LUBRINAT® PRODUCT COMPOSITION

Components	Function
Sodium Hyaluronate	Moisturizer
Propylene Glycol	Moisturizer
Natrosol 250H	Gelling
Sodium lactate of alkalizing	Agent solution
Sodium benzoate	Preservative
Lactic acid acidifying	Agent
Cremophor EL	Hydration Support
Methylparaben	Preservative
Deionized Water	Aqueous vehicle

HYALURONIC ACID MOLECULE

Hyaluronic acid has the capacity to hold water up to 1000 times its volume. Name The hyaluronic acid derivative term uronic more acid hyaloid (vitreous). The term hyaloid accurately describes its transparent on glass appearance (YAMADA and Kawasaki, 2005). Hyaluronic acid is the most abundant glycosaminoglycan present in the extracellular matrix that constitutes the dermis, sulfated and not covalently bound to the protein is the only glycosaminoglycan not limited to animal tissue. by fibroblasts, an enzyme linked plasma membrane (hyaluronic acid synthetase), which is secreted directly into the extracellular medium is mainly synthesized. Due to its exceptional physical properties, hyaluronic acid plays a dominant role in the structure and organization of the dermis and helps ensure flexibility and firmness (rocquet and Reynaud, 2008).

Many inflammatory mediators and growth factors activate this acid synthesis and signal transduction it appears to involve protein kinase (Kim et al., 2006). According to Kim et al. (2006), hyaluronic acid occurs in all vertebrate tissues and is present in body fluids in varying amounts and concentrations in the connective tissue and the lowest concentrations in blood. In the skin, the hyaluronic acid is hyaluronic acid primary reservoir in the body, over 50% of the total.

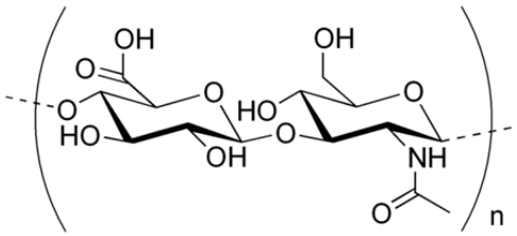
According Vazquez et al. (2010), hyaluronic acid has biological properties such as lubricity, viscoelasticity, the water holding capacity and biocompatibility.

Hyaluronic acid, according to Mao et al. (2003), can modulate the secretion of growth factor and cytokine inhibiting proteinase hydrolysis and influence various

cellular functions such as adhesion, growth, migration, proliferation and differentiation. It has antigenicity and does not induce inflammatory or allergic reaction.

It is applied topically, hyaluronic acid, according Harvima et al. (2006), it is not retained as a hydrophilic deposit on the skin, but instead, is actively absorbed from the surface of the skin in the dermis. Hyaluronic acid may freeze the water in the tissues and thus change the dermal volume and compressibility.

It is confirmed that Mao et al. (2003) reported, hyaluronic acid may also influence cell proliferation, differentiation and tissue repair. Changes in the availability and the synthesis of hyaluronic acid can be observed with aging, wound healing and degenerative diseases (Juhlin, 1997). Brown & Jones (2005) reported the striking movement of hyaluronic acid in keratin, epidermis and dermal layers of mice and human skin, apparently being absorbed rapidly from the skin surface and skin. There are two possible factors that may be involved in this behavior. First, the presence of hyaluronic acid receptors in the underlying skin can direct the location of hyaluronic acid applied. Second, the specific structure of hyaluronic acid hydrate and the presence of a hydrophobic region membranes may allow absorption of macromolecules. And bulky predominant extracellular matrix molecule according to Kim et al. (2006), hyaluronic acid improves tissue regeneration, where the rapid proliferation and repair occurs. Its water holding



capacity suggests that hyaluronic acid may play an important role in maintaining the extracellular space, facilitating the transport of ions, solutes, nutrient and preserve tissue

hydration. However, Kim et al. reports that hyaluronic acid content decreases with age, which may contribute to the formation of wrinkles and decreased skin elasticity. Kaya et al. (2006) observed in studies that topical application of hyaluronic acid has the ability to penetrate the epidermis and inducing the proliferation of keratinocytes, resulting in densification of human skin and induce the proliferation of cells inside the epidermal compartments and skin. And more correct, both fibroblasts and endothelial cells also proliferate in response to hyaluronic acid, providing a possible explanation for the deposition of collagen and dermal

angiogenesis, respectively, observed in human skin by topical application of hyaluronic acid.

The most important property of hyaluronic acid molecule, according to Brown and Jones (2005), is its ability to bind water, which induce proteoglycan become hydrated form such as a gel system. These aggregates of proteoglycans networks - hyaluronic acid due to the chemical characteristics of formations gels lead to a higher viscoelasticity in connection with only hyaluronic acid networks.

John & Prince (2009) discloses that hyaluronic acid plays a role as a space filling, shock absorption lubrication and modulation of inflammatory cells and free radicals. Since this is highly hydrophilic, biochemically water retains its hydrogen bonding that occurs between the adjacent carboxylic groups and groups N - acetyl, insofar as maintaining up to 1000 times its weight in water.

Importantly, there were no observed adverse effects caused by logs hyaluronic acid, except for mild allergic reactions caused by impurities of the same in all studies.

References

- BROWN, M.B.; JONES, S.A. Hyaluronic acid: a unique topical vehicle for the localized delivery of drugs to the skin. European Academy of Dermatology and Venereology (JEADV), v.19, p.308–318, 2005.
- HARVIMA, I.T. et al. Hyaluronic acid inhibits the adherence and growth of monolayer keratinocytes but does not affect the growth of keratinocyte epithelium. Arch Dermatol Res, v.298, n.5, p.207–219, 2006.
- JOHN, H.E.; PRINCE, R.D. Perspectives in the selection of hyaluronic acid fillers for facial wrinkles and aging skin. Patient Preference and Adherence, v.3, p.225-230, 2009.
- JUHLIN, L. Hyaluronan in skin. Journal of Internal Medicine, v.242, n.1, p.61–66, 1997.
- KAYA, G. et al. Hyaluronate Fragments Reverse Skin Atrophy by a CD44-Dependent Mechanism. PLoS Med, v.3, n.12, p.2291-2303, 2006.
- KIM, S.H. et al. The effects of Musk T on peroxisome proliferator-activated receptor [PPAR]-α activation, epidermal skin homeostasis and dermal hyaluronic acid synthesis. Arch Dermatol Res, v.298, n.6, p.273– 282, 2006.
- MAO, J. et al. Effects of hyaluronic acid-chitosan-gelatin complex on the apoptosis and cell cycle of L929 cells. Chinese Science Bulletin, v.48, n.17, p.1807-1810, 2003.
- ROCQUET, C.; REYNAUD, R. RenovHyal, a Patented Anti-Ageing Cosmetic Ingredient. Cosmetic Science Technology, p.112-129, 2008.
- VÁZQUEZ, J.A. et al. RHyaluronic acid production by Streptococcus zooepidemicus in marine by-products media from mussel processing wastewaters and tuna peptone viscera. Microbial Cell Factories, v.9, n.46, p.1-10, 2010.
- YAMADA, T.; KAWASAKI, T. Microbial synthesis of hyaluronan and chitin: New approaches – Review. Journal of Bioscience and Bioengineering, v.99, n.6, p.521-528, 2005.