LOCALIZATION OF GHRELIN IN THE EPITHELIAL CELLS OF THE DUODENUM IN THE RAT

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ABSTRACT

Ghrelin is a hormone discovered relatively recently, the effect of which is associated with the normal activity of the digestive tract. It is the most abundant in the gastric mucosa, but also occurs in other parts of the digestive system, sexual organs and some glands. Many authors associate the action of ghrelin with appetite and weight gain or weight loss.

The purpose of this study was by immunohistochemical methods to localize grelin-positive cells in the duodenal mucosa and comparatively to determine their amount. We use Ghrelin (H-40) antibody (Santa Cruz-USA), and for the visualization of the results - detection system EnVision™ FLEX Mini Kit, High Ph (DAKO - k8024 HRP). Histomorphometric study performed by Michael Vinther Image Analyzer, Version 1.33 (Mee Soft, Germany).

Key words: ghrelin, antibody, gastric epithelium, epithelial cells

INTRODUCTION

Ghrelin is a hormone discovered relatively recently, the effect of which is associated with the normal activity of the digestive tract. It is the most abundant in the gastric mucosa, but also occurs in other parts of the digestive system, sexual organs and some glands. Some investigators describe Des-acyl ghrelin as a food intake hormone (1) and many authors associate the action of ghrelin with appetite, obesity in humans (2) and weight gain or weight loss (3). Two major forms of ghrelin are described (4).

According Sato et al. (5) ghrelin is a stomach hormone that acts as an endogenous ligand of orphan G-protein-coupled receptor. It is a 28-amino acid peptide existing in two major forms: n-octanoyl-modified ghrelin, which possesses an n-octanoyl modification on serine-3 and des-acyl ghrelin. The same authors described the grelin as a peptide consisting of 28 amino acids, and is unusual among peptide hormones of which Ser3 is n-octanoylated. This modification, the first known case in mammals, is essential for ghrelin's activity.

An enzyme that catalyses the acyl-modification of ghrelin is discovered by Yang et al. (6). Zhang et al. (7) described a 23-amino acid peptide that they named *obestatin*. It has the ability to inhibit food intake in mice by intraperitoneal or intracerebroventricular injection. In addition, the authors reported that peripheral injection of obestatin inhibited jejunal contraction, suppression of gastric emptying and decreased body-weight gain (8). According Date and al. (9) ghrelin is present in X/A-like cells, which are about 20% of the endocrine cell population in adult oxyntic glands. Ghrelin-immunoreactive cells are also found in the duodenum, jejunum, ileum and colon.

Many author associates ghrelin with the stimulation of the growth factor secretion in human and animals (10, 11).

AIM AND METHODS

The aim of this investigation is to localize the ghrelin in the epithelial cells in the duodenum of the rat.

The material fixed in 10% aqueous formaldehyde for 48 hours, then embedded in

paraffin in accordance with the requirements of 56°C standard paraffin inclusion. Using ultramicrotome (Ultracut, Germany) did slice thickness 4 µm.

For realization of this aim we used an immunohistochemical methods Ghrelin (H-40) SC- 50 297 Company Santa Cruz, USA. Results visualized detection system Daco - En Vision FLEX - Mini Kit.

We applied immunohistochemical methods Ghrelin (H- 40) SC- 50 297 Company Santa Cruz, USA. Results visualized detection system Daco - En Vision FLEX - Mini Kit.

RESULTS AND DISCUSSION

Single ghrelin positive cells are observed in the duodenal mucosae. Frequently they are localized in the duodenal glands and in the cover epithelium (**Figure 1**). Our results are in accord of other publications (4, 12, 13). According Cojima and Kangawa (14) ghrelin immunoreactive cell density is lower in the duodenal mucosae in comparison with gastric mucosae but they are more in duodenum than in lower parts of the small intestine. In the intestine, ghrelin concentration gradually decreases from the duodenum to the colon.

Figure 1. Ghrelin-positive cell in duodenal mucosae

Two type - closed- and opened-type of ghrelin-producing cells exist in the rat (15) and two major forms of ghrelin peptide – ghrelin and des-acyl ghrelin are described in rat gastrointestinal tissues (4). The main molecular forms of intestinal ghrelin are n-octanoil and des-acyl ghrelin like to the stomach ghrelin (14).

CONCLUSION

Numerous ghrelin-positive cells are described in X/A-like cells in adult stomach. Ghrelin-immunoreactive cells are found in all parts of gastrointestinal tract but their quantity is in varying degrees in the different digestive organs.

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