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Changes in Expression of Galanin in the CSMG Neurons Supplying the Prepyloric Area of the Porcine Stomach Induced by Intragastric Infusion of Hydrochloric Acid

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Abstract : Gastrointestinal disorders, especially acid-related diseases, including peptic and duodenal ulcers, gastroesophageal reflux disease, upper GI bleeding or stress-related mucosal disease, are currently serious health issues encountered very frequently in patients worldwide. However, to date, the response of sympathetic neurons to gastric mucosal injury and local inflammation following hyperacidity is unknown. Thus, the present study was designed to determine possible changes in expression of galanin (GAL) in the CSMG neurons supplying the prepyloric area of the porcine stomach in a physiological state and following experimentally-induced hyperacidity by using combined retrograde tracing and double-labelling immunohistochemistry. The choice of the domestic pig as an experimental model in the present study is not accidental and is justified by the high degree of physiological and anatomical similarity to human digestive system functions. In this experiment ten juvenile female pigs of the Large White Polish breed were used. The animals were divided into two groups: control and animals with hydrochloric acid infusion (HCl). The neuronal retrograde marker Fast Blue (FB) was injected into the anterior prepyloric wall of the stomach of all animals. After 23 days, animals of the HCl-group were reintroduced into a state of general anesthesia and intragastrically given 5 ml/kg of body weight of 0.25 M aqueous solution of hydrochloric acid. On the 28th day, all animals were euthanized. The CSMG complexes were then collected and the CSMG cryostat sections were stained immunocytochemically for GAL and TH (tyrosine hydroxylase). Immunohistochemistry revealed that in the control group 8.40 ± 0.53 % out of 200 FB-positive CSMG neurons contained GAL. In HCl group upregulation of the GAL-IR neurons to 22.52 ± 1.18 % were observed. All GAL-IR neurons in both groups showed the simultaneously TH immunoreactivity. Increase in the expression of GAL in FB-positive neurons of the HCL group may suggest its participation in the protective mechanisms of neurons in different pathological processes, such as gastric hyperacidity.

Keywords : coeliac-superior mesenteric ganglion complex, gastric innervation, hyperacidity, immunohistochemistry
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