# Morphological Changes of the Hypothalamic Magnocellular Neurons during Chronic Dehydration

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## Summary

The immunoreactivity of c-fos protein was transiently detected in magnocellular neurons of the supraoptic nucleus (SON) and paraventricular nucleus (PVN) of the rat hypothalamus after intraperitoneal injection of hypertonic saline solution. In contrast, c-fos immunoreactivity was persistently seen in the SON and PVN of the rats which were chronically dehydrated by water deprivation. Moreover, the effect of osmotic stimulation on c-fos expression and cell size increase in the SON were evaluated in intact, sham-operated, and AV3V-lesioned rats. c-fos positive neurons were found mainly in the AV3V regions and the hypothalamic magnocellular neurons in the forebrain in dehydrated intact rats. Intraperitoneal injection of hypertonic saline and chronic dehydration induced a significant increase in number of c-fos positive neurons in the supraoptic nucleus of intact and sham-operated rats. AV3V lesions completely abolished the expression of c-fos in SON neurons of rtas that were intraperitoneally injected with hypertonic saline and were chronically dehydrated. Chronic dehydration inceased significantly cell size of OXT and AVP magnocellular neurons in intact and sham-operated rats. However, there was no increase in cell size of those in the AV3V-lesioned rats. These results demonstrate that neural input deprived from AV3V regions plays a significant role in causing c-fos expression and structural changes such as cell size increase in the hypothalamic magnocellular neurons with osmotic stimulation.