

Hyaluronic Acid



Hyaluronic Acid Gel



Hyaluronic Acid Has Moisturizing & Anti-Aging Effects

Hyaluronic acid (HA), or also called hyaluronan, is a naturally occurring large sugar molecule (glycosaminoglycan) that consists of subunits of 2 sugars (glucosamine and glucuronic acid). It is present as filling material in most human and animal connective tissues especially the skin where it has a protective, structure-stabilizing and shock-absorbing function. Besides its major role in cosmetics as humectant, HA is also used in a number of other clinical applications due to the unique viscoelastic nature of HA along with its biocompatibility and non-immunogenicity. HA has been used as a supplementation of joint fluid in arthritis, as a surgical aid in eye surgery, as an injectable gel that acts as a filler to remove wrinkles, and as compound to facilitate the healing and regeneration of surgical wounds. More recently, HA has been investigated as a drug delivery agent for various routes of administration, including ophthalmic, nasal, pulmonary, parenteral and topical.

Hyaluronic Acid in the Skin

HA is found in almost all vertebrate organs, but most abundantly in the soft connective tissues of the skin. The estimated total amount of HA in human skin has been found to be 5g, about a third of the total amount of HA believed to be present within the entire human body. Interestingly, HA is not only found in the deeper layers of the skin where connective tissue is predominant, but also in the top layers of the skin (epidermis) around the horny cells (keratinocytes). In the skin, HA is bound to proteins together with other glycosaminoglycans, such as dermatan sulphate, chondroitin sulphate and keratin sulphate. As its name implies, aggrecan is composed of very large proteoglycan aggregates. The most important property of these molecules is their strong ability to bind to water. Consequently,

HA becomes hydrated to such an extent that a gel-like system is formed. Hence, the main function of HA is to aid in the body's water maintenance providing essential moisture for body processes and molecular transport. However, as we age, the HA levels in the skin decrease, contributing to skin aging and formation of wrinkles. For example, at fifty years of age the amount of HA in the skin is only about 50%.

Production of Hyaluronic Acid

HA is not only present in vertebrates but occurs but also in bacteria as a component of the cell coat which is why HA is primarily produced biotechnologically through microbial fermentation with the aid of yeast extract and peptones and serums. It is rarely isolated from animal sources, including the synovial fluid, umbilical cord, skin, and rooster comb.

Benefits of Hyaluronic Acid

- Replenishes levels of skin HA
- Hydrates dry skin
- Makes skins soft & smooth
- Reduces fine lines & wrinkles
- May promotes hair growth
- Restores hair color
- Reconstructs connective tissue

Hyaluronic Acid in Cosmetics

HA is being extensively utilized in cosmetic products because of its ability to penetrate the skin and its unique moisturizing and viscoelastic properties and excellent biocompatibility. As a consequence, the most popular indications of cosmetic HA products are to moisturize the skin and/or combat signs of aging. In addition, HA has been suggested to promote hair growth and restore hair color. Due to its radical scavenging properties, HA has also been suggested to have some antioxidant effects and are thus added to sunscreens and/or after-sun products. Since HA is a water-soluble compound it can be easily incorporated into cosmetic formulas. Typically, it is used at concentrations of 0.01 to 2.0 %.

High-molecular weight HA does not readily dissolve in water as it binds water very quickly. Thus, HA needs to be carefully sprinkled into the water under constant high-speed stirring preferably with a hand mixer or vortex mixer. The mixture starts then thickening quickly and becomes a gel. At that point no additional HA can be added as there is no water left for HA to be dissolved in. Adding more HA would only form lumps.

Low-Molecular Weight Hyaluronic Acid

HA is also available in low-molecular weight form, meaning that the large HA molecule has been enzymatically cleaved into smaller fractions. Such smaller molecules can better penetrate the skin providing smoothing and softening effects to the skin. Also, low-molecular weight HA has been found to provide excellent anti-irritating and regenerating effects once absorbed by skin.

Low-molecular weight HA does not form gels when added to water but dissolves quickly. It is typically added to the water-phase of emulsions at a concentration between 5% to 10%.

Hyaluronic Acid as Wrinkle Fillers

Either in a stabilized form or in combination with other polymers, HA is also used as injectable dermal wrinkle fillers in cosmetic surgery. Clinical studies have shown that injection of such products into the dermis can reduce facial lines and wrinkles in the long term with fewer side effects and better tolerability as compared to collagen.