

## Change of salivary secretion from the parotid gland of rat by hypertonic stimulation: central control of the secretion

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### Summary

Humidity in the oral cavity is influenced by saliva and mucus. Increase of plasma osmolarity decreases secretion of saliva and mucus. This induces oral dryness. The hypothalamus is a higher center of salivary secretion. The circumventricular organs in the hypothalamus have osmoreceptors which selectively respond to change of plasma osmolarity. Some studies show change of salivary secretion by intracerebroventricular injection of hypertonic solution. However, there was no consistency on the responses. Central mechanisms of body fluid balance including osmoreceptions and drinking behaviors have recently well understood by studies using rodents. To understand the central control of the salivary secretion in rats by hypertonic stimulation, the present study was designed. Salivary ducts of the parotid gland of Wistar rats were cannulated. Saliva was collected from freely moving rats. It was difficult to measure unstimulated saliva from the parotid gland of rat, because of the small secretion volume. Then we tested how stimulated saliva by feeding single pellets, the weights of which were 200 mg or 400 mg, was changed by hypertonic stimulation. As the hypertonic stimulation, 24 hr dehydration, intraperitoneal injection of 5 % NaCl solution and intracerebroventricular injection of 1M NaCl and 0.9 M mannitol solutions were used. As control of intraperitoneal and intracerebroventricular injections, 0.9 % and 0.15 M NaCl solutions were used, respectively. After intraperitoneal injection of 5 % NaCl solution and intracerebroventricular injection of 1M NaCl and 0.9 M mannitol solutions, time required to eat single pellets increased and saliva volume during the time did not decrease or rather increased in comparison to those in the control. Salivary flow transiently decreased after the injections. However, after dehydration, volume and secretory flow of stimulated saliva during eating single pellets increased compared to that in the control. From these results, it is suggested that acute hypertonic stimulation centrally decreases salivary flow from the parotid glands of rats and central osmoreceptions are involved in the control of the salivary secretion. In the chronic hypertonic stimulation like dehydration, there may underlie unknown mechanisms.