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# Using of Hyaluronic Acid as an Active Substance

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**Abstract:** In recent years, medicine, pharmacy and cosmetology have taken a long step in the use of high-molecular compounds) as the main active, as well as auxiliary, corrective substances and fillers. One of the most popular IUDs in medicine and cosmetology at the moment is hyaluronic acid (HA), which has found its application in surgery as a substitute for synovial fluid in joints as a lubricating and chondroprotective component; dermatology. As a remodeling agent for the correction of age-related deformities of the skin of the face, especially the skin around the eyes; gynecology, as an anti-adhesive agent for intravaginal splices.

**Keywords:** Hyaluronic Acid, Active Substance.

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At the beginning, a polysaccharide isolated from the vitreous body of a bull's eye (from Greek. haloes — vitreous and English uranic acid - uranic acid), with a sufficiently high molecular weight of 450 g / moll and does not contain sulfate groups. Further studies have shown that the polysaccharide is represented by fragments of disaccharide, which consists of D-glucuronic acid and N-acetylated glucosamine.

Scientific interest in hyaluronic acid, its production, isolation and application has been increasing. To date, more than 15,000 articles have been published in foreign and domestic journals. The result of the research was to obtain reliable data on the release of hyaluronic acid from various mammalian organs, as well as from cultures of various cells (hemolytic streptococcus, Streptomyces's, corynebacteria). Some data were of industrial importance, for example, the extraction of hyaluronic acid from the combs of chickens is still used today. For half a century, the range of application of hyaluronic has also increased (surgery, cosmetology, traumatology and orthopedics, dermatology, etc.), as well as the latest dosage forms based on its polymer structure have been created [36]. All this was not possible without establishing the biological role of the biopolymer, which, as it turned out, served as a component of the cell matrix necessary for the normal implementation of metabolic processes of tissue proliferation and differentiation. Thus, the process of hyaluronic metabolism in the human body was studied. It became known that about 5 g of hyaluronic acid is broken down and synthesized per day, and its content in the human body is about 0.007%, which is about 15 g in a woman weighing 70 kg.

Currently, the mechanisms of action of hyaluronic acids, their role in the human body and alternative ways of use are being investigated in the world. However, the issues of microbial synthesis of hyaluronic are particularly relevant, which is confirmed by the price per kilogram of purified product, which is about 700,000 tons. So, over the past 20 years, more than 50 patents have been issued in the world, which indicates a high interest in the problem

under consideration.

The effect of hyaluronic acid on collagen fibers. Hyaluronate is the main component of the intercellular matrix of various mammalian tissues, but it is unevenly distributed. For example, the maximum concentration of hyaluronic acid in the human body is observed in the synovial fluid, the umbilical cord, the vitreous body of the eye and the skin.

In the skin, glycosaminoglycan is contained in the interstitial space and performs a number of functions: retains water, thereby maintaining the natural elasticity and volume of the skin, which is so important in inflammatory reactions; participates in the processes of proliferation and differentiation of keratinocytes. Furthermore, immunocompetent cells, thereby plays a role in maintaining the normal process of growth and regeneration of the skin and the implementation of local immunity, strengthens collagen fibers; serves as a natural barrier protecting against the action of free radicals, pathogenic agents and chemicals. If you try to explain to a person far from biochemistry in simple words what hyaluronic acid is, it's easier to say this: it is a vital sugar for our body. From a scientific point of view, hyaluronic acid (hyaluronic acid, hyaluronic acid, hyaluronate) is a natural polymer, a polysaccharide consisting of monosaccharides. It is related to cellulose, xylene and, for example, starch. All of the above scientists refer to carbohydrates. The use of hyaluronate and its salts in cosmetology is based on the ability of hyaluronate-containing drugs to have a local anti-inflammatory, wound healing and immunomodulatory effect. The ability to retain water in the intercellular space is the basis of the mechanism of correction of age-related skin deformities. Nowadays, injections of 1-3% aqueous solution of hyaluronic acid for intra- or subcutaneous administration have become very popular in cosmetology practice. The introduction of hyaluronic acid into the epithelium in the form of an aqueous gel increases the elasticity and elasticity of tissues, thereby giving the skin its former qualities and beauty. However, high molecular weight hyaluronate has received the widest application in the manufacture of various combined creams and gels for external use. This type of product has the same focus as injections - to restore the rheological properties of the skin, thereby preventing the formation of wrinkles, pimples, etc.

Hyaluronic acid has become one of the most effective and popular moisturizing ingredients. Manufacturers rarely indicate its content in cosmetics, but usually it does not exceed 2%. Sometimes you can find products that claim from 75 to 100% hyaluronic acid, but on closer examination, it turns out that the composition is not pure hyaluronic acid, but a mixture of water, hyaluronic acid and various extracts.

For effective hydration, it is not at all required that the percentage of hyaluronic acid in the cream or serum is off the scale. It is much more important to apply the product correctly. Hyaluronic acid moisturizes the skin because it attracts and retains water in it, but this water must come from somewhere. Experts warn that in a dry climate, when applied to a dry face, the hyaluronic acid will begin to pull water from deeper layers of the skin to the surface and thereby produce an effect exactly the opposite of what is expected. This is the main nuance of using products with hyaluronic acid. It either needs to be dissolved in a large amount of water (for example, in the form of tonics and lotions), or it needs to be applied to wet skin (this applies to serums and creams). Logically, in a humid climate, hyaluronic acid works great on its own.

In this article we will talk about successful products with hyaluronic acid for different types, needs of the skin— from tonics and serums to creams, and patches. The only format that we intentionally ignore is washbasins. The fact is that the moisturizing ingredients in cosmetics work only when they are on the skin for a long time, and cleansers are usually washed off almost immediately.

Hyaluronic acid has properties that make it extremely suitable for use as dermal filler: it is

able to bind a large amount of water, is present in the skin in natural conditions and is not prone to cause undesirable reactions. Fillers (Fill — from English — to fill) are injectable skin fillers that are used in cosmetology to reduce the depth of wrinkles, nasolabial folds and creases in the corners of the mouth. Fillers are also used to add extra volume to the face in the area of cheekbones, cheeks and lips. They are one of the most plastic materials for injection contouring, which determine not only the ease of their introduction, but also the uniform distribution.

In conclusion, low molecular weight hyaluronic acid has a microscopic size of molecules; therefore it penetrates deep into the skin. The second factor is the active substance. The higher its concentration, the more effective the cream will be. From a scientific point of view, the transport of substances through the membrane is carried out by diffusion from an area with a high concentration to an area with a lower concentration, that is, low-molecular hyaluronic acid naturally penetrates the skin along a concentration gradient. Hyaluronic acid is a product of animal origin that has truly amazing properties and the highest range of applications both now and in the future of its further use. Therefore, it is not surprising that its properties are studied all over the world.

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