

# EFFECT OF PROLONGED NOCICEPTIVE STIMULATION ON SECRETION AND ELECTRICAL ACTIVITY OF THE DOG'S STOMACH

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Chronic experiments were carried out on 9 dogs with a Pavlov gastric pouch and implanted electrodes for electrogastrography by Sobakin's method. Throughout a period of prolonged (2-5 h) nociceptive stimulation, gastric secretion in response to meat was inhibited, but after the end of stimulation it was increased above the control level. The gastric electrical activity was characterized by a sharp decrease in the amplitude and frequency of the electrogastrogram waves at the beginning of the first hour, with a return to control values toward the end of the second hour after cessation of nociceptive stimulation.

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Experiments have shown that nociceptive stimulation of short duration (from 30 sec to 5 min) can influence gastric secretion [3, 4, 6] and the electrical potential of the stomach [2, 7].

The object of the present investigation was to study the effect of prolonged (for several hours) nociceptive stimulation on the secretory and electrical activity of the stomach.

## EXPERIMENTAL METHOD

Experiments were carried out on 9 adult mongrel dogs (males) in which a Pavlov gastric pouch had been formed and electrodes implanted for electrogastrography into the pyloric division of the stomach at a one-stage operation. Altogether 114 experiments were performed: 69 control and 45 with application of nociceptive stimulation. The electrogastrograms (EGGs) were recorded with bipolar leads using the ÉGS-3 apparatus by Sobakin's method [5]. A special feature of the technique used was the combined investigation of the secretory activity of the stomach and its electrical potential, reflecting the state of its motor function. Nociceptive stimulation was applied by the method of Grechishkina and Kokhar' [1]. It began immediately after the dogs had been fed with 100-200 g crushed meat and continued for between 2 and 5 h.

## EXPERIMENTAL RESULTS

During nociceptive stimulation the volume of gastric juice fell in all 9 animals on the average by  $8.9 \pm 1.98$  ml ( $P < 0.01$ ). Immediately after the end of nociceptive stimulation the amplitude of the EGG waves fell considerably — on the average by  $1.03 \pm 0.14$  mV ( $P < 0.001$ ). In most animals this was accompanied by a decrease in the frequency of the waves. In two dogs, however, the decrease in amplitude was accompanied by an increase in frequency of the waves, and in one dog it was unchanged compared with the control. The mean frequency of the EGG waves fell by  $0.72 \pm 0.3$ /min ( $P < 0.05$ ).

During the second hour after the end of nociceptive stimulation the volume of gastric juice was increased compared with the control by  $3.3 \pm 0.84$  ml ( $P < 0.001$ ). The changes developing previously in the amplitude and frequency of the EGG waves gradually disappeared.

Throughout the period of nociceptive stimulation gastric secretion was therefore inhibited, but after its end, the secretion increased considerably (compared with the control). The state of the gastric electrical activity was marked by a considerable decrease in amplitude and frequency of the EGG waves during the first hour and by absence of changes compared with the control during the second hour after discontinuation of nociceptive stimulation.

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It can be postulated that nociceptive stimulation, in accordance with the principle of the competitive dominant, causes inhibition of the food center, but later, after the cessation of stimulation, the excitability of the food center is increased.

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