

## INCREASED Na CONCENTRATION IN CSF IS IMPORTANT FOR MAINTAINING ARTERIAL BLOOD PRESSURE IN DEHYDRATED RATS.

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### Summary

The role of increased Na concentration of cerebrospinal fluid ( $[Na]_{csf}$ ) in regulating arterial pressure in dehydrated state was studied in urethane anesthetized rats dehydrated ~10% of body wt. We measured  $[Na]_{csf}$  continuously with a double barreled Na sensitive microelectrode placed in the lateral ventricle (LV) together with mean arterial pressure (MAP) from the femoral artery. The measurements were performed during the infusion (INF) of hypotonic (~260mosmol/kgH<sub>2</sub>O) or isotonic (~300mosmol/kg H<sub>2</sub>O) artificial CSF into the LV at 5 $\mu$ l/ min for 10 min and during 10 min of recovery. The dehydration increased  $[Na]_{csf}$  significantly from  $141\pm 1$ (mean $\pm$ SE, n=12) to  $148\pm 1$  meq/kg H<sub>2</sub>O ( $p<0.01$ ), MAP from  $86\pm 3$  to  $97\pm 4$  mmHg ( $p<0.05$ ), and hematocrit from  $46.3\pm 0.9$  to  $49.9\pm 0.7\%$  ( $p<0.01$ ). MAP and  $[Na]_{csf}$  decreased immediately after the start of INF and attained the maximal decreases of  $-9\pm 1$  mmHg and  $-8\pm 1$  meq/ kgH<sub>2</sub>O at the end of INF, and then both recovered toward the pre-INF levels. Changes in MAP( $\Delta$ MAP) were highly correlated with those in  $[Na]_{csf}$  ( $\Delta[Na]_{csf}$ ) throughout the experiment with a regression equation of  $\Delta$ MAP=1.03 $\Delta$ [Na]<sub>csf</sub>+0.25 ( $r=0.96$ ,  $p<0.001$ ), whereas there was no significant change in neither  $[Na]_{csf}$  nor MAP during the INF of isotonic artificial CSF (n=5). These results indicate that  $[Na]_{csf}$  plays an important role in maintaining arterial pressure in hypovolemia due to dehydration.