

## **ENCAPSULATED HYALURONIC ACID: *An Essential Nutrient for Ageless Skin and the Reversal of Wrinkles***

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Hyaluronic acid (H.A.) is one of the least understood, and least appreciated topical agents in the skin care world. The truth is, however, that this simple little molecule factors significantly into the ability of the body to slow and reverse the formation of crow's feet, facial fine lines and shallow wrinkles. In a sea of skin care products, most of which have never been properly tested in clinical trials to substantiate their true effectiveness, hyaluronic acid stands out as one of the few natural substances that is proven in clinical trials to forestall and reverse the aging process, enabling users to often reverse the appearance of facial aging by 5-7 years in many cases. As such, skin care professionals should have a strong working knowledge of how hyaluronic acid works in the skin and how to identify a topical hyaluronic acid product that meets the criteria as a product that will reverse crow's feet, fine lines and shallow wrinkles in their clients.

### **WHAT IS H.A ?**

Hyaluronic acid is composed of a repeating chain of two sugar molecules attached together (known as a disaccharide). The first sugar molecule or monosaccharide is uronic acid and the second monosaccharide is N-acetylglucosamine. Hyaluronic acid, then, is a repeating chain of these two monosaccharides attached together, forming a disaccharide. In the human body, skin cells typically make hyaluronic acid chain lengths consisting of between 1,000 and 10,000 repeating disaccharide units (uronic acid attached to N-acetylglucosamine). A natural substance, H.A. is produced by skin cells throughout your lifetime and is found in great abundance in young skin (both the epidermis and dermis). It functions to keep skin youthful, supple, smooth, hydrated and toned and also maximizes the ability of skin to hold moisture within skin cells.

Anti-aging experts classify hyaluronic acid as a conditionally-essential skin nutrient, which means that when we are young, our skin cells make sufficient amounts of it, but the synthesis of H.A. declines markedly as we age. A natural humectant, H.A. can best be described as an unbelievably thirsty little sponge: it holds up to 1,000 times its weight in water molecules within the skin layers. If you ever wondered why babies have such soft, hydrated, supple skin, it's because their skin is super-enriched with hyaluronic acid, which allows the skin to hold copious amounts of water, keeping it supple, smooth, resilient and wrinkle-free.

### **H.A. declines as we age, causing the skin to shrivel up and wrinkle**

We begin to produce H.A. at a great rate before we are born. As I alluded to, the best example of this high level of H.A. synthesis and concentration within the skin is seen in the skin of a baby. You know what I'm talking about. It's the skin you'd love to have - soft, full, smooth and supple. Sadly, it's all down hill from there. During the aging process, skin cells lose their ability to produce optimal amounts of H.A. This significantly contributes to skin aging, in that it leads to skin dehydration from the inside out, promotes thinning of the skin, facilitates wrinkle development, as well as fine lines and crow's feet, and makes the skin feel drier. By age 50, it's estimated that we produce less than half of the H.A. we did in our youth. The decline in H.A. production that occurs as we age is a large reason for the decreased suppleness, reduced elasticity and loss of skin tone, and skin thinning, we experience over time.

The bottom line is, to keep the skin in great condition we need to feed our skin H.A. everyday from about the age of 20.

## **What is the function of H.A. in the Skin?**

You know what H.A. is, and where it's found. Let's delve into the details on how it can prevent and reverse wrinkle development and examine its other crucial roles in skin physiology. Under ideal conditions, H.A. is found in all the layers of the epidermis and the dermis. It actually resides between skin cells and forms part of the cement substance that holds cells together, very similar to how mortar holds the bricks together in the structure of a house. The difference is that H.A. doesn't just provide a structural support role within the skin (although it does this, too), but rather acts to hold moisture within the skin, plumping it up to prevent the skin from shriveling up, which in turn, reduces and reverses the formation of wrinkles. Also, the H.A. present on the surface of the skin acts as nature's most effective moisturizer. After the first application, most clients report that the surface of the skin feels smoother and silkier than they experienced prior to H.A. use.

H.A. is also the medium through which epidermal cells must pass as they work their way up (or migrate) to the skin's surface and take their place on the front line. In the process, H.A. provides developing skin cells with nutrients that are passing through and directly supports their metabolism, growth and maturation. And H.A. is also a powerful skin antioxidant, helping to minimize free radical damage from UV-light, which also causes wrinkles, accelerated skin aging as well as skin cancer.

## **Replenishing H.A. in the skin to slow and reverse wrinkles**

As someone with a masters degree in science, with specialties in nutrition and biology, and a fellow of the Academy of Anti-Aging Research (Pasadena, CA), I wish I could tell you that the oral ingestion of hyaluronic acid supplements could replenish the skin with the H.A. it no longer produces beginning at age 20. However, that would be grossly misleading. The truth is that hyaluronic acid taken orally has not been shown to benefit the skin in any way. Skin cells simply have not been shown to extract hyaluronic acid from the bloodstream (other tissues do, such as joint cartilage tissue, but the skin does not). The only reliable way to replenish the skin with the H.A. it no longer makes for itself is by the topical application of an encapsulated form of H.A., that contains varying chain lengths of the basic disaccharide unit (uronic acid attached to N-acetylglucosamine)

It's unfortunate that your skin makes less and less H.A. as we age, but the good news is that you can replenish your skin H.A. levels back to more youthful concentrations by topically applying a proven form of H.A. serum every morning and evening.

The key to making H.A. work to the best of its ability is how it is delivered to the skin's surface, so it can most effectively be distributed through to all the layers. In its natural form, hyaluronic acid is not absorbed very well by the skin and it does not penetrate to the deeper skin layers upon topical application. This is because it is too large a molecule to penetrate through the skin. Also, there are other properties that restrict its absorption.

However, research carried out in recent years has led to the production of an encapsulated form of H.A. that is able to penetrate through all the skin layers and replenish each of the layers of the epidermis and dermis with hyaluronic acid. It requires the H.A. to be encapsulated or surrounded by a special delivery agent, known as a second generation liposome. Studies continue to show that this encapsulated form of ultra-pure H.A. is the most reliable and proven method to distribute the H.A. throughout all layers of the skin.

Using this method the H.A. is delivered to the skin's surface through the carrier agent mentioned above. At the same time this form of H.A. contains a wide range of "chain lengths," some large, some medium and some small. Being too big to penetrate the skin to any real depth, the larger chain lengths of H.A. remain at or near the surface. They begin to trap water in this area of the skin, hydrating the superficial layers and producing instant smoothness to the skin's surface.

Meanwhile, medium and shorter chain lengths of H.A. begin to work their way down to the lower

levels of the skin that the larger chains cannot reach, and begin the hydration process in these deeper layers of the epidermis and the dermis. This process enables H.A. to give the surface of the skin a smooth, attractive appearance, while enabling the deeper layers of the skin to trap water molecules, plumping up the skin, which reverses wrinkles, and results in a more supple, elastic and toned look. Thus, the only effective way to replenish the skin with H.A. is through the use of an encapsulated H.A. that contains varying chain lengths of the basic disaccharide unit, mentioned above.

With continued use, this ultra-pure, encapsulated form of H.A. has shown an ability to reverse fine lines and crow's feet wrinkles in clinical trials and experimental studies. These results are often seen within the first two months of daily use. Dating back to 1998, studies were first carried out on hairless mice to test the penetration ability of encapsulated hyaluronic acid. After these studies proved successful an anti-aging placebo-controlled study was performed on healthy human volunteers, which demonstrated that this encapsulated form of H.A. was capable of diminishing wrinkles, preventing wrinkles from forming, improving skin elasticity and restoring the structure and organization of the collagen protein within the dermis. This large clinical trial employed the use of before and after silicone impressions of facial wrinkles that were assessed for length and depth by computer analysis. After 56 days of continuous use there was a significant reduction in the length and depth of facial wrinkles (especially around the eyes) in the group using the encapsulated H.A. twice daily, compared to the placebo group, as confirmed by computer analysis. Simply stated, encapsulated H.A. is proven to replenish the skin with the missing H.A. it requires after age 20 in order to efficiently hold water in the skin and thereby, plump the skin back up to its more natural and youthful appearance, while providing other structural and physiological benefits to skin structure and skin health.

### **H.A. also increases collagen synthesis**

Hyaluronic acid has been used for many years as a substance that promotes wound healing. When H.A. enters your skin, it works to invigorate fibroblasts, which are living cells in the body that play an important part in the wound-healing process. When activated, the fibroblasts within the skin secrete collagen and elastin, two key elements in the healing process. It should be noted that fibroblasts normally decrease in number and activity as we age. Interaction with this form of H.A. helps to reverse this process, encouraging fibroblast activity to a more youthful level of function. In turn, H.A., along with the use of biopeptide, are likely the most important topical substances that can stimulate the production of collagen in aging and wounded skin, which is also an important anti-aging benefit.

Based on these findings it shouldn't be surprising to learn that H.A. has been used therapeutically to treat acute and chronic wounds such as abrasions, post-operative incisions, first and second-degree burns, vascular and metabolic ulcers, and pressure sores. It has also been used to reduce the incidence and severity of radio-epithelitis (inflammation of skin cells), which commonly occurs in patients undergoing radiotherapy for cancer and other reasons. The application of encapsulated H.A. serum is often helpful in healing eczema lesions as well, in conjunction with supplementation with essential fatty acids and a high potency multiple vitamin and mineral supplement.

### **What is the source of encapsulated H.A.?**

Hyaluronic acid, as a topical nutritional agent, is produced from one of two sources. It's either animal-based or plant based. I personally favor the latter, as I feel it is a "cleaner" version of H.A. as the animal-based source could be more susceptible to a wide variety of contaminants that may be damaging to your skin, or diffuse into the bloodstream and damage other organs and tissues of the body. Just like ingesting bone meal to get your calcium, which has been shown to contain undesirable levels of lead, mercury and other heavy metals, animal-based H.A. products may also contain contaminants that can damage our bodies or trigger allergic or hypersensitivity reactions. Thus, the form of encapsulated H.A. that I prefer is an ultra-pure, non-animal based,

encapsulated form of H.A. This is the form of H.A. used in the clinical trial noted previously and this is the one that I have seen work with my patients (and on my own face!). Here are the applications for the use of an H.A. product that meet the criteria I have outlined:

1. Everyone over 20 years of age requires H.A. topical application, twice per day (morning and night) to slow the aging of their face and prevent dehydration and wrinkles that will otherwise occur on their face and neck.
2. To reduce existing fine lines and shallow wrinkles on the face
3. To reduce the appearance of existing crow's feet around the eyes
4. To enhance the moisturizing and hydration of the skin
5. To enhance skin smoothness and the elegant feel of the skin (an immediate effect)
6. To aid the healing of the skin wounds mentioned above
7. To help heal eczema lesions, whereby the H.A. serum should be applied directly to the lesions two to three times daily

## **Conclusion**

Hyaluronic acid is a natural substance produced by skin cells and is found in great abundance in young skin (both the epidermis and dermis) where it functions to keep skin youthful, supple, elastic, smooth, hydrated and toned and also functions as a natural skin moisturizer.

As a natural humectant, hyaluronic acid binds to water molecules, holding up to 1,000 times its weight in moisture. This accounts for its amazing ability to keep the skin youthful, elastic and supple, and to fill in fine lines and superficial wrinkles, reversing the age appearance of the skin. In the aging process, skin cells reduce their ability to synthesize optimal amounts of hyaluronic acid, and this significantly contributes to skin aging. By age 50, individuals are estimated to have less than half of the hyaluronic acid they had in their youth.

Clinical and experimental studies show that the topical application of a specialized blend of ultra-pure, encapsulated hyaluronic is able to deliver hyaluronic acid throughout all skin layers, including the deepest layers of the dermis. This unique delivery system has been shown to be the only reliable method of delivering hyaluronic acid to all skin layers.

Experimental and human clinical studies have demonstrated the effectiveness of this unique system of hyaluronic acid delivery throughout the skin, with significant objective and subjective changes to the skin observed within 56 days of regular daily use, compared to a placebo. A recent human study demonstrated that hyaluronic acid, delivered in this form, can markedly reverse fine lines, crow's feet and shallow wrinkles within only two months of daily use.

Upon application, it immediately improves the smoothness and appearance of the skin, and with continued use, more significant and lasting changes can be seen, as hyaluronic acid concentrates and exerts its natural physiological effects throughout all skin layers.

Hyaluronic acid is also an antioxidant, which helps prevent free radical damage to the skin from sunlight and other sources of ultra-violet light (e.g tanning beds)

In the context of skin health and anti-aging, ultra-pure, encapsulated hyaluronic acid should be considered a conditionally-essential skin nutrient that is best applied topically, rather than orally, and should be viewed as an integral part of a skin anti-aging, anti-wrinkle and a natural moisturizing program. It should be applied morning and night for optimal results, which become very visible within a very short period when applied daily. I suggest that my patients, clients and friends begin using it daily by age 20.

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