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*Usage of hyaluronic acid in the treatment of pathological state  
of epithelium of an oral cavity*

The human body is equipped with many natural mechanisms responsible for immunisation. The development of medical science and molecular biology has led to the knowledge of many processes taking place in various tissues. The same is true for substances, which are of a fundamental importance to the path of these processes. It is thanks to these methods of genetic engineering that we now can recognize, isolate, and synthesise the substances that are identical with the natural ones. These substances can now be used in treatment.

One of these substances is hyaluronic acid (HA). HA is a natural mucopolysaccharide belonging to glycosaminoglicans. HA is one of the matrix elements of the basic connective tissue. Its structure consists of disaccharides – glucuronic acid and N-acetylglucosamine, which are built in a long, undivided chain with branches reaching up to 2.5  $\mu\text{m}$ . This chain creates a kind of skeleton, to which, through the specific binding proteins, proteoglycan macromolecules are attached. Through this structure the molecules called aggregates of proteoglycans are created. They fill a space of intracellular matrix. They bind a large quantity of water, creating out of the basic matrix, a kind of porous and hydrated gel. In this gel cells and fibres are clinging.

This hydrated liquid structure allows for large quantities of hydrophylic cells and macrocells to be transported. This also creates an adequate environment for the movement of cells. This is fundamental with inflammatory, angiogenesis, and cell regeneration processes.

HA plays a significant role in tissue rehydration and the transfer of constituents into an external environment, which is capable of absorbing water in quantities 50 times greater than its dry weight. HA has the ability to react with other particles, e.g.: collagen, which allows the creation of a functional barrier against germs and toxic substances. This protects the tissues from rapid continuation of inflammation and oedema. HA degradation through bacterial hyaluronidases leads to expansion of the inflammation process (5, 6).

HA is an important factor in the regulation of angiogenesis, in particular growth and migration of vascular endothelial cells (4,7). This plays a significant role in processes of regeneration and wound healing.

This action has an influence on fibroblasts migration and the process of fibrogenesis, thus the healing process is faster (1). This movement happens through a temporary binding of glycoprotein of the cells with HA or osteopontine of the intracellular matrix.

Tissues with a high level of HA (including fetal tissue), heal faster and without scarring. Through clinical experience it has been noticed that wound healing is accelerated and scarring is minimized, with the usage of HA (3). HA is present in connective tissue of the whole body including the oral mucous membrane and periodontium.

Large quantities of HA are aggregated in the outer layers of healthy gums. There, it participates in creating an antibacterial barrier and contributes to the structural and functional integrity of periodontal ligaments.

With periodontal diseases and other tissue traumas (inflammatory conditions, gingival pockets, wounds, etc.) the tissue requirement for HA increases considerably (by up to some 200% compared with the basal values) thus demonstrating its specific role in regulating cell turnover and optimizing local tissue regeneration. The deficiency in HA that arises under these conditions prevents the tissue from :

- restoring the normal free water balance (as a consequence of which swelling and compression cause an increase in pain),
- activating the migration of fibrocytes and as a consequence, healing is slower.

Therefore, a lack of suitable HA is responsible for the continuation of the inflammatory condition.

The study of the human body has proved that the availability of exogenous HA, with similar structure to the one naturally occurring, facilitates the process of wound healing (2). Thanks to the wide spectrum of the biological activity of HA, a usage in dentistry has been established as a factor with haemostatic properties, working not only against oedema, inflammation, but also supporting regeneration of oral cavity tissue.

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## SUMMARY

This article contains basic information on the chemical structure, properties and functions of hyaluronic acid in the human body. HA is a natural mucopolysaccharide which occurs in the basic connective tissue of the human body. HA plays a significant role in processes of angiogenesis and the tissue regeneration. Through clinical experience it has been noticed that wound healing is accelerated and scarring is minimized, with the usage of HA. The usage of HA in dentistry is indicated in inflammatory conditions and other tissue trauma.

Wykorzystanie kwasu hialuronowego w leczeniu stanów patologicznych  
błony śluzowej jamy ustnej

W pracy poglądowej zawarto podstawowe informacje na temat struktury chemicznej, właściwości i funkcji kwasu hialuronowego w ludzkim organizmie. Kwas hialuronowy jest mukopolisacharydem naturalnie występującym w istocie podstawowej tkanki łącznej organizmu czło-

wieka. Ma on duże znaczenie w procesie angiogenezy i regeneracji tkanek. Klinicznie stwierdzono przyspieszenie gojenia ran i zmniejszenie powstawania blizn podczas stosowania kwasu hialuronowego. Kwas ten znalazł zastosowanie w stomatologii w takich sytuacjach, jak stany zapalne i urazy tkanek jamy ustnej.