



PROBLEMS OF CARCINOGENESIS

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ABSTRACT

Experiments on 7 Wistar rats were performed to verify the hypothesis on significance of impaired process of feces evacuation from colorectal intestine. Local damage of somatic and visceral nerves in the anus region resulted in violation of defecation process and accumulation of feces in expanded colorectal parts of intestine in one week of observation. Pathological changes in tissue structure in muscular and submuscular layers of intestine together with transformations in corresponding nerve ganglia were revealed in one and two weeks by histological methods. Such changes in experimental model are associated with typical events in daily life of a person suffering from chronic constipation. Persistent chronic constipation leads to systematic damage of tissues in colorectal region followed by development of pathological processes and formation of inflammatory and precancerous processes in colorectal region.

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INTRODUCTION

The problem of carcinogenesis is one of the major socially important problems, which has not been resolved yet [1]. It is advisable to have a look at the problem from another point of view. The authors have chosen colorectal cancer among the other oncology topics where reviews mention importance of the diet. Each country has its own preferences in traditional foods– this together with morbidity data in different countries leads to conclusion that the diet is important in terms of oncological pathology development, but what is the pathological aspect? Paradoxically, but modern devices for brain entertainment brought a number of problems for other body parts. We are talking about long-lasting enthusiastic sitting of modern people of different age, sex and residence in a toilet with their mobile phones. This leads to one feature which was previously typical for elderly – chronic constipation [2]. Nowadays more and more young people suffer from it [2, 3] – as well as from colorectal cancer [4].

METHODOLOGY

Disturbed motility in colorectal region leads to development of constipation, followed by many consequences, including impact on emotional sphere. There are two major aspects in this problem: repeated trauma to the tissues around caudal

intestine filled with feces [5, 6] and microflora imbalance [7, 8]. Relationships between microbes and human body now became as relevant as ever taking into account recent epidemiological situation. The authors tried to verify assumption on the consequences in colorectal area caused by conduction disorders in surrounding nerve plexuses. Prolonged bowel movements are accompanied by elevated rectal pressure followed by disturbed blood flow and injury of local nerve plexuses [9,10]. The authors performed experiments on 7 male Wistar rats weighing 320-350 grams: intestine was mobilized along the posterior wall to transitional fold of peritoneum, inferior rectal nerve and parasympathetic efferent were partially intersected to interrupt innervation of distal colon. Surgery was performed under ketamine-xylazine-acepromazine anesthesia (55.6, 6.6 and 1.1 mg/kg, respectively, i/p). Separate interrupted sutures were used to cover the wound in layers. All experimental procedures were carried out in accordance with the Protocol of the Ethics Committee of the Institute of Physiology of the National Academy of Sciences of Belarus. Destructive changes were noticed in significant part of intermuscular plexus ganglia after one and (more pronounced) 2 weeks of observation (Figure 1). Frozen slices were stained with hematoxylin and eosin according to the protocol

(http://www.ihcworld.com/_protocols/special_stains/h&e_ellis.htm).

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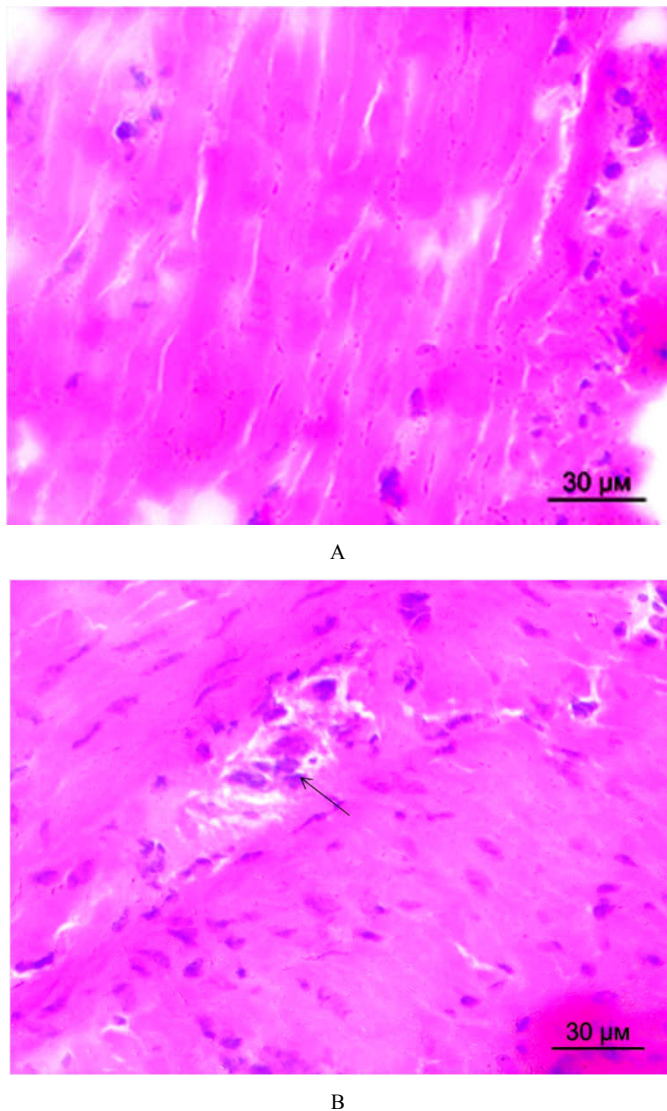


Figure 1 shows part of rectum of rat in one (A) and two weeks (B) after nerve damage modeling in colorectal region. Hematoxylin-eosin staining. The arrow indicates damage of intermuscular plexus ganglion.

Prolonged disturbances of diet and motility of intestine lead to impairment of innervation of colorectal intestine followed by development of dysbiosis [11-14]. Dysbiosis leads to translocation of endotoxin into surrounding tissues and further into bloodstream, which results in development of pro-inflammatory processes [15-18]. Chronic pro-inflammatory processes are known to be one of the causes of malignancy of cells. Chronic constipation should be prevented at first symptoms as it is hard to eliminate both local and systemic pathological processes caused by translocation of endotoxin from intestine into internal milieu and formation of conditions for malignancy development in colorectal region in advanced cases.

CONCLUSION

In conclusion, effective ways should be developed to prevent disturbances of intestine motility to minimize effect of conditions for development of malignancy in colorectal region. The authors understand that this part of the problem is one of the key ones in oncogenesis, but, unfortunately, not the only one.

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