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STUDYING OF PROTECTIVE FACTORS OF THE ORAL CAVITY

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Annotation: Antimicrobial peptides provide the first line of defense for oral tissues against the introduction of pathogens. Several groups of antimicrobial peptides have been found in the oral cavity, which have different origins and are active against bacteria, fungi and viruses, as well as having the properties of immunomodulators and chemoattractants. Antimicrobial peptides play a crucial role in maintaining oral health.

Keywords: protective factor, antimicrobial peptide, barrier, histatine Hst-5

RELEVANCE OF THE THEME: The microflora of the human oral cavity is extremely diverse and is normally represented by several hundred species of microorganisms. In periodontal diseases, as a rule, the quantitative ratio of microbes changes, and their species composition remains constant. This circumstance suggests that the cause of diseases of the tissues of the oral cavity is not the bacterial infection itself, but a violation of the adequate interaction of the macroorganism with the microflora. In this regard, researchers are particularly interested in the study of the protective systems of the oral cavity, in particular, the study of the characteristics of AMP (antimicrobial peptides).

PURPOSE OF THE RESEARCH: To study the protective factors of the oral cavity and the effect of certain drugs on its condition in various diseases (gingivitis, pulpitis, etc.).

MATERIALS AND METHODS OF THE RESEARCH

For the study, 75 volunteer students of secondary schools № 2 (37) and № 1 (38) in Andijan aged 9 to 13 years (grades 4-7) were selected. Among them were students who had pulpitis (25) and gingivitis (37). For the study, the use of Hst-5 histatin as an antifungal agent in the composition of therapeutic gels and pastes, artificial saliva and acrylic removable dentures was proposed. The effect of histatin on the development of pulpitis, gingivitis and other diseases of the oral cavity was investigated, and the results of the study were systematically evaluated. In our study, we used gels with histatins to prevent the development of gingivitis and plaque.

It should be noted that the oral cavity is the main gateway for infection to enter the human body. With inhaled air and food, a huge number of different microorganisms, including pathogens, are deposited on the mucous membrane. At the same time, the vast majority of pathogens are successfully and very quickly neutralized already at the time of penetration, which indicates a powerful system of antibacterial protection in the human oral cavity. This protection is multifactorial and multi-component. First, the oral mucosa creates a physical barrier to the introduction of microorganisms. Secondly, when microbes enter, epithelial cells secrete cytokines and secretory immunoglobulin A, which activates the influx of neutrophils into the gingival sulcus. Thirdly, the most important antimicrobial functions are performed by the salivary glands.

In saliva, many factors of nonspecific and specific protection against pathogens were found: mucins, antibacterial peptides, enzymes, antibodies, proteins of the complement system, etc.

Systemic disorders in the absence of one of the AMPs in some hereditary pathologies are accompanied by the development of diseases of the tissues of the oral cavity. Thus, Papillon-

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Lefebvre syndrome, characterized by early periodontitis and multiple dental caries, occurs due to a mutation in the cathepsin C gene. In Kostmann's disease (hereditary neutropenia), the production of α-defensins by neutrophils decreases. This disease is accompanied by the development of periodontitis at an early age. Scientists have shown that the periodontal condition does not improve even after the introduction of neutrophils during drug treatment. Scientists suggest that the damage to the tissues of the oral cavity in this pathology is associated with a deficiency of α-defensins and cathelicidin LL-37.

RESULTS

According to the results of the study, the positive effect of therapeutic gels and pastes in the development of gingivitis and pulpitis was revealed. In 80% of volunteers with gingivitis, pulpitis and other diseases of the oral cavity, its condition improved and the symptoms of these diseases gradually disappeared. These funds were used for the prevention of diseases and were recognized as successful. In 93% of volunteers, an improvement in the protective factors of the oral cavity was found when assessing its condition. Parents were offered the use of these drugs in identifying symptoms and preventing diseases of the oral cavity (gingivitis, pulpitis, etc.).

DISCUSSION

Among the protective factors of the oral cavity, antimicrobial peptides (AMP) occupy a special place. These are small molecules containing 12 to 50 amino acid residues that can kill microbial cells. Most currently known AMPs have a broad spectrum of antimicrobial activity, acting against Gram-positive and Gram-negative bacteria, as well as yeast and some viruses. In addition, convincing evidence has been obtained that a number of AMPs have anticarcinogenic activity, as well as immunomodulators. At present, it has become clear that in the oral cavity, AMPs not only destroy pathogenic microorganisms, but also participate in maintaining normal microflora. Despite the differences in the primary structure, all AMPs share a number of common characteristics. Most AMPs are amphiphilic molecules: they contain positively charged amino acid residues of arginine, lysine or histidine, as well as more than 50% of non-polar amino acids. Their presence allows AMP to interact with the lipid bilayer of the plasma membrane of pathogens and disrupt its structure and integrity. In addition, many AMPs affect various intracellular processes. The following types of AMP were found in the oral cavity: α- and β-defensins, histatins, adrenomedullin and human cathelicidins, the sources of which are the oral mucosa, salivary glands and neutrophils. The greatest amount of AMP is produced in the oral mucosa, since the epithelium actively responds to signals from the environment, to infection, integrating innate and acquired immune responses. The β-defensins, cathelicidin, adrenomedullin, as well as the antimicrobial protein calprotectin secreted by the mucous membrane complement the protective function of the antimicrobial factors of the salivary glands, lysozyme, immunoglobulins and histatins.

INFERENCE: Histatin Hst-5 is an ideal candidate as a component of antifungal drugs for the treatment of oral diseases: on the one hand, it has an activity comparable to synthetic azoles and polyene antimycotics, and on the other hand, it is a natural component of human saliva, which reduces the risk of adverse reactions to its use. In addition, the difference between the mechanism of action of histatins and antimycotics used in the clinic makes their use promising in the development of resistance of mycospores to medical drugs. Due to the fact that oral AMPs are diverse and act on microorganisms very quickly, the likelihood of developing resistance to them is quite small. This gives hope that AMPs can be used to produce antimicrobials, resistance to which develops very slowly. Therefore, it is proposed to use AMPs with antiviral and antifungal activity in immunocompromised individuals, including AIDS patients, for the prevention and treatment of candidiasis and herpetic gingivostomatitis. The use of AMP for the prevention and treatment of gingivitis and periodontitis seems promising. There is speculation that the use of AMP can stop the

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progression of these diseases. To this end, it is proposed to use of AMP as part of gels, rinses or applications for topical use.

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