

Change of Na concentration in CSF during acute hypernatremia
in anesthetized rats.

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Summary

To quantify the response of Na concentration in cerebrospinal fluid ($[Na]_{csf}$) to acutely increased Na concentration in plasma ($[Na]_p$), we measured $[Na]_{csf}$ and $[Na]_p$ continuously with a Na sensitive microelectrode in the lateral ventricle and with a flow cell typed Na sensitive electrode placed in an extracorporeal circuit, respectively. Intravenous infusion (INF) of 1M NaCl was performed with varying rates of 0.1ml (n=5), 0.2ml (n=6), and 0.3 ml/ 10 min 100g boy wt. (n=5). In every group, $[Na]_p$ increased during 10 min of INF and reached the maximal value ($\Delta[Na]_p^{max}$) of 8.6 ± 0.7 (0.1ml), 12.8 ± 1.2 (0.2ml), and 17.8 ± 1.4 meq/ kgH₂O (0.3ml), and then $[Na]_p$ declined rapidly to approximately 40% of $\Delta[Na]_p^{max}$ in each group and maintained this level until the end of the experiment. $[Na]_{csf}$ in all groups increased with $[Na]_p$ and reached 20% of $\Delta[Na]_p^{max}$ in each group at 2-3 min after the end of INF and maintained the level until the end of the experiment. These results indicate that $[Na]_{csf}$ responds in a linear manner to increased $[Na]_p$, while the cerebrospinal fluid is protected against acute change in $[Na]_p$.