BRIEF NOTE

Immunocytochemical Study on the Glucagon Cells in the Feline Gastric Glands

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It has been established that cells containing pancreatic-type glucagon are present in the gastric mucosa of several species of animals including cat [1, 5–7, 10]. All these cells, except for human fetus (4), have been considered to be so-called closed type which have no contact with lumen [1, 5–7, 10]. However we found the so-called open type cells reaching the gastric lumen with their cytoplasmic process in the cat, which react with antibodies against porcine pancreatic-type glucagon and porcine glicentin.

Tissue material was obtained from five kittens weighing 130–890 g and five adult cats weighing 2.5–3.6 kg. Immediately after sacrifice by overdose injection of sodium pentobarbital, small pieces of the gastric mucosa were dissected out. Samples were fixed in Bouin’s fluid, dehydrated in alcohol and embedded in paraffin. Paraffin sections were treated with the peroxidase-antiperoxidase (PAP) procedure of Sternberger [9]. Antisera used as primary layer were rabbit anti-porcine glucagon serum (Japan Immunoresearch Laboratories, Takasaki, JK-20; diluted in 1:1000) and rabbit anti-porcine glicentin serum (kindly offered by Prof. N. Yanaihara, Shizuoka College of Pharmacy, Shizuoka, 480; diluted in 1:2000). PAP complex (Dako, Copenhagen) was used with a dilution of 1:80. Peroxidase activity was visualized by diaminobenzidine (DAB) [3] and nuclei were slightly counterstained with Mayer-Hematoxylin. The specificity of the immunocytochemical reaction was checked as recommended by Sternberger [9]. All of the control sections, treated with non-immune rabbit serum instead of specific antisera or with specific antisera preincubated with corresponding antigen, were negative in immunocytochemical reactions.

Glucagon immunoreactive cells (glucagon cells) were scattered in the epithelia of all over the gastric glands, although these cells seemed to be predominant in the middle third. They were oval or triangular in shape. In 2 μm-thick serial sections, all glucagon cells reacted also with anti-glicentin serum, as it was previously reported [8]. In 4 μm-thick sections of adult materials, one fifth of glucagon cells have luminal contact with their cytoplasmic process (Fig. 1). Evidently, glucagon cells were more numerous in the kitten gastric glands (Fig. 2) than in the adult (Fig. 3). However glucagon cells which reach the lumen seemed to be in similar proportion in kitten and adult.

It must be emphasized that in the
present study one fifth of glucagon cells reached the glandular lumen in the adult gastric glands. Ito et al. [4] reported that in 5 μm-thick sections one fourth of glucagon cells in the human fetal gastric glands reached the gastric lumen and that there were no gastric glucagon cells in the adult human being. They suggested that the function of human fetal gastric glucagon cells which reach the lumen may be somewhat different from that of other adult mammals. This suggestion based on the idea proposed by Fujita and Kobayashi [2] that the open type endocrine cells in the gut may be able to receive adequate stimuli directly from the gut lumen while the closed type cells can not. Therefore, it seems also probable that the function of open type glucagon cells in the gastric glands of adult cat may be somewhat different from that of closed type in other species [1, 5–7, 10]. It still remains to be determined whether these open type cells in the cat and human fetus have the same function or not.

REFERENCES


EXPLANATION OF FIGURES

Fig. 1. Glucagon immunoreactive cell in the gastric gland of adult cat. The cell is triangular in shape and reaches the gastric lumen with its cytoplasmic process. PAP method, counterstained with hematoxylin. ×2800.

Figs. 2 and 3. Glucagon immunoreactive cells in the gastric glands. They are oval or triangular in shape and are more numerous in the kitten (Fig. 2) than in the adult (Fig. 3). PAP method, counterstained with hematoxylin. ×600.

要約

ネコの胃腺におけるグルカゴン細胞についての免疫細胞化学的研究（短報）：北村延夫・山田純三・山下忠幸（帯広畜産大学家畜解剖学教室）——ネコの胃腺におけるグルカゴン細胞を免疫細胞化学的に検索した。免疫活性細胞は胃腺に認められ、成ネコよりも仔ネコにおいて多数存在したが、両者ともにグルカゴン細胞の少数は消化管内腔と交通を持つ、いわゆる開放型の細胞であった。
GLUCAGON CELLS IN THE FELINE GASTRIC GLANDS