

Experimental Morphology of the Salivary Glands Mechanisms of the Appearance of Hyposalivation

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Abstract: A decrease in the functional activity of the salivary glands causes a violation of the functions of the oral fluid, the active components of which provide oral homeostasis, the integrity of the mucous membrane, periodontal and hard tissues of the teeth. Review of experimental models of hyposalivation in laboratory animals.

Introduction. The oral cavity is the first section of the food canal that comes into contact with food. In the oral cavity, food is crushed by teeth and wetted with saliva. Saliva washes the teeth and mucous membrane of the oral cavity and has a protective and trophic effect. The secretion of saliva (hyposalivation) is noted during infectious and febrile processes, during dehydration, under the influence of substances that turn off parasympathetic innervation (atropine, etc.), as well as when an inflammatory process occurs in the salivary glands (sialadenitis, infectious and mumps and submaxillitis). Hyposalivation complicates the act of chewing and swallowing, contributes to the occurrence of inflammatory processes in the oral mucosa and the penetration of infection into the salivary glands, as well as the development of dental pathology.

There are a sufficient number of methods for modeling various pathological processes in the salivary glands (purulent, aseptic, obstructive, post-traumatic, cystic), leading to a decrease in their function. All these methods are based on invasive damage to the salivary glands [4]. Of the known non-invasive methods, it is necessary to distinguish the method of toxic damage to the salivary glands, obtained by treating the oral mucosa of rats with a solution of methyl ester of methacrylic acid [5]. As a result, destructive changes in the large salivary glands and a decrease in salivation are noted.

Review. A group of researchers from Jerusalem (Schwartz-Arad et al., 1991) found that after the extirpation of one of the submandibular salivary glands, vicarious hypertrophy of the other develops in the paired gland. On the third day of the experiment, the number of acinar cells increases by 54%. Then it decreases to normal. On the contrary, by the 14th day of the experiment, the number of ductal cells increases, compared with the norm. First, the number of interlobular cells increases, and then in the second week, the number of cells of the exhausted ducts clearly increases. That is, there is a divergence of cellular behavior in the development of vicarious hypertrophy of the contralateral submandibular salivary gland. Even more visual data on the ability of the salivary glands to regenerate were obtained in conditions of pathology. Post-traumatic regeneration is always associated with damage (resection, thermal effects: laser or cryodestruction; pathogenic effects of chemicals). Therefore, any post-traumatic regeneration begins with inflammation, without which it is possible and cannot begin. That is, post-traumatic regeneration can be considered simultaneously as acute aseptic sialadenitis. Indeed, the regeneration of the parotid salivary gland of a guinea pig after damage to the gland tissue by a chemical substance (aminoquinolin, iv), which causes the formation of necrosis, is similar in time to resection. The peak of proliferation occurs 72-84 hours after exposure (Rao, Reddy, 1976). The administration of ethionine within a week leads to an increase in the index of labeled cells to 4.5% in the acinuses of the parotid salivary glands of the rat on the 4th day after the cessation of administration (Leeb, 1978). There are various deviations of salivation from the norm.

Doctors of Medical Sciences, Professors Syrac A. A. , Sirak S. Q. together with postgraduate student Elizarov M. A. , and didenko's assistant N. A. , conducted an experiment simulating hyposalivation on white laboratory rats. The purpose of the study was the operationalization of the experimental model of hyposalivation. Studies were conducted on white laboratory rats (40 animals), which were divided into 3 groups: 1st - intact animals (n = 10); 2nd group - treatment of the oral mucosa with 0.01% atropine solution for 15 days (n = 15); 3rd group - treatment of the oral mucosa with ethacryl for 15 days (n = 15). Atropine and etacryl (ACR-15) - a triple copolymer of methyl methacrylate, ethyl and methyl esters and methacrylic

acid were applied, without rubbing, to the oral mucosa of experimental animals 2 times a day. Saliva was taken under general anesthesia (Zoletil 50), animals were removed from the experiment by an overdose of ether. The secreted salivary glands (parotid, submandibular and sublingual) were weighed on torsion scales. Morphological changes were assessed by preparations stained with hematoxylin and eosin and by Masson. Differences at $p < 0.05$ were considered reliable. According to the results of the study, by the end of 15 days after the start of the experiment in animals of both experimental groups, the level of salivation was significantly lower than in intact animals. The time of the latent period - from the onset of deep anesthesia to the appearance of the first drop of saliva in intact animals was an average of 6 minutes 52 seconds; in animals with atropine applications - 14 minutes 10 seconds; after applications of ethacryl - 19 minutes 56 seconds. During the collection of saliva (30 minutes), the animals released the following Amount of saliva: 0.021 ± 0.002 ml/min (intact), 0.005 ± 0.001 ml/min (atropine, $p < 0.05$) and 0.013 ± 0.002 ml/min (etacryl, $p < 0.05$), respectively. As a result of morphological studies, the degeneration of part of the epitheliocytes was limited, accompanied by the destruction of the alveoli and the accumulation of cell decay products in the interalveolar program. This process was accompanied by exfoliation of cells in the light and obliteration of the latter. Obliteration of the lumens of large ducts was also determined as a result of the initial accumulation, and subsequent calcification of the secretion of the gland. Diffusely distributed epithelial cells of glandular structures with intensively basophilic cytoplasm and hypertrophied nucleolus were detected, the lumens of the ducts expanded due to filling them with a large amount of secretion.

Conclusions. Many pharmacological drugs affect the release of saliva: stimulate (pilocarpine, proserine, iodine preparations), inhibit (atropine). The results of morphological studies have shown a total decrease in the functional activity of epitheliocytes of glandular structures. In some places, an increase in the density of the alveolar structures of the gland with deformation of epitheliocytes was detected. Thus, applications on the oral mucosa of laboratory animals of the triple copolymer of methyl methacrylate contribute to atrophic changes in the salivary gland with impaired salivation, lead to destructive changes in the salivary glands with a reliable amount of their relative mass. After the atropine load, the study of salivary gland preparations showed an intense total increase in the functional activity of epitheliocytes of glandular structures, which was expressed by the presence in their cytoplasm of vacuoles performed secretion. The volume of cells as a result of this process increased significantly, the intercellular spaces narrowed. As a result, the relative mass near the ear and submandibular glands significantly increased.

References:

1. Pedersen A. M. L., Sørensen C. E., Proctor G. B., Carpenter G. H., Ekström J. Salivary secretion in health and disease. *J. Oral Rehab.* 2018;45(9).
2. Sánchez G. A., Miozza V., Delgado A., Busch L. Determination of salivary levels of mucin and amylase in chronic periodontitis patients. *J. Periodont. Res.* 2011;46(2).
3. Güncü G. N., Yilmaz D., Könen E., Gürsoy U. K. Salivary Antimicrobial Peptides in Early Detection of Periodontitis. *Front. Cell. Infect. Microbiol.* 2015.
4. Xiao F., Han M., Wang X., Gong X., Huang E. [et al.]. Animal models of Sjögren's syndrome: an update. *Clin. Experiment. Rheum.* 2019.
5. Garets V. I., Fedonyuk L. Ya., Shevchenko K. V. Structural features of the own plate of the mucous membrane of the gums of rats under the influence of methacrylate. *Morphology.* 2018.