

BIOELECTRICAL ACTIVITY IN THE GASTRIC BRANCHES
OF THE VAGUS NERVE DURING THE DEVELOPMENT
OF A BROWN-PEARCE SARCOMA IN THE STOMACH WALL
IN RABBITS (BRIEF COMMUNICATION)

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In the nerves of a surviving preparation of the stomach removed for carcinoma no impulses are found in response to chemical stimulation, or their intensity is much less than that observed in the nerves of the stomach resected for peptic ulcer [2].

In the present investigation the afferent impulse activity was compared in the branches of the vagus nerve arising from the region of the stomach affected by a Brown-Pearce sarcoma in the corresponding nerves of the healthy stomach.

EXPERIMENTAL METHOD

A suspension of the tumor in a volume of 0.2-0.4 ml was injected into the anterior wall of the antral region of the stomach. The impulse activity in the branch of the vagus nerve running from the tumor was investigated 12-24 days later. The same branch was used in the control animals. After the initial activity had been recorded, the stimulus was applied by injecting 0.5% hydrochloric acid or 1% caffeine solution in a volume of 2-3 ml into the stomach through a thin drainage tube, and the impulses were again recorded after various time intervals. After the experiment the animals were sacrificed and the size of the tumor estimated by Schreck's method [3].

EXPERIMENTAL RESULTS

The impulse activity in the branch of the vagus nerve supplying the antrum of the stomach was studied in 12 rabbits with a tumor in this region and in 11 control animals.

In the control rabbits the initial electrical activity in this branch of the vagus nerve amounted to 31 ± 5.25 impulses per second, varying in amplitude from 7 to 20 μ V. A similar frequency has been observed in the gastric branches of the vagus nerves in cats [1]. Following the application of solutions of hydrochloric acid and caffeine to the gastric mucosa, the frequency and amplitude of the potentials increased in 10 of 11 experiments.

The initial activity in the corresponding branches of the vagus nerve of the animals with a tumor in the wall of the stomach may be divided into three types. In seven experiments the initial activity was minimal, the frequency of the potentials did not exceed 10 impulses per second, and their amplitude was such that they could hardly be distinguished from the noise of the amplifier. In another three experiments the frequency of the impulses varied from 17 to 32 impulses per second, and in two cases a fast activity of 48 and 50 impulses per second was recorded. The mean frequency for the group of rabbits with tumors was 15 ± 4.73 impulses per second ($P < 0.005$). Stimulation of the electrical activity as a result of injection of hydrochloric acid and caffeine into the stomach was observed in only 6 of 12 experiments, and in four of these the initial activity was low. In these same experiments the initial impulse activity in the nerves supplying parts of the stomach away from the tumor (the body and part of the fundus) was more intensive than that in the nerve supplying the region of the tumor. To ascertain if there was any relationship between the afferent impulse activity and the size of the tumor, the total number of observations was divided into

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two groups. In one of the groups, with a tumor not exceeding 1.5 cm in diameter (7 rabbits), the frequency of the impulses was 24 ± 8 per second, while in the other, with a tumor of a mean diameter of between 1.6 and 3.0 cm (5 rabbits), it was only 5 ± 1.58 per second ($P < 0.05$).

LITERATURE CITED

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