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SECRETION OF ENZYMES BY THE SALIVARY GLANDS UNDER CONDITIONS OF THEIR BASAL AND STIMULATED SECRETION

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Relevance of the issue. In recent years, probeless research methods have been increasingly used to study the functional state of the main digestive glands. One group of these methods takes into account the hydrolytic enzymes of the digestive glands in the blood and urine. This method is based on the fact that the main digestive glands, along with exocretion of the main amount of enzymes they synthesize, increte a certain amount into the blood and lymph [2], from where these enzymes are excreted by the renal and extrarenal pathways, including the salivary glands [3] .

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 in physiological conditions.

Methods and techniques for conducting experiments and observations: In chronic experiments on dogs, saliva was collected, its volume was taken into account, and hydrolytic enzymes were determined in it. In order to study the possibility of their receptor origin, the corresponding hydrolases in the blood were determined in parallel.

Chronic experiments were carried out on dogs with excreted ducts of the parotid, submandibular and sublingual salivary glands according to I.P. Pavlov in the following series.

In chronic experiments on animals, the enzyme-secreting activity of the salivary glands was studied under conditions of their basal and stimulated secretion. The experiments involved dogs with excreted salivary gland ducts.

After collecting basal secretion (5 minutes), salivation was stimulated by giving the animals meat-sugar powder (10 g), saliva collection continued for 5 minutes from the start of salivation. During the experiments, hydrolases of saliva and blood were taken into account.

Results and discussion: When stimulated by exogenous conditioned and unconditioned stimuli, the paired salivary glands of dogs secrete a small amount of saliva, the volume of which changes periodically. We also noted basal salivation of the parotid, submandibular and sublingual glands, which was insignificant in volume. Moreover, the salivation tension in the parotid gland is approximately 3 times less than in the submandibular and sublingual glands (the secretion of which was collected from their common duct and in the future these glands will be designated mixed for brevity).

The basal secretion of enzymes by these glands has significant differences not only due to the volume of salivation, but also the content of the recorded enzymes in saliva. Thus, the amylolytic

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activity of the saliva of the parotid glands was approximately 2 times higher than that of the mixed glands. The lipolytic activity of the basal secretion of these glands had less difference, but still the saliva of the mixed glands had a slightly higher lipase content due to the volume of salivation; the secretion of this enzyme was much higher in the mixed glands.

Pepsinogen in the basal secretion of the mixed glands was contained in a significantly (1.5 times) higher concentration than in the saliva of the parotid gland, and its release with the saliva of the latter was approximately 5 times lower than with mixed saliva.

The presented data indicate a low amylase content in the saliva of dogs, confirming the literature data. Moreover, under conditions of basal secretion, the saliva of the parotid glands may have higher amylolytic activity. With basal secretion, there are small differences in the lipolytic activity of saliva from different salivary glands. As for pepsinogen, its content is always higher in the saliva of the submandibular and sublingual glands. These data indicate a known "specificity" of the salivary glands in conditions of their minimal functional activity.

Since the time of classical Pavlovian studies, it has been known that volume and viscosity are largely determined by the dryness of the applied food irritants and their chemical composition. We used a food stimulus in the form of meat-sugar powder, which increases the volume of salivation, but the enzymatic activity of saliva decreases (compared to the corresponding indicators of basal secretion) for all enzymes taken into account, but their release per unit time was higher or remained unchanged. The content of pepsinogen in the saliva of this group of dogs was high and its excretion reached high values.

Taking into account the volume of secretion, we can conclude that the mixed glands, when stimulated by food stimuli, have more pronounced enzyme-secreting activity than the parotid glands. This applies not only to amylase, the synthesis of which can occur in the salivary glands itself, but also to other enzymes that are less specific to the salivary glands (lipase, pepsinogen).

In the physiology and experimental pathology of digestion there is a section that is theoretically developed less than many others. This is the physiology of endocretion of enzymes by the digestive glands [3]. In this problem, such key issues as the pathways and mechanisms of endocretion of enzymes by the digestive glands, the physiological significance of this phenomenon, and the mechanisms for ensuring enzyme homeostasis in the body remain unidentified, although its transformations have been noted in many pathological conditions, often far from the pathology of the digestive organs.

Suppliers of hydrolytic enzymes into the blood from among the digestive glands are the salivary, gastric, and pancreas. glands, liver and small intestine [2, 3].

The content of enzymes in the blood of experimental dogs is not the same. Amylase and pepsinogen are approximately equally contained in the blood, amounting to 16.6±1.1 and 15.7±1 units/ml per hour, respectively. The lipolytic activity of the blood is three times less than the previous enzymes and is 5.0±0.3 units/ml hour.

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Amylolytic activity has been detected in many tissues: small intestine, liver, kidneys, muscle, lungs, fallopian tubes and adipose tissue [1,2]. This, however, does not mean that they all synthesize and transport a significant amount of amylase into the blood and the main suppliers of α-amylase into the blood are the pancreas and salivary glands. According to many authors dealing with this issue, using different methods for differentiating P- and S-isoamylase from blood serum [1, 3], the share of amylolytic activity of pancreatic α-amylase is 30-40% [8], and according to some data - 13-17 % [9].

Blood lipase is mainly of pancreatic origin. The origin of serumlipase is also associated with the liver [4].

Blood pepsinogen is of gastric origin [2]. Research and clinical interest in pepsinogen in blood and urine has increased sharply since the 40-50s of the last century. However, to this day there are frequent publications on the determination of which enzymes of the digestive glands in the blood and urine are more informative about the morphofunctional state of the glands producing the corresponding enzymes, and which methods for determining them are more preferable [1, 5, 6, 7]. The problem of enzyme endocretion, of course, is relevant for all digestive glands.

We consider the high direct correlation between the secretion of enzymes by the salivary glands and their level in the blood as an argument in favor of the receptor origin of these enzymes in saliva. Taking this into account, we subjected the results obtained to a correlation analysis in parallel to the content of enzymes in the blood and saliva, as well as the secretion of this enzyme by the salivary glands.

The results obtained showed that amylolytic activity and its secretion by the salivary glands have a fairly high dependence on the amylase content in the blood. The correlation coefficients for amylase secretion by the salivary glands are high and more reliable than for their content in saliva. If we compare the correlative indicators of the parotid, submandibular and sublingual glands, they are approximately the same.

Positive correlation coefficients are observed between the content of lipase in the blood and its secretion by the salivary glands. These indicators for the parotid salivary glands are higher than for the submandibular and sublingual glands.

From this we can conclude that the hydrolytic enzymes in saliva - amylase, pepsinogen and lipase - are of a receptor nature. The severity of the secretion of enzymes by the salivary glands depends on their functional state; with stimulated salivation, the secretion of enzymes by the salivary glands becomes more dependent on their level in the blood.

Summarizing the data obtained, it is possible to draw the following conclusions:

1. Under conditions of basal secretion, the salivary glands of dogs secrete amylase, lipase, and pepsinogen. The amylolytic activity of the saliva of the parotid gland is higher than that of the submandibular and sublingual glands. The content and release of lipase and pepsinogen are higher in the saliva of the submandibular and sublingual glands than in the saliva of the parotid gland.

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2. Stimulation of salivation when feeding animals increases the secretion of enzymes by the salivary glands. There are individual differences in the enzymes secreted by different salivary glands, but the secretion of enzymes is usually higher in the submandibular and sublingual glands than in the parotid glands.

3. The content of hydrolytic enzymes in the blood is not the same - amylase and pepsinogen are contained in approximately the same quantities, and lipase is three times less than the previous enzymes.

4. There is a direct dependence of the content and secretion of enzymes by the salivary glands on their level in the blood. This dependence increases with stimulated salivation than with functional rest.

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