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RELEASE OF AMYLASE, LIPASE AND PEPSINOGEN BY THE SALIVARY GLANDS AND THEIR CONTENT IN THE BLOOD AFTER UNILATERAL NEPHRECTOMY

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We studied the mechanisms of transformation of some salivary enzymes and established the real contribution of the salivary glands to the enzyme homeostasis of the body during unilateral nephrectomy.

The results were obtained that with unilateral nephrectomy, the content of amylase and pepsinogen in the blood increases, but its lipolytic activity remains unchanged, the volume of basal secretion of the salivary glands, the content and secretion of amylase by the parotid salivary gland increases. Unilateral nephrectomy stimulates the incretion of pepsinogen by the gastric glands, and accordingly, increases its secretion from the blood by the salivary glands. After unilateral nephrectomy, lipolytic activity and its release in saliva remain unchanged.

It is well known that after unilateral nephrectomy, the remaining kidney undergoes compensatory hypertrophy. A huge amount of literature is devoted to this issue, which emphasizes the theoretical and practical significance of this issue. Using the method of unilateral nephrectomy, the main patterns of compensation for the function of paired organs were studied. Unilateral nephrectomy is one of the common operations in the surgical treatment of kidney diseases.

There are very few works devoted to the comprehensive accounting of the renal secretion of hydrolytic enzymes after nephrectomy, and the objective of this part of the study was to study the effect of unilateral nephrectomy on the content of amylase, lipase and pepsinogen in the blood and their secretion by the salivary glands and kidneys under basal (fasting) and stimulated conditions. giving food stimuli the incretion of these enzymes by the digestive glands.

The purpose of the study was to study the mechanisms of transformation of the enzyme spectrum of saliva and establish the real contribution of the salivary glands to the enzyme homeostasis of the body during unilateral nephrectomy.

Research methods. In chronic experiments on animals, the secretion of individual enzymes by the salivary glands and their content in the blood after unilateral nephrectomy, under conditions of basal secretion of the salivary glands, were studied. The experiments involved dogs with previously removed salivary gland ducts.

After unilateral nephrectomy, the secretion of enzymes in saliva and their content in the blood under conditions of basal secretion were recorded. During the experiment, blood was taken from a vein and saliva was collected by stimulating salivation with meat-sugar powder. The content of amylase, lipase and pepsinogen was determined in plasma and saliva.

Research results. Table 1 presents data on the effect of unilateral nephrectomy on the content of enzymes in the blood under conditions of basal secretion of the digestive glands, which are sources of hydrolases secreted into the blood. As can be seen from this table, unilateral

nephrectomy has an ambiguous effect on the content of amylase, pepsinogen and lipase in the blood.

After unilateral nephrectomy under conditions of basal secretion in two dogs (Laska, Tarzan), amylolytic activity and pepsinogen content significantly increased. In the third dog (Bobik) they remain at the level of the original values.

The lipolytic activity of blood in experimental dogs after unilateral nephrectomy remains unchanged. This means that unilateral nephrectomy not only affects the secretion of enzymes by the kidneys, but also affects the incretion of enzymes by the digestive glands.

From the data presented in Table 2 it is clear that after unilateral nephrectomy in experimental animals, the volume of basal secretion of the salivary glands, in the dog Tarzan - the parotid gland, Laski - the submandibular and sublingual salivary glands, increases.

In the dog Bobik, the volume of basal secretion of the salivary glands after unilateral nephrectomy remains at the level of initial values.
Unilateral nephrectomy has an ambiguous effect on the enzyme spectrum of saliva. In all experimental dogs after nephrectomy, amylolytic activity and its flow rate in the saliva of the parotid gland increases. In the submandibular saliva with the sublingual salivary glands, amylolytic activity and its flow rate, after unilateral nephrectomy, remains at the level of initial values.

There is a unidirectional change in the amylolytic activity of the blood and its secretion by the salivary glands, this proves the participation of the salivary glands in maintaining enzyme homeostasis through incretion and recretion, especially amylase.

Our results of a correlation analysis between the content of amylase in the blood and its release in saliva showed that the correlation coefficients for the saliva of the parotid gland were always greater than for the saliva of the submandibular and sublingual glands. These results confirmed the literature data [1, 2] that in the saliva of the parotid, submandibular and sublingual glands the ratio of S-, P-amylolytic activity is observed in the parotid saliva S - 55-67%, P - 33-44%, and in submandibular and sublingual saliva S – 79%, P – 21%.

From this we can conclude that the parotid salivary gland can secrete more P-amylase from the blood than the submandibular and sublingual salivary glands.

In all experimental animals after unilateral nephrectomy, the content of pepsinogen in the saliva of all salivary glands tends to increase, but these changes are unreliable. In two dogs (Laska and Tarzan) out of three, the release of pepsinogen in the saliva of the submandibular and sublingual salivary glands significantly increased (Table 2). The correlation coefficients between the content of pepsinogen in the blood and its secretion by the salivary glands were high and positive.

This means that there is a direct dependence of the secretion of pepsinogen by the salivary glands on the level of its content in the blood. These results confirmed the literature data [3] that pepsinogen in saliva is of a receptor nature, i.e. it is secreted from the blood by the salivary glands. Pepsinogen is secreted into the blood by the chief cells of the gastric glands.

From the above, we can conclude that unilateral nephrectomy stimulates the incretion of pepsinogen by the gastric glands, and, accordingly, increases its secretion from the blood by the salivary glands.

After unilateral nephrectomy, basal lipase secretion by the salivary glands remains unchanged. In only one dog (Tarzan) an increase in lipase secretion was observed in the saliva of the submandibular and sublingual glands. This is most likely the result of increased salivation by these glands.

Correlation analysis showed that there is a direct relationship between the content of lipase in the blood and its secretion by the salivary glands. We consider this as an argument confirming the receptor nature of lipase in saliva.

After unilateral nephrectomy, under conditions of basal secretion in dogs, amylolytic activity and the content of pepsinogen in the blood increase or remain at the level of initial values, and its lipolytic activity remains unchanged. This means that unilateral nephrectomy stimulates the incretion of pepsinogen and amylase by the gastric and pancreatic glands, and, accordingly, increases their secretion from the blood by the salivary glands.

After unilateral nephrectomy, there is a direct relationship between the content and, especially, the release of amylase in saliva and the level of its excretion in the urine. The correlation coefficients of parotid saliva are much larger and more reliable than the saliva of the submandibular and sublingual glands. The reason for this may be the following phenomenon: firstly, the homeostasis of amylase in the blood is ensured by the kidneys and salivary glands; the increase in amylase content in the blood after unilateral nephrectomy led to increased excretion in urine and saliva.

After unilateral nephrectomy, lipolytic activity in the blood and its secretion by the salivary glands remains unchanged. But the content and, especially, the excretion of lipase in the urine after unilateral nephrectomy significantly decreases. These multidirectional changes in the secretion of lipase by the salivary glands and in the urine led to the fact that in the dog Tarzan the correlation coefficients between the secretion of lipase by the salivary glands and urine are negative. This means that the salivary glands, to a certain extent, compensate for the insufficient functioning of the kidney in the homeostasis of the lipase enzyme.

After unilateral nephrectomy in experimental dogs, the content of pepsinogen in the blood increases and, accordingly, this led to an increase in its secretion in the saliva of the submandibular and sublingual salivary glands. The correlation coefficients between the content and secretion of pepsinogen by the salivary glands and in urine are mostly positive and low.

Food stimulation, after unilateral nephrectomy, regardless of the type of stimulus, stimulates the secretion of amylase by the salivary glands; it did not affect the lipolytic activity and flow of lipase; the release of pepsinogen in the saliva of the submandibular and sublingual salivary glands.

The unidirectionality of changes in the secretion of amylase in the saliva of the parotid gland and urine, after unilateral nephrectomy, under conditions of stimulation of enzyme incretion, shows that both the parotid salivary gland and the remaining one kidney play a role in the homeostasis of blood amylase.

There is an interdependence between the submandibular, sublingual salivary glands and the remaining kidney after nephrectomy in maintaining pepsinogen homeostasis. From this we can conclude that the salivary glands seem to have “specialized” in maintaining enzyme homeostasis, if the parotid salivary gland is more involved in maintaining the constancy of

amylase and lipase, and the submandibular and sublingual salivary glands are more supportive of the constancy of pepsinogen in the blood.

From this we can conclude that the homeostasis of various enzymes reacts ambiguously to a decrease in the excretory function of the kidneys, i.e. The role of the kidneys in maintaining the homeostasis of various enzymes varies. The importance of the kidneys in maintaining enzymes is unequal; pepsinogen is in first place, amylase is in second place, and lipase is in last place. Therefore, when the excretory function of the kidneys is impaired, the content of pepsinogen in the blood increases most, and then amylase, while the content of lipase remains unchanged.

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