

## **Involvement of TRPM8 Receptor in Cooling-Induced Contraction of the Rat Fundus**

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**Introduction & objectives:** The stomach is exposed to cold temperatures during the process of ingestion of cold food. The duration of exposure depends on the nature of the food item, solid or liquid. Cooling has been shown to induce contractions of several smooth muscles, in vitro. However, the mechanism involved in the contraction is not yet known. In this study, we examined the possible involvement of transient receptor potential (TRP), TRPM8 receptor in cooling-induced contraction of the fundus.

**Materials & Methods:** Adult male Sprague-Dawley rats were used in this study. Circular muscle strips were prepared and set up for isometric tension recording in 25 ml organ baths containing Krebs' solution (gassed with 95% O<sub>2</sub>/5% CO<sub>2</sub>) at 37°C. Tissue expression of TRPM8 was examined using RT-PCR. Differences between mean values were tested for significance using Students t-test. The difference was assumed to be significant when p<0.05

**Results:** Cooling produced reproducible temperature-dependent contractions of the fundus, contractions being inversely proportional to the temperature. Maximum contraction was attained at 15°C. A submaximal temperature of 20°C was used in subsequent experiments involving inhibitors. Cooling-induced contraction was significantly attenuated in a Ca<sup>2+</sup>-free (1mM EGTA) medium. The contractile response was inhibited by 65.6±2.4% (n = 5; p<0.05). Capsazepine (3-30 µM), a TRPM8 receptor antagonist, significantly inhibited cooling-induced contraction, reducing the response by 21.1±5.8% and 49.7±5.8% respectively (n=7; p<0.05), indicating a role for TRPM8. Using RT-PCR, it was observed that the mRNAs for TRPM8 was expressed in the rat fundus.

**Conclusion:** Cooling-induced contraction of the rat fundus is mediated by activation of TRPM8 receptor and depend on extracellular Ca<sup>2+</sup>.

**Keywords:** Stomach, cooling, TRPM8.