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PEPTIDE YY-CELLS (PYY) IN NEUROENDOCRINE TUMOURS OF RECTUM

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PEPTID YY-ĆELIJE U NEUROENDOKRINIM TUMORIMA REKTUMA

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SAŽETAK

Peptid YY-ćelije su najbrojnije u donjim partijama ileuma, kolonu i rektumu, gde su lokalizovane u dubokim delovima Liberkinovih kripti. Pripadaju „open-cell" tipu, odnosno pružaju se od bazalne membrane do lumena creva. U patološkim stanjima rektuma ove ćelije su retko ispitivane.

Cilj našeg rada je mikromorfološko i imunocitohemijsko ispitivanje PYY-ćelija u neuroendokrinim tumorima rektuma.

Materijal čine 30 slučaja neuroendokrinoma rektuma, dobijenih polipektomijom i kalupljnih u parafinske blokove. Na presecima debljine 5 mikrometara su primenjene klasična HE metoda i imunocitohemijska ABC tehnika sa sa anti-PYY antitelima (1:1800, DAKO)

PYY-ćelije su bile prisutne u svim histološkim tipovima neuroendokrinoma, pri čemu je njihova markantna hiperplazija verifikovana u trabekularnom tj. B-tipu tumora. Hiperplazija PYY-ćelija je prisutna i kod tumora glandularne građe (C-tip), gde su ove ćelije većih dimenzija i obično grade tubularne strukture.

U radu se diskutuje o biogenezi PYY- ćelija i o efektu peptida YY na biološka svojstva tumora. Takođe se razmatra i savremeni aspekt neuroendokrinih ćelija.

Ključne reči: rektum, neuroendokrini tumor, PYY-ćelije

ABSTRACT

Peptide YY-cells (PYY) persist in grate numbers in lower parts of ileum, colon and rectum, localized in deep parts of Liberkunis crypts. These are „open type" cells, which means they extend from basal membrane to gut lumen. In rectal pathological states these cells are rarely examined.

The aim of our study is micromorphological and immunocytochemical PYY-cells examination in rectum neuroendocrine tumours.

The document consideres thirty (30) cases of rectum neuroendocrinomas, got by polypectomy and gathered in the paraphine blocks. On 5-micrometer cross sections there were used classic method and ABC immunocytochemical technique with an anti PYY (1:1800, DAKO)

PYY-cells were found in all histological types of neuroendocrinomas and their marked hyperplasia was verified in tuberculous B-type tumours. PYY Hyperplasia can also be found in the glandulare structured tumours (C-type), -cells were found in all histological types of neuroendocrinomas and their marked hyperplasia was verified in tuberculous B-type tumours where these cells are bigger and usually form tubular structures.

The study discussion is about PYY-cell biogenesis and about PYY efect on the tumour biological characteristics. It is also considered a modern aspect at neuroendocrine cells.

Key words: rectum, PYY cells and neuroendocrine tumours

INTRODUCTION

Although the neoplasms are not frequent when neuroendocrine tumors occur, they present a great diagnostical challenge, due to unspecific and often hidden simptomatology.

Appart from EC-, L-, and D1-cells in the rectum, there are Peptid YY(PYY)-cells. In the gastrointestinal tract, these cells are the most numerous in the lower parts of the ileum, colon and rectum. They belong to the „open-cell„ type, in other words they extend from the basal membrane to the intestinal lumen (1). The distribution and the frequency of these cells are parallel to the distribution of the goblet cells, in other words their number grows towards the lower parts of the intestine (2). The production of PYY, which belongs to the hormone family of the pancreatic polypeptide (3). In the rectum PYY cells are localised in the deep parts of the crypts of Lieberkuhn (4) (Lieberkuhns glands). Since the information about the distribution and morphology of the cells, in the pathology states of the rectum, are controversal, the aim of our study is immunostandardization and micromorphological examination of the PYY-cells distribution in the various histological types of the neuroendocrine tumors of the rectum.

MATERIAL AND METHODS

Our study includes 30 cases of neuroendocrine tumor of the rectum which were obtained from polipectomy, which were fit into paraffine blocks. The material was fixed into Bowen's solution for 24 hours, manually processed embedded into the paraffine. On the 5 mm sections the classical Haematoxylin-Eosin method was processed, for differentiating of the histological variations of neuroendocrine and immunocytochemical ABC technicque (after Hsu-u, 1981)with anti-PYY-antibodies (1–1800, DAKO)

RESULTS

We have differentiated the insular (A-type), trabecular (B-type), glandular (C-type) and mixed variations, which include insular-glandular variation (A+C) and tubecular-glandular variation (B+C), by micromorphological analysis of our material.

Minor populations of PYY-cells are verified in all histological variations of tumour. Howerver, the emphasied hyperplasia of PYY-cells is recognised in tumours of trabecular types (B-type) (Figure 1), in which largely immunoreactive PYY-cells are mainly individual, with a triangle shape and a bottle shape and with cytoplasmic extension

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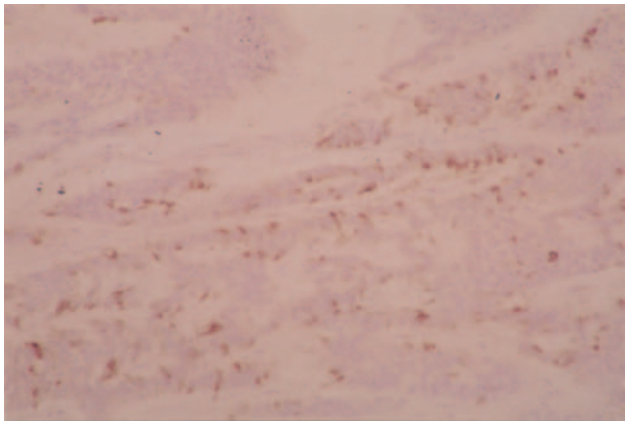

Figure 1. Hyperplasia of PYY-cells in trabecular tumour

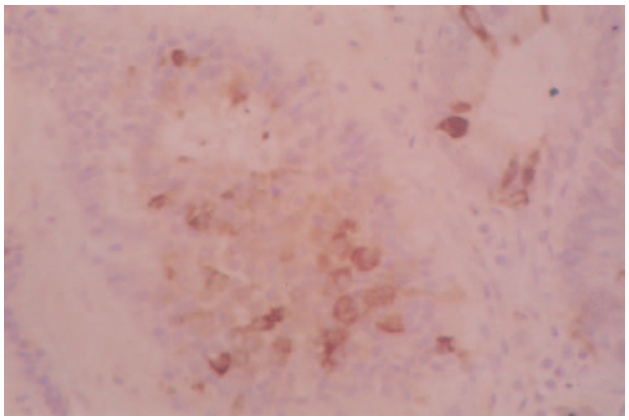

Figure 2. Large immunoreactive PYY-cells

which reach to the nearest goblet cells (Figure 2). Hyperplastic PYY-cells were present in the tumour of glandular hystological type (C-type) where these cells are larger (hypertrophical), circular or oval, rarely individual, usually make rosets or tubular arrangements (Figure 3).

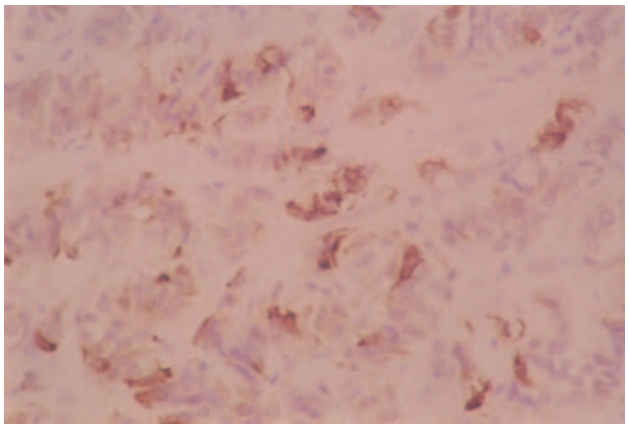

Figure 3. Rosets due to PYY-cell hyperplasia

DISCUSSION AND CONCLUSION

Neuroendocrine tumours have five widely accepted ways of growth: insular, trabecular, glandular, undefferentiated and mixed. By using histological classification of Soge and associates (1981), on our material, there have been noticed that the rectal neuroendocrinoms are mainly of trabecular, glandular or mixed structure, many scientists have noticed the correlation between the tumour growth type and the disease prognosis.

There are a lot of literature discussions about the significance of the histological growth of tumour in relation to disease prognosis, however, most of the scientists believe that trabecular and mixed tumour structures have better prognosis than other histological types (5, 6)

In most of the rectular neuroendocrine tumours of trabecular, glandular and mixed structure there has been emphasised hyperplasia PYY-cells. Not depending on the cell shapes (whether they were bottle shaped or circular or whether thery were individual or in groups), they have always had cytoplasmic extension towards the neighbouring goblet cells which suggests their paracrine characteristics (3, 2). Tiny cytoplasmatic granulas of these cells produce peptidYY, for which has been established by the immunocytochemical reactions, that together with enteroglucagon are located in L-cells columns (7) and also with glucagon of A-cells of pancreas, which was acknowledged by our authors (8, 9).

These results lead to the conclusion that peptid YY could be regulatory peptid of the pancreas islands, attaching into the work of enteroinsular axis (8). The moust famous biological effects of PYY are: intestinal vasoconstriction and inhibition of jejunal and column motility, inhibition of bicarbonate secretion from the pancreas, inhibition of gastric juice secretion in the cases of stimulations with small pentagastrin dosage.

Appart from these. PYY has also got some antagonistic effects on cholecystokinin, first of all it inhibits sphincter of Oddi (10). Further, it is believed that PYY inhibits the insuline secretion which indirectly inhibits glucagone secretion. It is possible that PYY performs this with the direct local inhibition having paracrine effect on pancreas B-cells (11).

The higher values of PYY in serum are acknowledged with a patient with steatorrhoea with tropical sprue and with chronical pancreatitis, as well as with patients with neuroendocrine tumour of ovary (12, 13)

According to our results we are drawing a conclusion that the dominant cell population of rectal neuroendocrine tumours are made of PYY-cells. It is also observed by our work, which is concerned by micromorphological characteristics of these cells, that their products-polipeptid YY effect the regulation of tumour growth in apacrine way.

REFERENCES

1. Buffa R, Capella C, fontana P et al: Types of endocrine cells in the human colon and rectum. Cell Tissue Res 1978; 192: 227–40.
2. Wilander E, El-Salhy N, grimelius L et al: polypeptideYYand pancreatic polypeptide (PP) in rectal carcinoids. Virch Arch Pathol Anat 1983; 401: 67–72.
3. Conlon M, Chartel N and Vaudry H: Primary structure of PYY : implications for the molecular evolution of the pancreatic polypeptide family. Peptides 1985; 13: 145–9.
4. De Lellis RA, Dayal Y and Wolfe HJ: Carcinoid tumors: changing concepts and new perspectives. Am J Surg Pathol Lab Med 1987; 111: 620–4.
5. Mc Dertemott EW, Goduric B and Brennan JP: Prognostic variabiles in patients with gastrointestinal carcinoid tumors. Br J Surg 1994; 81: 1007–9.

6. Rindi G, Azzoni C, La-Rosa C et al; ECL cell tumor and poorly differentiated endocrine carcinoma of the stomach prognostic evaluation by pathological analysis. Gastroenterology 1999; 116: 532–42.
7. Nilson O, Bilchic A, Adrian TEDistribution and immunocytochemical colocalization peptide YY and enteroglucagon in endocrine cells of the rabbit colon. Endocrinology 1991; 129: 139–48.
8. Jancic Sl, Jakovljevic V, Katic K et al: Neuroendocrine-pancreatic cells in mammary carcinogenesis. Acta Biol Med Exp 2002; 27: 73-4.
9. Rosic G, Jancic S, Maric I. et al: Co-localization peptideYYin A-cells of the pancreas in the experimental breast carcinogenesis. An immunocytochemical study. Pathol International 2004; 54: A50.
10. Adrian TE, Savago AF, Sogar GR et al: Effect of PZZ on gastric, pancreatic and biliary function in human. Gastroenterology 1985; 98: 494–9.
11. Guslaine B, Gross R, Roye M et al: Evidence for a direct inhibitory effect of PYY on insulin secretion in rats. Pancreas 1992; 7: 595–600.
12. Fiocca R, Rindi G, Capella C et al: Glucagon, glicentin, proglucagon, PYY and PP immunoreactivites of rectal carcinoid tumours and related non tumor cell. Regul Pept 1980; 17: 9–29.
13. Lundberg JM, Willander E, El-salhy et al: PYY and PP in rectal carcinoids. Virch Arch Pathol Anat 1983; 401 (1): 67–72.