

# Rejuvenate your Aging Skin

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According to a team of dermatology experts, “Wrinkles now have a greater social impact because people live longer.”<sup>1</sup>

This increased awareness is prompting maturing individuals to seek compounds that produce rapid age-reversal effects.

The problem has been that skin rejuvenation requires more than a single compound, as dermal aging is a multi-factorial process.

The good news is that ten new bioactive compounds have been identified that work in complementary ways to restore youthful skin. The human studies substantiating the age-reversal effects of these new compounds are unprecedented!

Consumers will be gratified to learn that these new anti-aging compounds have been combined into one nutrient-dense serum that also provides ingredients with time-tested

benefits when applied to aged skin.

## Pioneering Skincare

Scientific skin rejuvenation traces back to the pioneering work of research scientist Carmen Fusco, associate professor of nutrition at New York Medical College.

Troubled by the adverse effects of drugs, the former pharmacology instructor focused her research on nutrient-dense compounds that generate not side effects, but “side benefits.”

For 35 years, Fusco has researched topical nutrients shown to inhibit DNA damage, protect skin cells, and help maintain the resiliency of youth as we age.

Science is catching up to Fusco’s early “side benefits” focus. According to one study, “Active ingredients go well beyond simple moisturizers and exert a more complex activity in protecting skin... nourishing it and removing its superficial layers.”

We now know that—in addition to a good diet and regular sleep—topical application of a variety of nutrients can play an important role in skin preservation and rejuvenation.



## The Evolution of Skin Science

Discoveries made by Professor Fusco and Life Extension<sup>®</sup> in the early 1980s triggered a decades-long evolution in science-based skincare. This led scientists to conclude that nutrients found in new cosmeceuticals are “closer to drugs in preventing and treating wrinkles.”

Some of the earlier ingredients developed such as alpha-hydroxy acid and beta-glucan have become mainstay active ingredients in costly commercial skin care products.

A variety of bioactive compounds have now been confirmed to work in different but complementary ways to target skin aging issues. Their synergistic effect is documented by research showing that, when multiple pathways are triggered, cells in different dermal layers are able to signal or “talk to” each other—working cooperatively to repair tissue, boost cell energy, and prevent free radical damage.

Like a high potency multi-vitamin supplement, consumers now have access to 28 of these active compounds in one light and thin serum that spreads on like a lotion while providing unparalleled cell penetration.

## The New Topical Compounds!

In order to nourish skin topically, scientists previously identified compounds that inhibit the causes of prematurely aged skin: insufficient hydration, loss of collagen fibers, free radical damage, and clogged pores.

Adding to the list of established topical nutrients are 10 additional compounds that further modulate underlying causes of degeneration and damage to skin!

## Matrixyl® synthe'6™2

The breakdown of skin scaffolding is a major cause of wrinkles.

A novel tripeptide compound called Matrixyl® synthe'6™ has been found to complete the maturation and stabilization of fibers, thereby stimulating the scaffolding of skin molecules.<sup>2</sup>

In a controlled clinical study of 25 women aged 42-70, a cream containing Matrixyl® synthe'6™ was applied 2 times daily to the crow's feet on one side of the face and the whole forehead and a placebo cream was applied to the crow's feet on the other side of the face. Scientists measured the participants' wrinkles and crow's feet before and after application of the creams.

The researchers found that frown lines among the Matrixyl® synthe'6™ group were lifted by 28%, and the volume of wrinkles was diminished by 31%. Wrinkle depth also improved by 16%. Wrinkle depth is one of the most important factors in the visual perception of wrinkles. And this anti-wrinkling effect was observed in just 2 months.<sup>2</sup>

Scientists also observed that in the test group applying Matrixyl® synthe'6™, crow's feet were lifted by 13%, the surface area they occupied shrunk by 29%, and their volume was reduced by 21%.<sup>2</sup>

Matrixyl® synthe'6™ actively promotes the synthesis of six skin matrix constituents—collagen I, III, and IV, hyaluronic acid, fibronectin, and lamini. These skin matrix constituents are found in the lower epidermis, where cells communicate with each other and with the cells in the dermal layer. (The epidermis is the upper layer of skin and the dermis sits beneath it.)

## Next Generation Hyaluronic Acid

Excessive dryness of the skin promotes fine lines and weakens cells. It can cause lipids in the skin's fatty layer to crystallize, causing dull and flaking skin.

Hyaluronic acid, a natural skin constituent, is a good moisturizer owing to its ability to capture water molecules, which reduces the visibility of lines. It is also a volumizing agent. For these reasons, hyaluronic acid is an ingredient in many skincare applications.<sup>3</sup>

However, scientists have now developed a potent new generation of this compound—an aqueous gel of modified hyaluronic acid. This gel forms a thin film on the skin and continuously delivers the larger amount of water bound by this new compound.<sup>4</sup>

When Rutgers University scientists tested this unique gel on human skin, they found that skin cells treated with this modified hyaluronic acid held 6 times more moisture in total, and 5 times more moisture in the stratum corneum (extreme outer layer), than cells treated with regular hyaluronic acid. This greater moisturizing effect was observed even 24 hours after application!<sup>4</sup>

This advanced hyaluronic acid also exhibited the ability to combat oxidation and free radical attack, which can damage skin structure and cause wrinkles.<sup>4</sup>

### What You Need To Know: Rejuvenate and Protect Aging Skin

Scientific evidence now indicates that modulating the many causes of skin aging—ranging from free radicals and collagen breakdown to moisture loss and glycation—requires the synergy of a network of topical compounds.

A total of 28 bioactives have been developed to inhibit skin aging—from the more familiar vitamin C and alpha hydroxy acid, to the new Matrixyl® synthe'6™, modified hyaluronic acid, Vegetal Filling Spheres™, and lots more.

However, to come close to benefiting from the entire network of complementary bioactives, you'd need to layer on a dozen skin creams, each of which provide only 2 or 3 active ingredients.

A new multi-ingredient firming serum now delivers all 28 scientifically proven bioactives—in a nutrient-dense serum instead of a thick cream. Additionally, the serum is naturally scented and is free from mineral oil and sodium lauryl sulfate. This new generation formulation uniquely includes the addition of ten new breakthrough compounds!

For an unparalleled multi-factorial skin rejuvenation program, get restful sleep, eat a nutrient-dense diet, exercise—and apply this new firming serum to your skin daily.



## Vegetal Filling Spheres™5

Deterioration of skin matrix, combined with moisture loss, results in indentations and wrinkles. But a new compound attacks this problem from deep inside the indentations.

Vegetal Filling Spheres™ are derived from wheat protein, which is a biopolymer known for its hydrating capacities. Scientists applied either Vegetal Filling Spheres™, or placebo, to the crow's feet of 30 volunteers. They observed a 31% decrease in the total wrinkle surface, and a 27% decrease in wrinkle length. And this effect was seen in just one hour!<sup>5</sup>

Researchers found these spheres had settled inside the wrinkle indentations deep within the lower epidermis. There, they acted like microscopic sponges, trapping moisture that would normally be lost through the skin surface.<sup>5</sup> The observed result was a physicochemical effect: the spheres expanded with moisture and physically plumped wrinkles—transforming the skin surface from wrinkled to smooth.<sup>5</sup> Remarkably, the plumping effect occurs immediately after application—and is long-lasting! There is also a durable increase in hydration of the middle and upper layers of the epidermis.<sup>5</sup> These Vegetal Filling Spheres™ have been incorporated into this new firming serum.

### Underlying Causes of Skin Damage

A person may look a decade or two older than his or her age due to an inadequate program to inhibit the chief causes of skin damage. An effective skin protection and rejuvenation program needs to be multi-factorial and synergistic to modulate the various age-related pathways.

All of the following factors can damage skin and cause premature skin aging:

Stress-induced sleep loss or insomnia can promote premature aging of the skin.

An under-active thyroid can result in reduced hormone levels that cause dry, flaky skin.

Excess sun exposure can result in photo-aging of the skin and skin cancer.

Very low consumption of essential fatty acids (such as fish oil, or flaxseed oil) can dry the skin.

An antioxidant-impooverished diet can result in oxidative, free-radical skin damage, and premature aging.

A phytonutrient-poor diet—one that includes too few plant foods—can accelerate free radical damage.

An unbalanced diet high in processed foods can promote skin cell damage.

Breakdown of the skin scaffolding—initiated even by frowning or laughing—can cause wrinkles.

Dryness can promote fine lines, weaken skin cells—and even cause lipids in the skin's fatty layer to crystallize, resulting in dull, dry and flaking skin.

Compromised stem cells inhibit the replacement of damaged skin.

Stress, both short term and chronic, can cause skin cells to appear tired.

Free radicals and cosmic irradiation cause damage to the skin cell structure, resulting in lines and wrinkles.

Inflammation can cause puffiness, blemishes, and pigmented lesions.

Elevated glucose levels can cause glycation—the process by which sugars attach themselves to the amino acids in collagen—which reduces the regenerative ability of collagen fibers, in turn promoting wrinkles, sagging and “creping.”

Gravity and other mechanisms result in a tendency for skin to take on a sagging appearance.

Aging is associated with a slowing down in collagen renewal, causing damaged and wrinkled skin.

Toxins and environmental pollutants may prematurely age skin.

Clogged pores can harbor bacterial infections and cause inflammation, redness, blemishes, and scaly skin.

Compromised shedding of old skin cells in the epidermis can cause a rough or dull appearance.

Topically applied nutrients may—without a product-based ingredient delivery system—sit on the skin surface, overly saturating the wrong layers, causing inflammation, limiting any nutrient effect, and adding to the clogging of pores.

Sodium lauryl sulfate, often found in skincare products, might interfere with the activity of nutrients.

### Poly P

Skin cell proliferation and collagen synthesis both slow down as we age, producing visible lines.

Fortunately, a polyphosphate compound found in almost all cells has been shown to inhibit this deterioration. Called Poly P, these polyphosphates promote tissue remodeling.<sup>6</sup>

Poly P communicates with skin cells at the dermal layer where fibroblasts—responsible for cell renewal—are produced. Scientists believe this interaction increases production of skin cells, which surface to replace old cells.<sup>6</sup>

Poly P is believed to increase the production of collagen.<sup>6</sup>

Boosting production of both collagen and fibroblasts (cells responsible for building and maintaining the structural framework of the skin) improves skin volume and tone, making Poly P a vital component for advanced skincare.

### Taurine

Skin tissue can age prematurely due to various factors—compromised skin cell barrier, insufficient hydration, ultraviolet-induced apoptosis (cell death), and free radical damage.

Glycation reactions are another problem. These occur when sugars attach themselves to the amino acids in collagen—which reduces the regenerative ability of collagen—in turn promoting wrinkles, sagging, and “creping.”

Scientists noted that the body increases levels of the amino acid taurine in tissues that suffer physical damage or trauma. This led to a fascinating discovery: taurine modulates multiple skin-damaging pathways when applied topically to the skin!<sup>7</sup>

Specifically, evidence suggests taurine repairs the skin barrier, rehydrates keratinocytes (the main cells of the upper skin layers), inhibits apoptosis, and reduces free radical damage. Taurine also offers antioxidant, anti-inflammatory, and anti-toxin benefits—protecting against premature aging and environmental toxins.<sup>7</sup> Taurine is believed to inhibit glycation, one of the main causes of cellular aging.

## Salicylic Acid

Clogged skin pores can harbor bacteria, causing inflammation, swelling, and blemishes. This impedes the desirable sloughing off of old skin cells, causing scaly or dry patches.

Salicylic acid—a beta-hydroxy acid—is known to be a keratolytic agent: it thins skin where there is an excess buildup of cells, and causes the skin’s outer layer to loosen and shed. In this way, salicylic acid renews the skin surface, revealing fresh, younger cells. Keratolytics also soften keratin, a major skin component, which in turn improves the skin’s moisture-binding capacity.

Salicylic acid is used topically for acne, because it penetrates pores containing sebum (oily matter), kills bacteria within pores, and then softens and sloughs off the outer skin cells (epithelium). It also prevents further pore clogging by constricting the pore diameter.

Scientists now recognize that salicylic acid can prevent pore clogging, promote the shedding of old cells, reduce the size of pores—and make room for new cell growth.<sup>8</sup>

## Pichia-Fermented Resveratrol



Skin often suffers from insufficient hydration, oxidative stress, or slow collagen turnover. These factors cause weakened cellular structure and result in wrinkles. Inflammation of the skin also promotes aging.

Resveratrol has long been known as an antioxidant and anti-inflammatory, as well as a mimetic of some of the benefits of calorie restriction. It appears to work partly by activating the sirtuin 1 gene and enhancing the functioning of mitochondria, cellular energy factories.<sup>9</sup>

The application of resveratrol to the skin is linked to anti-aging and anti-inflammatory effects.<sup>10</sup> And when one study showed that topical application of resveratrol prevented skin cancer in mice treated with a carcinogen,<sup>11</sup> this further suggested a role for resveratrol as a topical skincare agent.

Scientists then investigated ways to utilize resveratrol to generate a more direct and potent effect on skin appearance. They developed a special resveratrol, which is fermented by *pichia pastoris* yeast,<sup>12</sup> and tested it on the skin of humans.

In a double-blind, placebo-controlled, 22-person study, participants applied pichia fermented resveratrol to one side of their faces twice a day. Skin hydration was measured by a special technique known as corneometric reading, and high-resolution photos were taken.

The resveratrol-treated sides of the volunteers’ faces showed a 36% greater degree of hydration over the control sides. Wrinkles were dramatically lifted, and expression lines were noticeably smoothed. These effects were observed after just 28 days!<sup>12</sup>

### How Many of These Active Compounds Does Your Skincare Product Contain?

Scientists know that it takes an entire network of synergistic compounds to modulate all aspects of skin rejuvenation—including collagen, shedding, pore size, wrinkling, sagging, scaffolding, oxidation, inflammation, and glycation.

Check your skincare product. Most products contain only one or two active ingredients.

If you see a long list of ingredients that are not on the following list, they are most likely excipients—ingredients that have no direct, active effect on the skin but are added to increase spreadability or to keep the ingredients from separating, caking, or going bad. Some are added simply to provide color or fragrance. These are not active ingredients because they have no direct effect on the nourishing or repair of the skin.

The following is a list of bioactive ingredients that are now available in one new facial skin firming serum:

Pomegranate (*Punica granatum*) extract

Green tea (*Camellia sinensis*) extract

White tea (*Camellia sinensis*) extract

Matrixyl® synthe'6™

Modified hyaluronic acid

Vegetal Filling Spheres™

Poly P (sodium polyphosphate)

Taurine

Salicylic acid  
Pichia-fermented Resveratrol  
DMAE (dimethylaminoethanol)  
Botanimoist® AMS (pyrus malus)  
Botanistat® PF-64  
QuSome® Delivery System  
Glycerin  
Avobenzone  
Glycine soja (soybean) oil  
Panthenol (Vitamin B5)  
Tocopherol (Vitamin E)  
Tocopheryl acetate (Vitamin E)  
Beta-glucan  
RNA  
Sodium PCA  
Hydroxydecyl ubiquinone (CoQ10)  
Ceramide-2  
Thioctic acid (alpha lipoic acid)  
Lactic acid  
Vitamin C (as ascorbyl phosphate)

## **DMAE**

When skin loses its firmness, this signifies thinning collagen, compromised membranes, and cellular dehydration. The result is a visible sagging, with a wrinkling tendency.

In a human study, scientists found that topical application of dimethylaminoethanol (DMAE) increased both the thickness of collagen fibers, and skin hydration.<sup>13</sup>

Another controlled study showed DMAE produces an anti-inflammatory effect and a clear increase in skin firmness.<sup>14</sup>

Also, when DMAE was topically tested on humans in a randomized clinical trial, researchers found it resulted in mitigation of lines in the forehead and around the eyes. There was a beneficial effect on the appearance of coarse wrinkles, under-eye dark circles, nasolabial folds (“laugh lines”), and neck skin, which was noticeably firmed. These effects were observed in just 16 weeks!<sup>14</sup>

Scientists also observed that DMAE exerts a general firming action on skin cells, likely explained by the fact that, as a precursor of acetylcholine, DMAE alters muscle contraction.<sup>15</sup>

The acute skin-firming effects of DMAE were further confirmed in a randomized, double-blind, split-face study on 30 humans,<sup>16</sup> and by quantitative measures of cutaneous tensile strength (the force required to pull the skin).<sup>13</sup>

Daily skin application for an entire year showed no adverse effects.<sup>13</sup>

## **How Topical Bioactives Repair and Rejuvenate Skin**

The full range of topical agents (see the box listing these compounds on previous page) works synergistically, acting along a network of pathways, resulting in more youthful, firmer, healthier, and vibrant skin. Together these bioactives:

- Accelerate collagen production
- Promote shedding of old cells
- Decrease pore size
- Deliver more moisture to cells
- Protect stem cells
- Lift wrinkles
- Smooth fine lines
- Provide anti-sagging activity
- Stimulate skin cell scaffolding
- Fight free radical oxidation and DNA damage
- Combat inflammation
- Inhibit glycation—one of the chief causes of cellular aging



## **Botanimoist® AMS Apple Saccharides**

Keratinocytes produce keratin, the material comprising fibrous proteins responsible for strengthening skin membranes. So loss of hydration in keratinocytes causes a weakening of skin cells, resulting in a sagging, wrinkling effect. Also, a depletion of cellular moisture causes lines to be more visible.

Scientists tested hydrating capability of a dried extract of apple fruit, called Botanimoist® AMS (apple moisturizing saccharide) in a placebo-controlled human study. A single topical application of this extract resulted in 89% increase in skin hydration—after just 30 minutes!<sup>17</sup>

Even after 6 hours, skin hydration of participants treated with 5% Botanimoist® AMS remained 31% higher than the hydration level of untreated skin.<sup>17</sup>

It has also been suggested that there may be a stem cell-protecting effect.

## **Botanistat® PF-64**

The nutrients found in all skincare products need protection against microbes and constituent breakdown. This is generally accomplished by including the preservative paraben.

However, fears have arisen concerning this common preservative's estrogenic effects.

Scientists seeking an alternative developed Botanistat® PF-64, which is a paraben-free blend of mild but effective biocide ingredients providing broad-spectrum protection against bacteria, fungi, yeasts, and molds.<sup>18</sup>

## **Summary**

Solid scientific evidence shows that it takes a synergistic network of topical nutrients to powerfully modulate the many factors of skin aging—from pore size and oxidation to glycation and wrinkling.

There are now 28 bioactive compounds available to inhibit skin aging—ranging from the earliest alpha hydroxy acid and vitamin C to the new hydrating Vegetal Filling Spheres™ and modified hyaluronic acid.

But because commercial skin products generally focus on only 2 or 3 active ingredients, you'd need to layer on a dozen skin creams to come close to benefiting from the entire complementary network of these proven compounds. Some of these bioactive compounds sell for hundreds of dollars by themselves in commercial preparations. Based on the clinically proven data substantiating their efficacy, it's easy to understand why maturing individuals would pay a king's ransom to obtain them.

Fortunately, a new firming serum delivers all 28 scientifically proven bioactives in a single, nutrient-dense serum—not a thick cream—and at a fraction of the cost.

Adding this new multi-ingredient firming serum to a nutrient-rich diet and a good sleep regimen is the greatest possible multi-factorial defense against the loss of youthful-looking skin.

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.

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