). It was indicated, that similar stimulation of the SCG caused an increase in AVP and OXY release into the

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Table 1
Vasopressin (AVP) and oxytocin (OXY) concentration in CSF

	Control group	Preganglionic SCG fibers stimulation
AVP (pg/ml)	24.86 ± 4.89	23.47 ± 4.95
OXY (pg/ml)	8.26 ± 2.86	8.67 ± 2.25

blood (LIPINSKA et al. 1996). We hypothesized that the experimental model of the posterior pituitary lobe incubation „in situ" could reflect the physiological status of neurohypophysial hormones release into the subarachnoid space and subarachnoid cistern. In that research, dramatical increase in the release of AVP and OXY into incubating fluid of the posterior pituitary lobe *„in situ"* was observed (LIPINSKA et al. 1992, 1995). However, in another experiment no change was observed in AVP release into the cerebral ventricles perfusing fluid after electric stimulation of SCG (LIPINSKA and BUIJS 1988). Finally, according to these controversial results, in present experiment, it was decided to collect CSF directly from the cerebellospinal cistern through the suboccipital puncture, as it seemed to reflect the physiological conditions better than the perfusion of cerebral ventricles and the posterior pituitary lobe incubation *„in situ"*. Nevertheless, after electrical stimulation of preganglionic fibers of superior cervical ganglion, we did not observe any changes of AVP and OXY concentration in CSF, comparing to the control group.

In conclusion, it should be emphasized, that neurohypohysial hormones in the blood and central nervous system have different functions. According to that, not surprisingly, the mechanisms that cause release of these neurohormones into CSF differ from that, which induce their release into the blood.

On the basis of our experiment, it can be assumed that, peripheral sympathetic innervation derived from SCG, does not influence the vasopressin and oxytocin release into the CSF.

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