AC ExoRoot

Hairspan, Longevity Defined

INCI: *Water & Chlorella Vulgaris Extracellular Vesicles & Phospholipids & Lactobacillus Ferment*

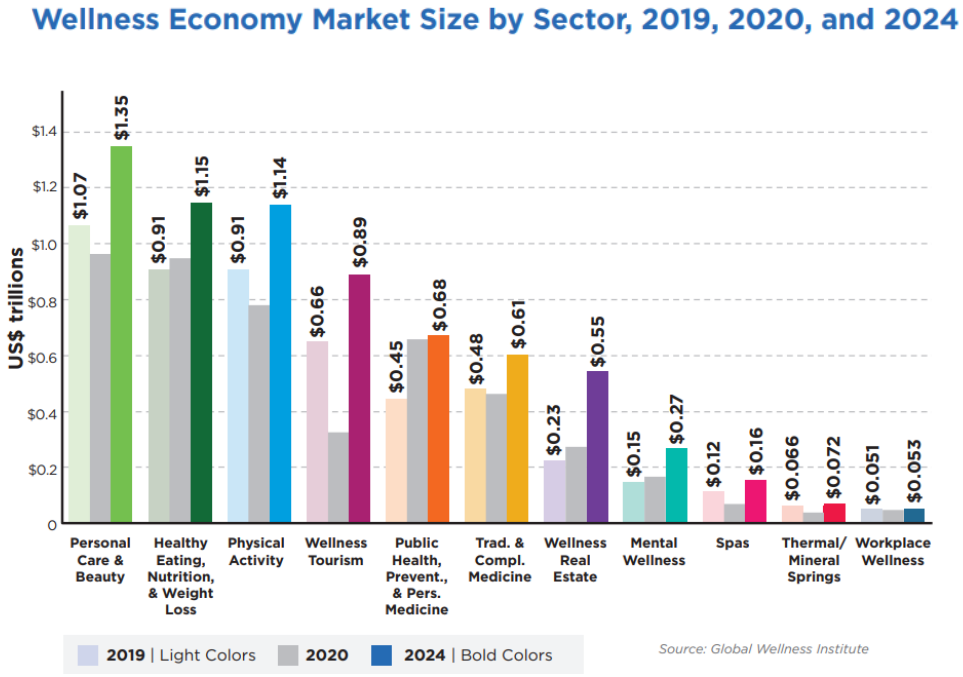
The Future of Aging

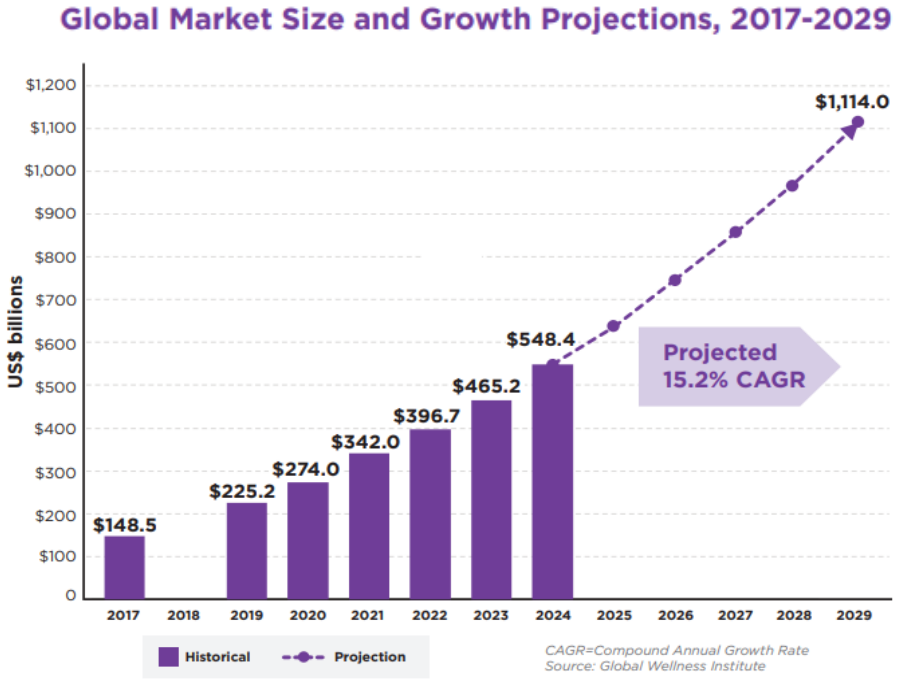
Longevity is redefining beauty, placing wellness at its core. This shifts the focus from reversing age to supporting the body's biological systems over time.

Daily rituals mark this shift, as practices like red light therapy and cryotherapy move from occasional indulgences into wellness rituals.

Active Concepts

Wellness on the Rise





Market Size: Wellness now accounts for over 6.12% of global GDP, exceeding IT, sports, and pharma in scale.

Growth Rate: Annual growth is forecast at 7.6% until 2029, faster than world GDP.

Core Drivers: Personal care and beauty alone accounts for roughly 20% of the global wellness economy

Active Concepts

Hair Longevity: The Next Frontier

The beauty industry has long treated hair aging as cosmetic and surface-level.

In reality, hair aging is biological, and hair is an early signal of internal health. These changes are shaped by key biomarkers of hair aging that shape *Hairspan* – the biological foundation that supports the time hair stays healthy, resilient, and visibly vital.

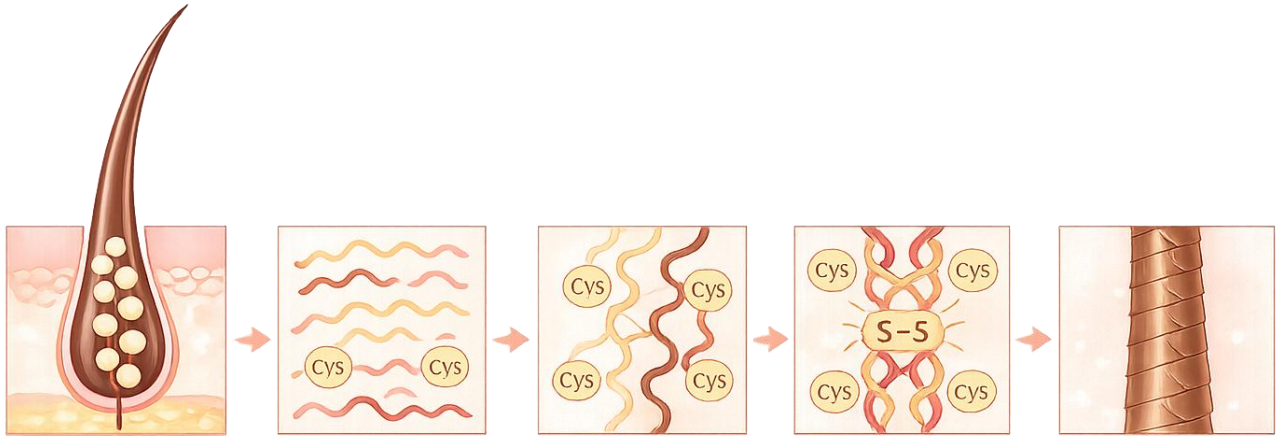
Positioning haircare as a wellness ritual shifts the focus from surface-level fixes to preserving Hairspan through its underlying biology.

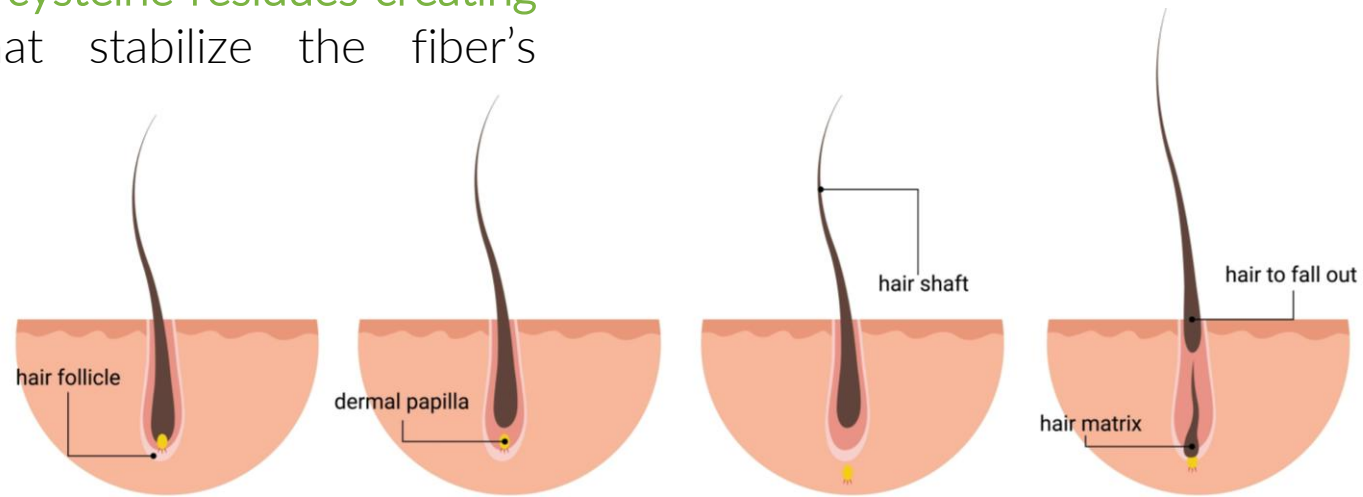
Active Concepts

Hair Biology

Hair length is determined by the anagen phase of the hair cycle. When this phase is shorter, strands have less time to grow, making the retention of length and follicle vitality more difficult.

During the anagen phase, follicle cells assemble keratin peptide chains made of amino acids that form the hair fiber, with cysteine residues creating disulfide cross-links that stabilize the fiber's structure and strength.





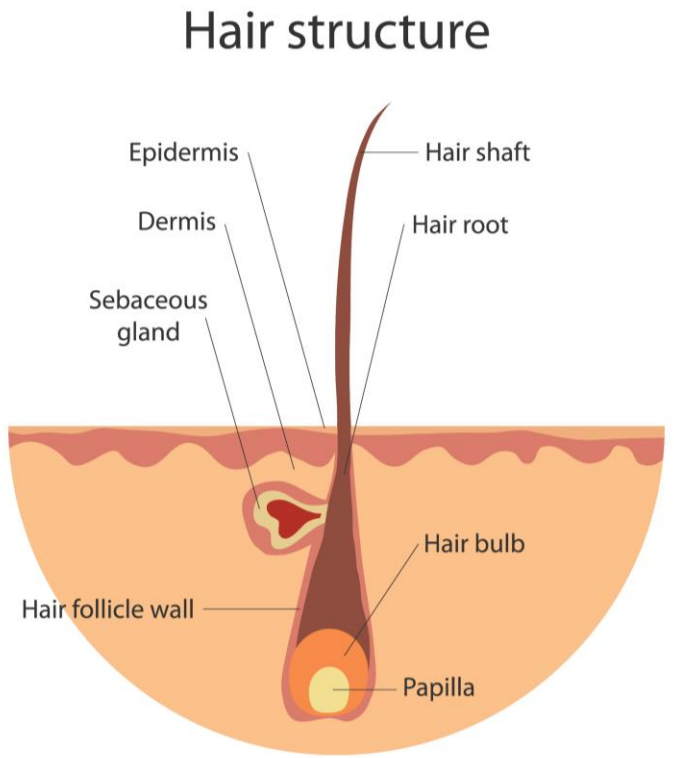
Active Concepts

The Science Behind Scalp Care

Hair grows much like a flower, where its strength and longevity depend on the quality of the soil that supports it, the scalp.

When the scalp environment becomes compromised, the anagen (growth) phase shortens and hair can appear thinner over time.

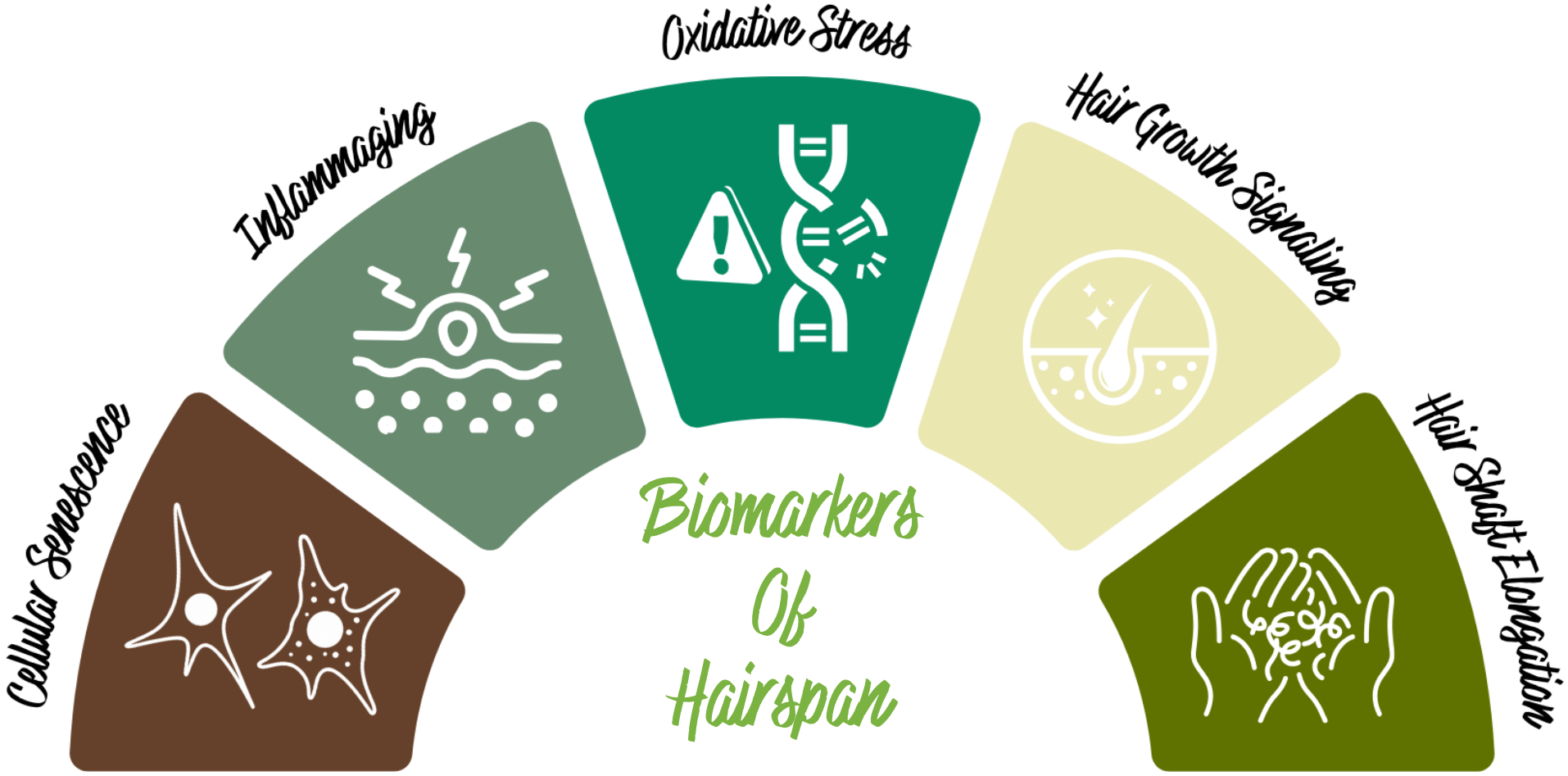
Beyond fiber formation, amino acids can play a role in supporting scalp longevity. Arginine has been found to support collagen synthesis, inflammatory balance, and oxidative stress defense.



Active Concepts

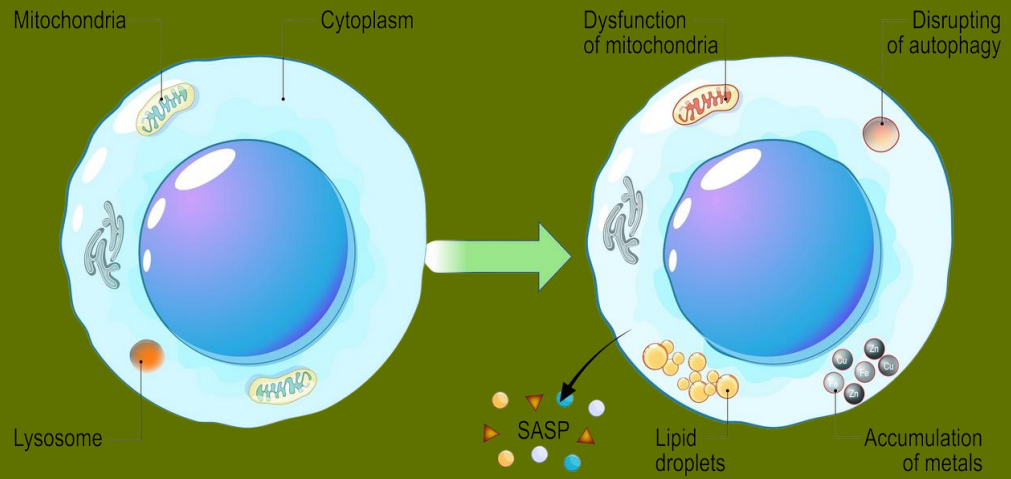
Hairspan: Longevity Defined

Hairspan reflects the functional longevity of hair and is shaped by a network of biological biomarkers. Together, these factors influence how long follicles can sustain active growth and structural resilience. As these biomarkers decline over time, Hairspan shortens, appearing as reduced time in the growth phase, slower fiber formation, loss of density, increased fragility, and weaker recovery from everyday stressors.



Cellular Senescence

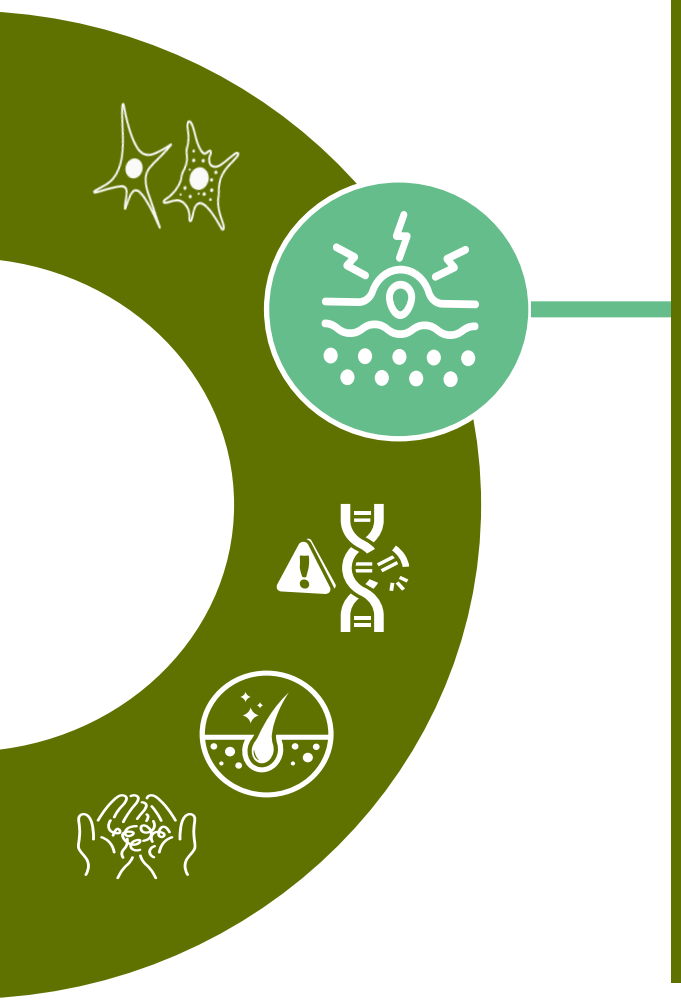
The hair follicle is surrounded by a fibroblast-rich tissue sheath that produces collagen to provide structure to the follicle and surrounding scalp. Over time, fibroblasts can become senescent, releasing signals that weaken the extracellular matrix, impair repair processes, and contribute to scalp and skin aging.



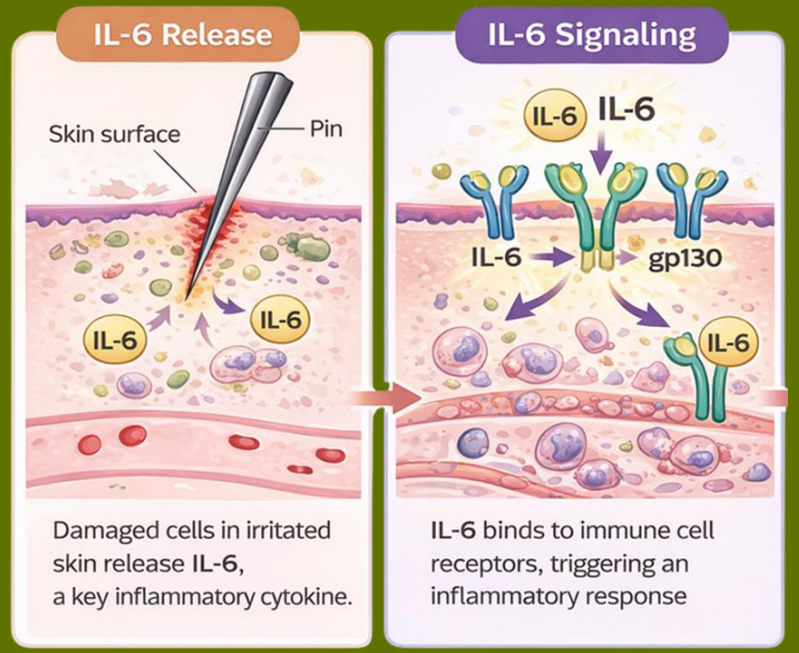
SA-β-gal: a gold-standard biomarker that identifies aging cells by detecting enzyme buildup linked to cellular slowdown.

Active Concepts

Inflammaging



Inflammaging refers to the age-associated buildup of low-grade inflammation in the scalp, where persistent inflammatory signaling progressively disrupts follicle function and hair growth dynamics.

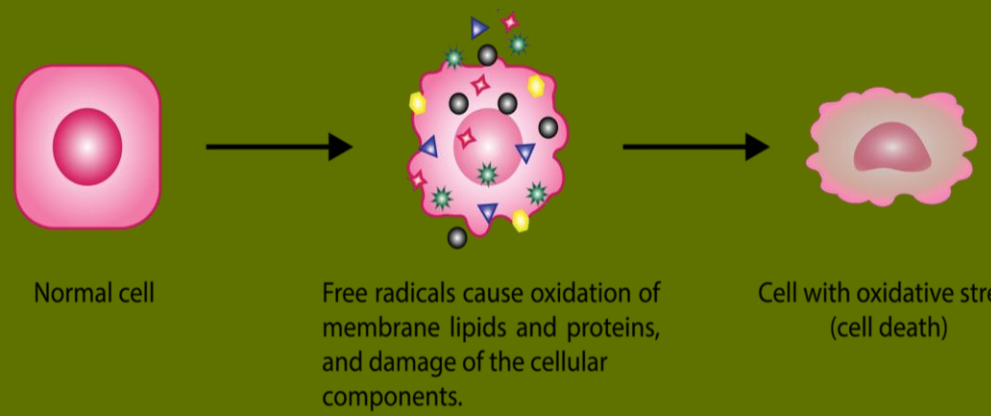


IL-6: a pro-inflammatory cytokine and biomarker of inflammation whose elevated levels indicate active inflammatory signaling.

Active Concepts

Oxidative Stress

Oxidative stress occurs when reactive oxygen species (ROS) overwhelm the scalp's natural antioxidant defenses. When this balance is lost, cumulative cellular damage can disrupt scalp and follicle function. Oxidative stress disrupts follicle biology by damaging DNA, lipids, and proteins, activating inflammatory pathways, and accelerating collagen breakdown.

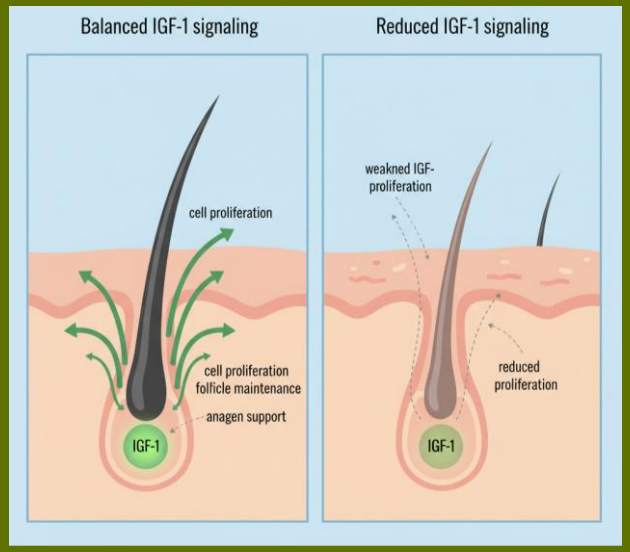


ROS: a biomarker of oxidative stress that indicates an increase in cellular stress and aging-related damage

Active Concepts

Hair Growth Signaling

A healthy scalp provides the conditions needed for effective growth signaling. When scalp homeostasis is preserved, these cellular signaling pathways can function as intended. A loss of scalp balance can quietly destabilize the follicle environment, leaving hair more prone to shedding, thinning, and diminished fiber quality over time.

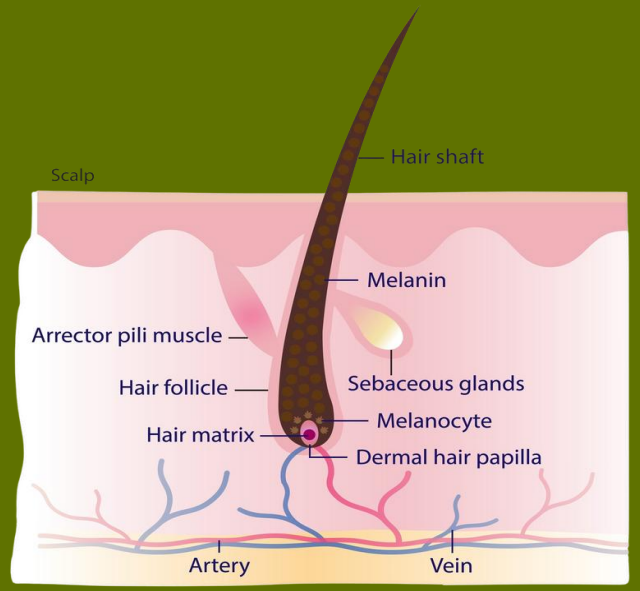


IGF-1: a functional biomarker of hair growth activity, reflecting the follicle's ability to remain in the active (anagen) growth phase.

Active Concepts

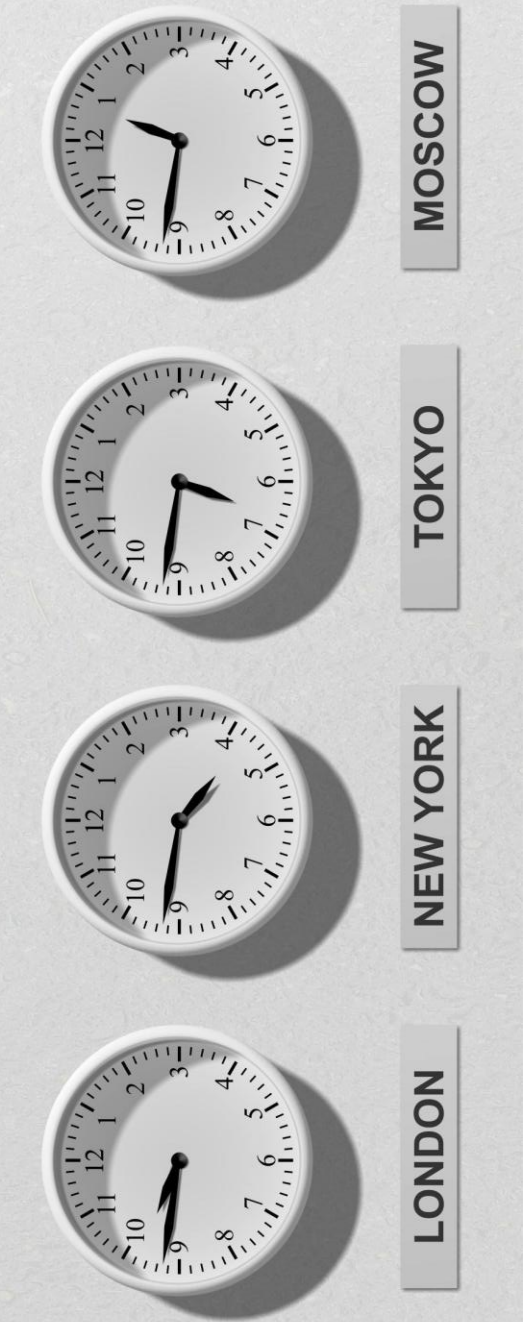
Hair Shaft Elongation

As hair follicles age, their ability to continuously produce hair fiber becomes compromised. As growth signaling and follicular support systems weaken, follicles are more likely to exit the growth phase prematurely. Over time, this biological shift contributes to increased shedding, visible thinning, and delayed regrowth.



Hair Shaft Elongation: a biomarker of active hair growth, reflecting sustained anagen phase activity and functional follicle output.

Active Concepts



Global Hair Growth Market

U.S. Market:

- Minoxidil is the only FDA-recognized OTC option for hair regrowth claims
- Cosmetics rely on appearance, wellness, and scalp health language
- Differentiation via delivery format, actives, clean formulas, wellness angle.

European Market:

- Hair growth and regrowth claims are prohibited for cosmetics
- Allowed claims emphasize breakage reduction, fiber strengthening, scalp barrier support, and anchoring
- Strong focus on scalp health, natural ingredients, and anti-inflammatory positioning

Asia Market (Korea, Japan, China):

- Strict limitations on hair growth claims across cosmetic categories
- Japan and Korea allow quasi-drug or functional cosmetic pathways with additional substantiation
- Claims often center on scalp microbiome balance, barrier strength, anti-aging, and stress-related hair concerns

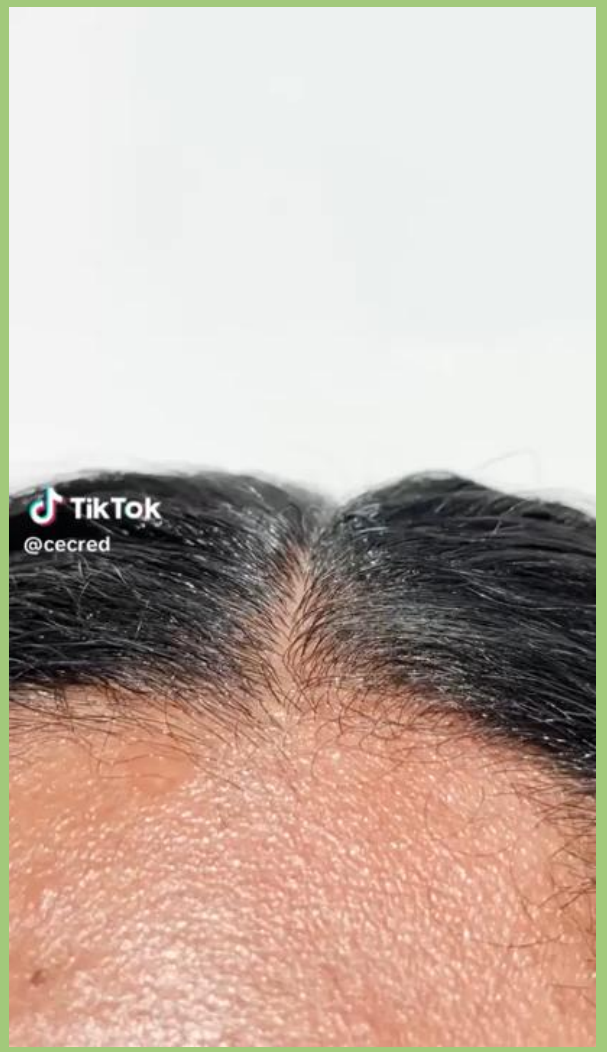
Latin America Market:

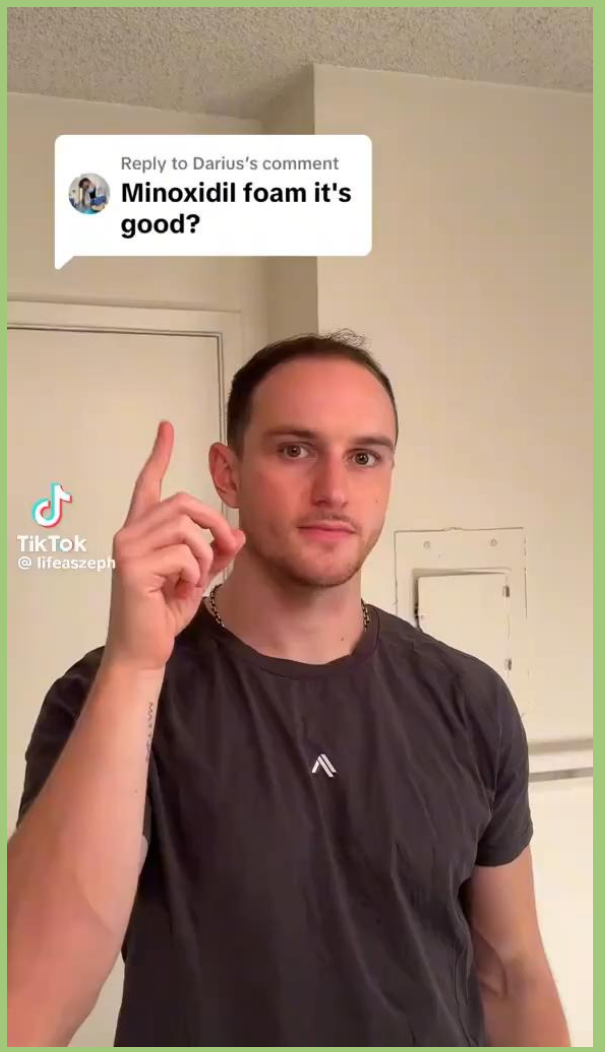
- Cosmetic-style restrictions on explicit hair growth claims
- Claims focus on scalp balance, hair strength, and density appearance
- Growing interest in anti-aging, stress-related hair concerns, and long-term hair vitality

Active Concepts

Market Insights

Active Concepts





Hair Growth: Rooted in Opportunity

Globally, hair growth claims sit outside cosmetics, with regrowth tightly regulated and largely confined to minoxidil.

This leaves beauty brands boxed into narrow options:

- Growth claims limited to minoxidil, with innovation driven by delivery formats
- Cosmetic actives that support scalp care and hair appearance, without growth claims

Despite being driven by well-established biology, hair growth and renewal remain an area with limited solutions for cosmetic brands.

AC ExoRoot

Water & Chlorella Vulgaris Extracellular Vesicles & Phospholipids & Lactobacillus Ferment

AC ExoRoot defines hair longevity by targeting Hairspan — the biological foundation that supports the time hair stays healthy, resilient, and visibly vital.

By reframing hair care as a wellness ritual, hair has become a visible biomarker of internal balance and long-term health rather than a surface-level concern.

Minoxidil opened the door to growth claims, but AC ExoRoot finally gives brands something meaningful to say beyond them. AC ExoRoot delivers hair longevity by supplementing scalp biology – the next frontier.

promotes hair longevity | supports Hairspan | scalp pro-aging

Active Concepts

Nature's Blueprint for Renewal

Chlorella vulgaris is one of the planet's oldest microalgae, refined by millions of years of survival in nutrient-challenged and high-stress environments in nature, resulting in a protective cellular architecture and metabolic flexibility.

Widely cultivated and utilized across supplements and biotechnology, *Chlorella vulgaris* is valued for its inherently amino acid–rich, peptide-dense composition that supports its long-term stability in nature.

Chlorella vulgaris naturally absorbs sulfur from its environment, converting it into bioactive peptides that fuel the cellular machinery for resilience.

Active Concepts

Benefits

Promotes Hair Longevity

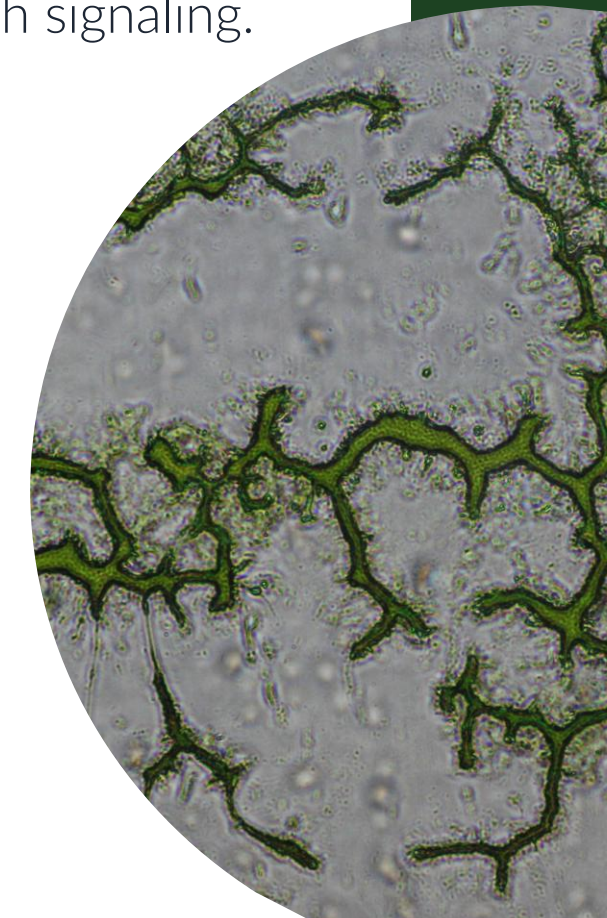
Powered by the amino acid-rich biology of *Chlorella vulgaris*, AC ExoRoot supports key biological biomarkers that maintain scalp homeostasis and hair growth signaling.

Supports Hairspan

Leverage the sulfur-rich peptides from *Chlorella vulgaris* to support a prolonged hair growth cycle.

Scalp Pro-Aging

Supports fibroblast function and extracellular matrix integrity to support scalp aging and maintain long-term resilience.



Product Passport

PASSPORT

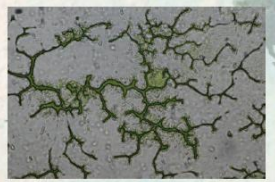
60202

AC ExoRoot

Road Map Tour

Start:

Chlorella vulgaris is sourced regionally respective to our three global manufacturing sites: NC for US, Italy for Italy, and Japan for Taiwan.



Active Concepts

Active Concepts

Chlorella Vulgaris is grown in cell culture using sulfur-rich media and then processed and extracted. Phospholipids are dispersed. *Lactobacillus ferment* is added and the blend is homogenized to form exosomes.

Active Concepts

Final Stop:

AC ExoRoot: the answer to increased Hairspan, combining scalp anti-aging with long-term hair longevity support.

Hairspan: Longevity, Redefined

Chlorella vulgaris offers sustainability by design. This freshwater microalgae grows quickly with minimal land and water requirements, delivering high biomass efficiency. Beyond efficient cultivation, it supports sustainability through carbon dioxide sequestration and wastewater bioremediation. AC ExoRoot advances this sustainability profile through cultivation of *Chlorella vulgaris* in cell culture, enabling efficient resource use while enhancing the bioavailability of its actives.

Our North Carolina–based supplier cultivates many of its cultures in-house, enabling controlled, resource-efficient production and optimized growing protocols. Our Japanese supplier cultivates microalgae in concrete-lined ponds to provide a controlled environment and helps to prevent interactions with surrounding soil and groundwater. Our Italian supplier is committed to sustainable microalgae cultivation, using renewable energy in addition to low-water processes that help to minimize environmental impact.

We are transparent in our supply chain from harvest to production. It's important to know where our raw materials come from and where they are going.

Safety & Toxicology

- Non-phototoxic
- Non-irritant to skin
- Non-sensitizing
- Non-irritant to eyes
- Non-harmful to aquatic life

Active Concepts

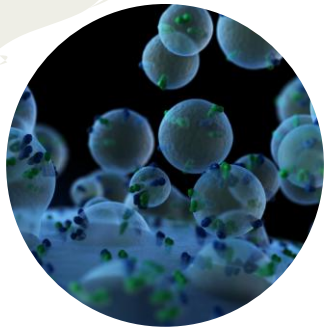
Microalgae is processed and undergoes an aqueous extraction

Dispersion of Phospholipids

Addition of *Lactobacillus Ferment*

AC ExoRoot

Homogenizing to form Exosomes



Chlorella vulgaris grown in cell culture using sulfur-rich supplemented growth media

Manufacturing Process.

Efficacy Studies

Scalp Anti-Aging

- Cellular Senescence (SA-Beta-Gal Assay)

Hair Growth Signaling

- Promotes Hair Growth (IGF-1 Assay)
- Increases Anagen Phase (Hair Shaft Elongation Study)

Scalp Defense

- Anti-Inflammatory (IL-6 ELISA)
- Antioxidant Protection (ROS)

Scalp Homeostasis

- Fibroblast Activation (Sirius Red Fast Green Assay)
- Hair Growth Signaling (IGF-1 Assay)
- Scalp Care Study

Cellular Senescence

As the scalp ages, some cells lose their ability to renew while remaining metabolically active, disrupting the surrounding scalp environment. This process contributes to collagen degradation and reduced support for healthy hair growth. SA-β-gal is a widely used marker of cellular aging that allows researchers to measure the presence of these senescent cells. Supporting a reduction in these aging signals helps maintain a healthier scalp and fuller-looking hair over time.

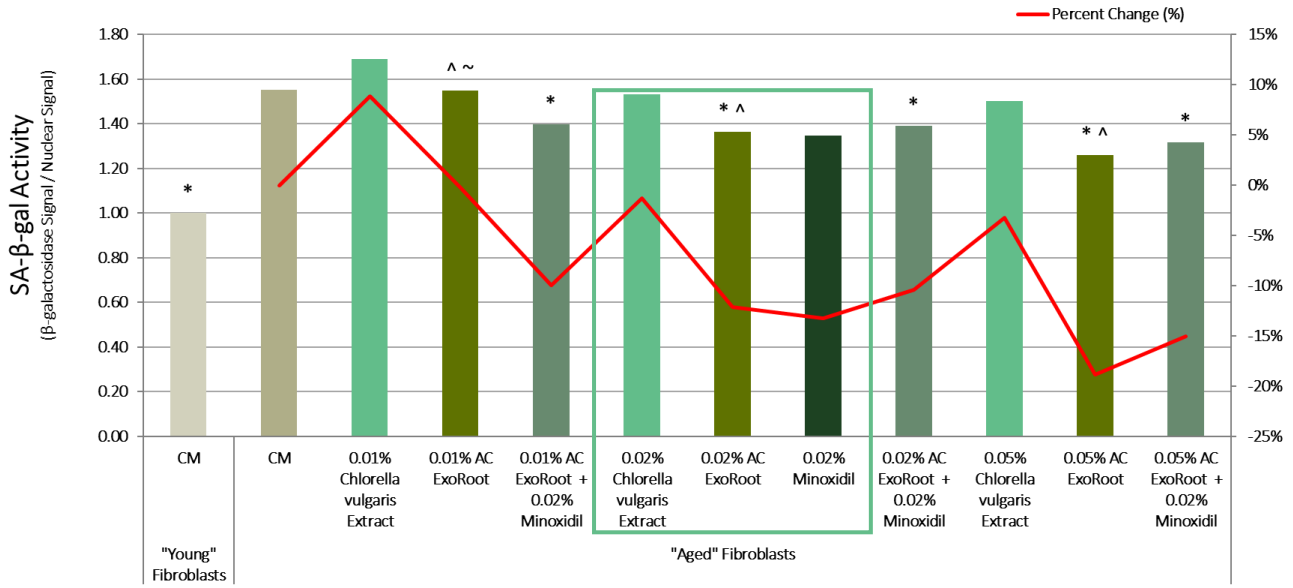


Figure 1. The effect of AC ExoRoot on cellular senescence levels in “aged” fibroblasts. Extract: Chlorella vulgaris Extract. Blend: % AC ExoRoot + 0.02% minoxidil. * indicates significance ($p \leq 0.05$) compared to “aged” fibroblasts. ^ indicates significance ($p \leq 0.05$) compared to Chlorella vulgaris Extract. ~ indicates significance ($p \leq 0.05$) compared to AC ExoRoot + 0.02% minoxidil.

At 0.02%*, AC ExoRoot decreased cellular senescence by

-12%

AC ExoRoot showed comparable performance to 0.02%* minoxidil.

*Evaluated in vitro at 0.02%, equivalent to a 2% application level.

Anti-Inflammatory

IL-6 is an inflammatory signal that increases with scalp stress and aging. When elevated, it can trigger pathways that break down collagen around the hair follicle, weakening the scalp structure that supports healthy hair growth. Reducing IL-6–related inflammation helps preserve the follicle environment, supporting stronger hair anchoring and healthier-looking hair over time.

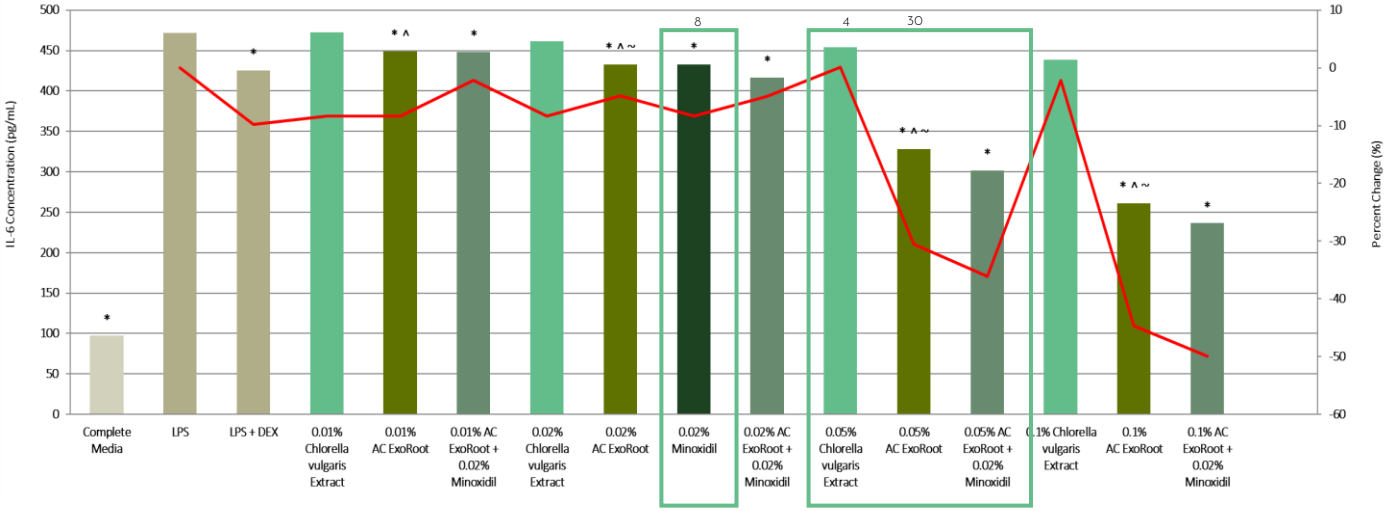


Figure 2. The effect of AC ExoRoot on IL-6 concentrations in dermal papilla cells. Extract: Chlorella vulgaris Extract. Blend: % AC ExoRoot + 0.02% minoxidil. * indicates significance ($p \leq 0.05$) compared to dermal papilla cells incubated with LPS. ^ indicates significance ($p \leq 0.05$) compared to Chlorella vulgaris Extract. ~ indicates significance ($p \leq 0.05$) compared to AC ExoRoot + 0.02% minoxidil

0.05%*AC ExoRoot reduced IL-6 levels in a minoxidil-based system by

-36%

AC ExoRoot pairs seamlessly with minoxidil, creating a synergistic approach to supporting scalp balance

*Evaluated in vitro at 0.05%, equivalent to a 5% application level.

Antioxidant Protection

Dermal papilla cells produce low levels of reactive oxygen species (ROS) under normal conditions. **Environmental stressors** such as UV exposure, pollution, and aging can **cause ROS to accumulate around the hair follicle**. Excess ROS **damages dermal papilla cells** and breaks down surrounding collagen, weakening follicular support. Over time, this oxidative imbalance can disrupt hair cycling and contribute to increased hair shedding.

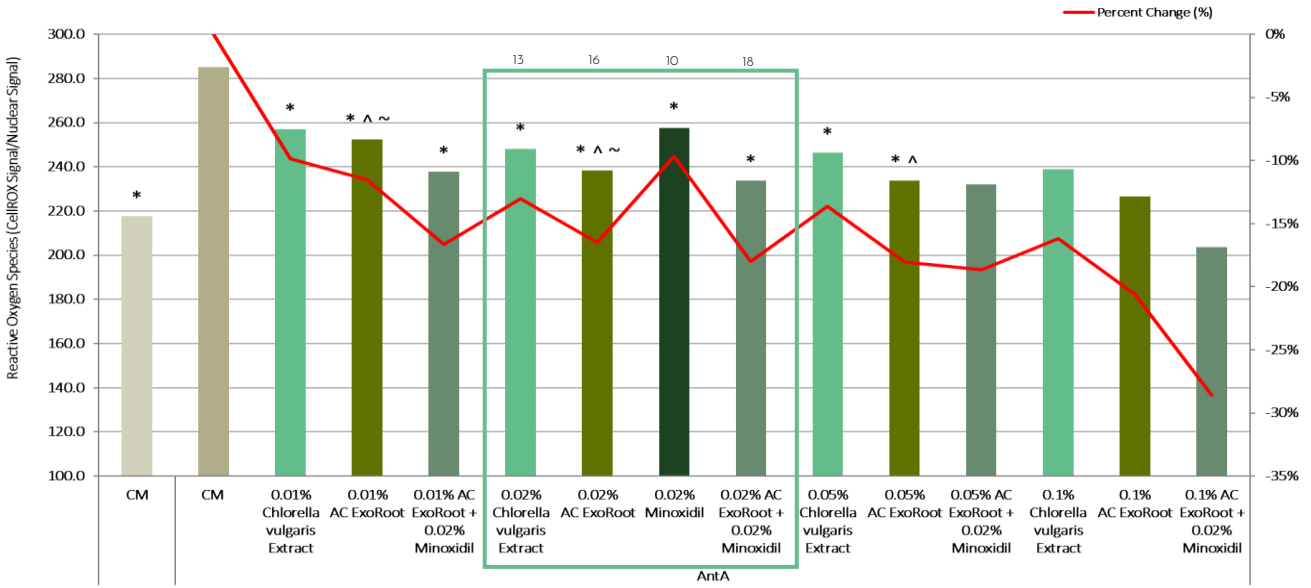


Figure 3. The effect of AC ExoRoot on ROS scavenging. Extract: Chlorella vulgaris Extract. Blend: % AC ExoRoot + 0.02% minoxidil. * indicates significance ($p \leq 0.05$) compared to AntA treated cells. ^ indicates significance ($p \leq 0.05$) compared to Chlorella vulgaris Extract. ~ indicates significance ($p \leq 0.05$) compared to AC ExoRoot + 0.02% minoxidil.

At 0.02%*, AC ExoRoot reduced ROS levels by

-16%

AC ExoRoot supported greater ROS reduction with minoxidil (-18%) and outperformed 0.02%* minoxidil alone (-10%).

*Evaluated in vitro at 0.02%, equivalent to a 2% application level.

Fibroblast Activation

Collagen is a key structural protein in the scalp that helps support hair follicles and the cells involved in hair growth. As collagen naturally declines with age and stress, the scalp loses strength and elasticity, making follicles less securely supported and increasing the risk of hair shedding over time.

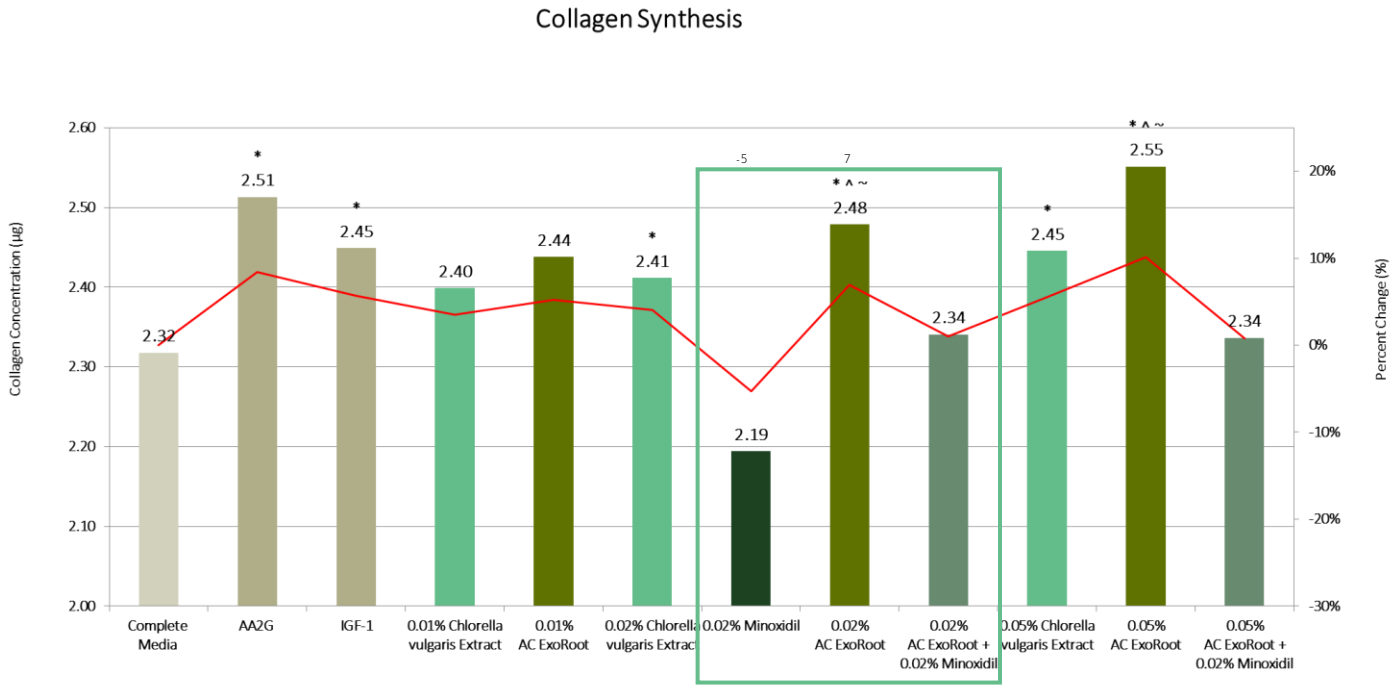


Figure 4. The effect of AC ExoRoot on collagen concentrations in dermal fibroblasts. Extract: Chlorella vulgaris Extract. Blend: % AC ExoRoot + 0.02% minoxidil. * indicates significance ($p \leq 0.05$) compared to untreated fibroblasts. ^ indicates significance ($p \leq 0.05$) compared to Chlorella vulgaris Extract. ~ indicates significance ($p \leq 0.05$) compared to AC ExoRoot + 0.02% minoxidil.

At 0.02%*, AC ExoRoot boosted collagen synthesis by

+7%

AC ExoRoot supported collagen levels with minoxidil, despite a 5% decrease observed with 0.02% minoxidil alone.

*Evaluated in vitro at 0.02%, equivalent to a 2% application level.

Hair Growth Signaling

IGF-1 is a naturally occurring growth signal that plays an important role in hair follicle activity. It helps support the growth phase of the hair cycle by keeping follicles active for longer and delaying the transition into shedding. By supporting IGF-1 signaling, the scalp environment becomes more favorable for stronger, healthier-looking hair growth.

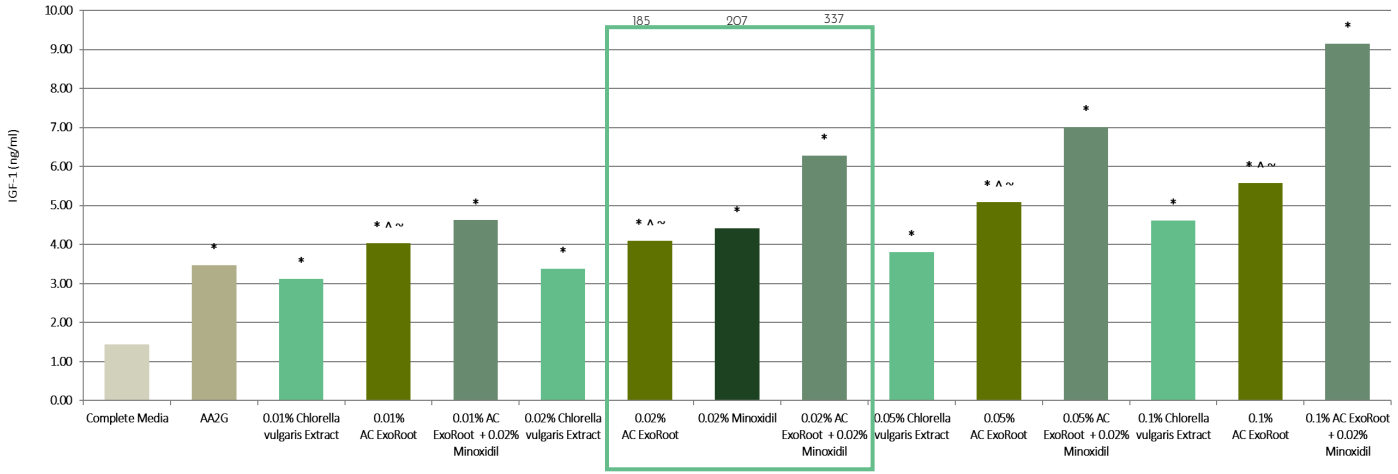


Figure 5. The Effect of AC ExoRoot on IGF-1 Production by Dermal Papilla Cells. Extract: Chlorella vulgaris Extract. Blend: % AC ExoRoot + 0.02% minoxidil. * indicates significance ($p < 0.05$) compared to untreated cells. ^ indicates significance ($p \leq 0.05$) compared to Chlorella vulgaris Extract. ~ indicates significance ($p \leq 0.05$) compared to AC ExoRoot + 0.02% minoxidil.

At 0.02%*, AC ExoRoot increased IGF-1 synthesis by

+185%

AC ExoRoot supports a balanced scalp and enhances key growth signals in minoxidil-based applications.

*Evaluated in vitro at 0.02%, equivalent to a 2% application level.

Scalp Care Study

The scalp plays a critical role in hair health, yet irritation, dryness, and barrier disruption can compromise comfort and create unfavorable conditions for healthy-looking hair. This study was conducted to evaluate the ability of AC ExoRoot to support scalp comfort, hydration, and overall condition through both instrumental measurements and consumer-perceived sensory outcomes, including cleanliness, hydration, tightness, itchiness, flakiness, and overall scalp satisfaction.

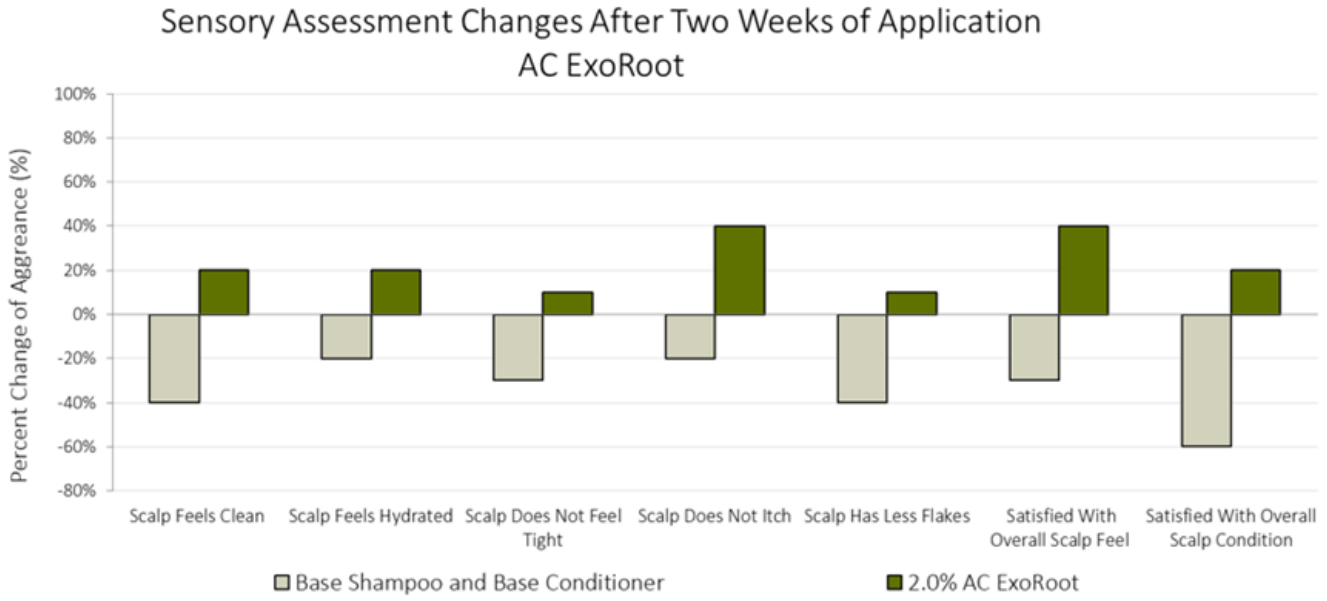


Figure 6. Changes in Sensory Assessment Parameters After Two Weeks of Application Compared to Baseline.

At 2.0%, AC ExoRoot improved overall satisfaction with scalp feel by

+40%

AC ExoRoot soothes visible scalp redness while supporting hydration and barrier function

Scalp Care Study

Scalp Hydration

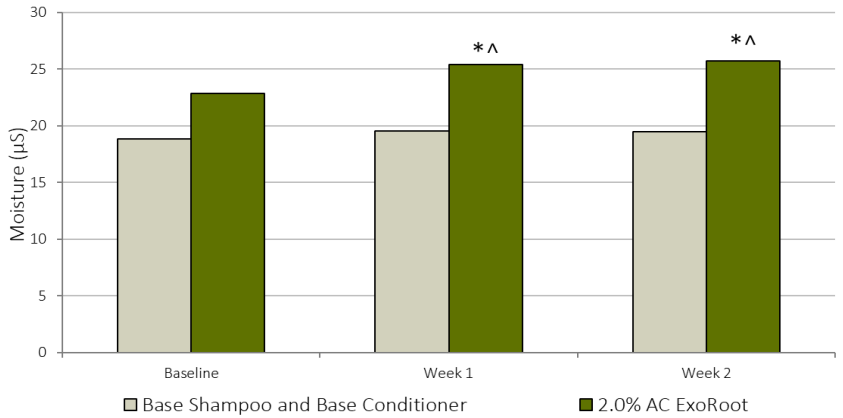


Figure 7. Scalp Hydration Overtime. * indicates significant ($p \leq 0.05$) compared to Baseline within the same condition. ^ indicates significance compared to the Base Shampoo and Base Conditioner ($p \leq 0.05$).

Scalp Erythema

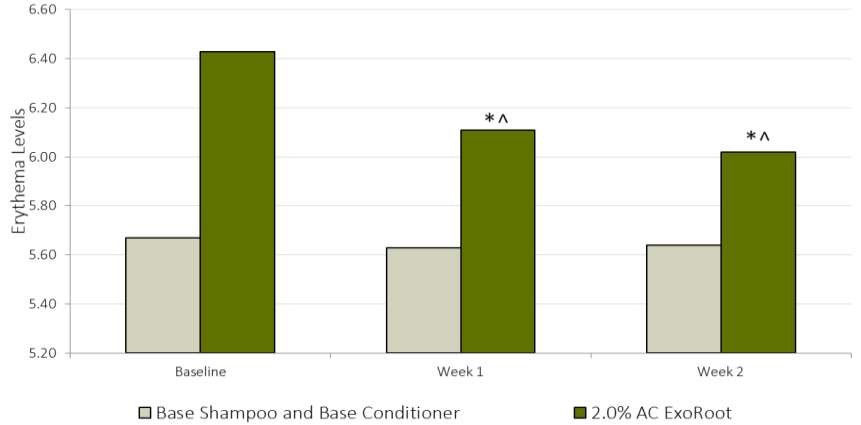


Figure 8. Scalp Erythema Overtime. * indicates significant ($p \leq 0.05$) compared to Baseline within the same condition. ^ indicates significance compared to the Base Shampoo and Base Conditioner ($p \leq 0.05$)

Barrier Function

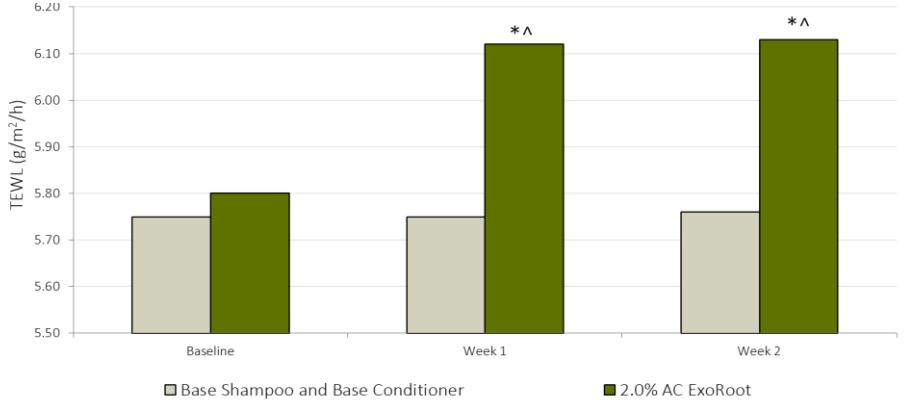


Figure 9. Top right. Scalp TEWL Overtime. * indicates significant ($p \leq 0.05$) compared to Baseline within the same condition. * indicates significant ($p \leq 0.05$) compared to Baseline within the same condition. ^ indicates significance compared to the Base Shampoo and Base Conditioner ($p \leq 0.05$).

Scalp Care Study

A one-week washout period was conducted prior to baseline measurements to minimize scalp irritation. Baseline and follow-up scalp images were captured using a DermaScope Camera Probe across the front, middle, and back of the scalp, alongside assessments of pigmentation, hydration, and transepidermal water loss (TEWL). Participants were blindly assigned to either a base shampoo and conditioner or the same base formulation containing 2.0% AC ExoRoot. Measurements and sensory self-assessments were collected at baseline and after one and two weeks of product use, with final weekly washes performed by salon professionals to ensure consistency.

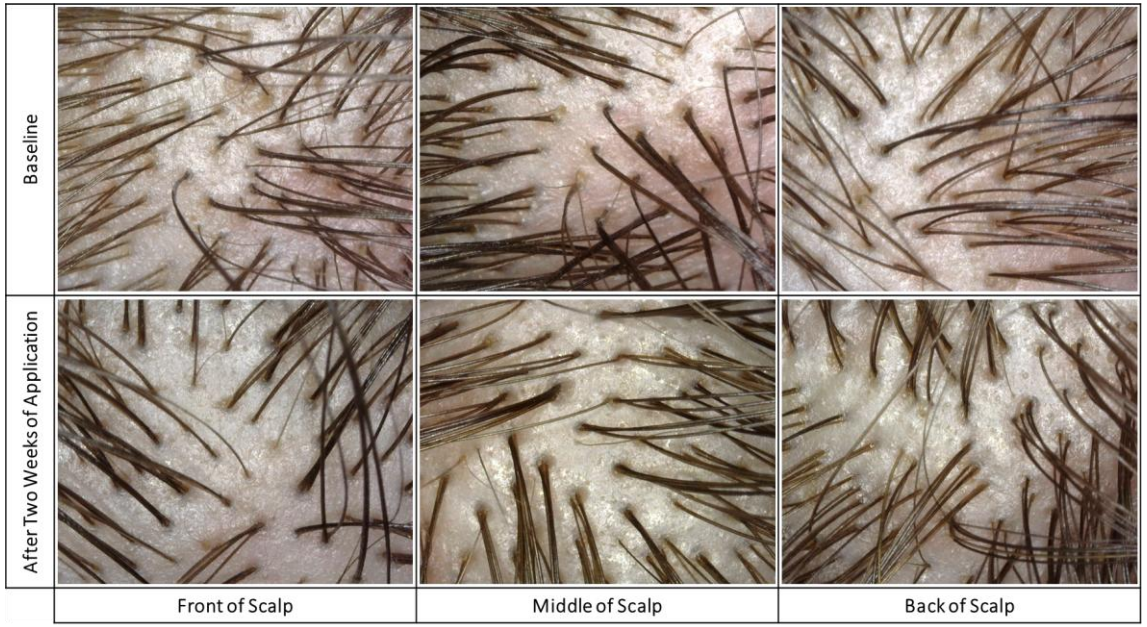


Image 1. Representative Scalp Images of a Participant at Baseline and After Two Weeks of 2.0% AC ExoRoot Application.

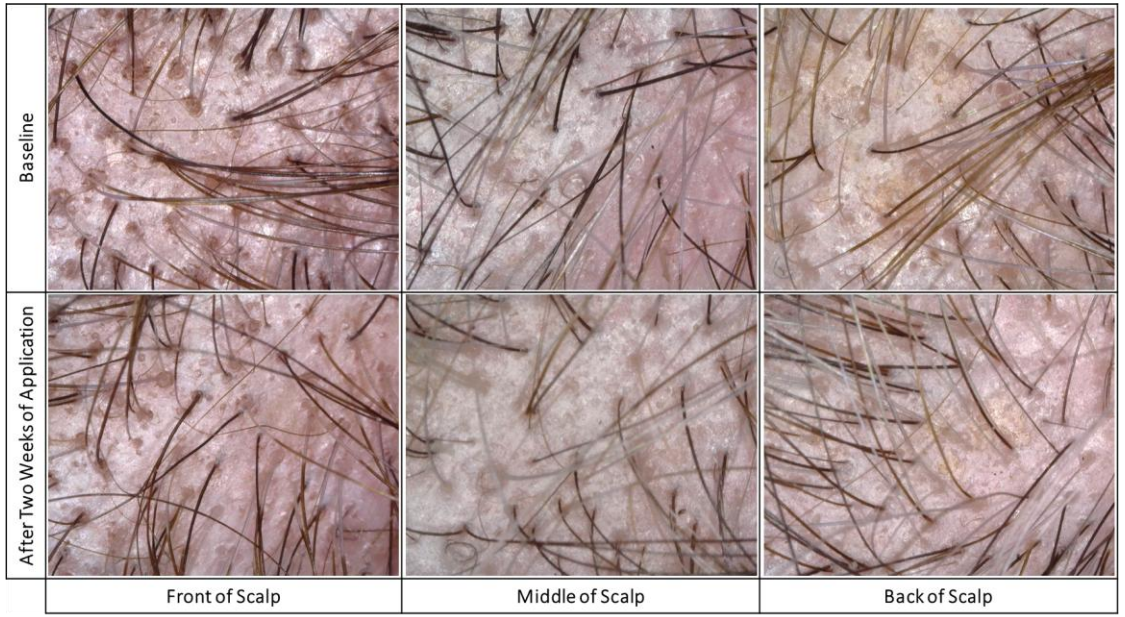


Image 2. Representative Scalp Images of a Participant at Baseline and After Two Weeks of Base Shampoo and Base Conditioner Application.

Hair Shaft Elongation

Hair is composed of the visible hair shaft and the follicle beneath the scalp, where growth is actively regulated. The follicle drives hair production through distinct growth phases, making it highly responsive to changes in its surrounding environment. To evaluate follicle activity, anagen-phase hairs with intact bulbs were collected from healthy male volunteers and cultured for 10 days. Hair follicles were maintained in complete media or treated conditions to assess effects on growth-related responses.

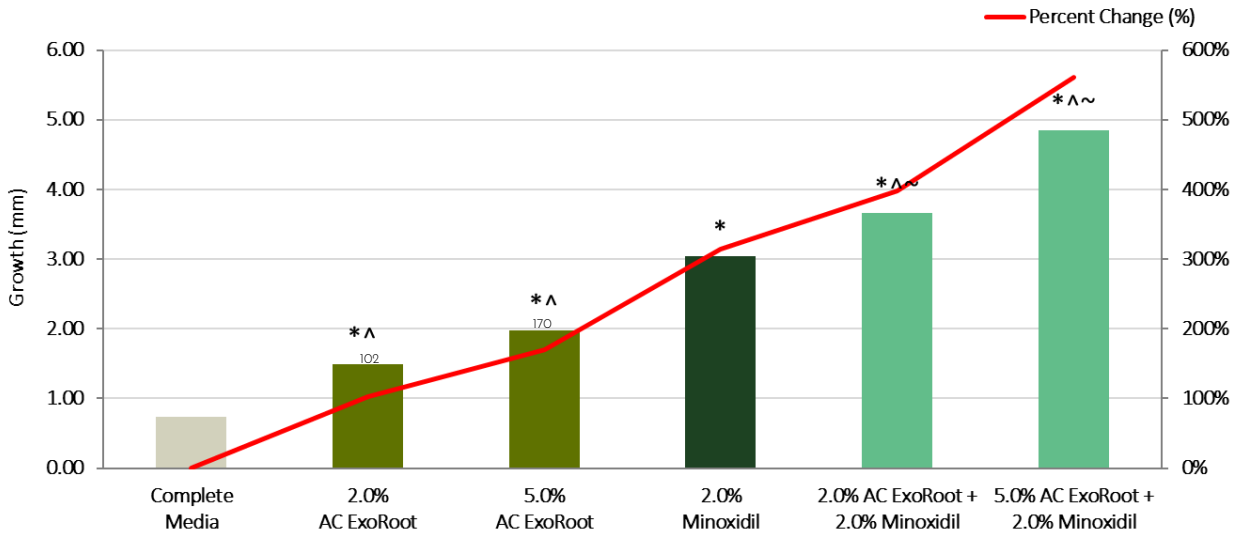


Figure 10. The Effect of AC ExoRoot, Minoxidil, and Blend on Plucked Hair Follicle Growth after 10 Days. Blend: % AC ExoRoot + 2.0% minoxidil. * indicates significance ($p < 0.05$) compared to Complete Media. ^ indicates significance ($p \leq 0.05$) compared to 2.0% minoxidil. ~ indicates significance ($p \leq 0.05$) compared to 2.0% and 5.0% AC ExoRoot.

5.0% AC ExoRoot exhibits synergistic effects with minoxidil, supporting an increase in hair shaft length by

+560%

AC ExoRoot supports visibly longer, healthier-looking hair on its own and enhances results of minoxidil-based systems.

Summary

WHAT.

AC ExoRoot defines hair longevity by targeting Hairspan — the biological foundation that supports the time hair stays healthy, resilient, and visibly vital.

WHY.

By reframing hair care as a wellness ritual, hair has become a visible biomarker of internal balance and long-term health rather than a surface-level concern. AC ExoRoot delivers hair longevity by supplementing scalp biology – the next frontier.

MADE OF.

Developed through advanced cell culture and BioAuthentic exosome technology, AC ExoRoot delivers the amino-acid rich, peptide-dense biology of *Chlorella vulgaris*.

ACTION.

AC ExoRoot was designed to support the biological markers that drive hair aging, from cellular senescence and inflammaging control to growth signaling and hair shaft elongation.

Product Inspiration

"Growth Getter" Scalp Drops

A daily scalp serum that supports a thriving scalp environment to promote the look of fuller, healthier-looking hair and hairline definition.

How To Use:

1. Fill dropper and apply directly to the scalp, focusing on the hairline and areas of concern.
2. Massage gently with fingertips.
3. Use daily. Do not rinse.

Growth Getter Scalp Drops

%	TRADE NAME	INCI	SUPPLIER
PHASE A			
91.85	Water	*Water*	Local
2.00	**AC ExoRoot**	***Water & Chlorella Vulgaris Extracellular Vesicles & Phospholipids & Lactobacillus Ferment***	**Active Concepts**
1.00	euxyl® PE 9010	*Phenoxyethanol (and) Ethylhexylglycerin*	Ashland
0.10	Natrlquest® E30	*Trisodium Ethylenediamine Disuccinate*	Innospec
0.20	Carbopol® 1342 polymer	*Acrylates/C10-30 Alkyl Acrylate Crosspolymer*	Lubrizol
PHASE B			
2.00	Hydrolite 5 Green	*Pentylene Glycol*	Symrise
0.25	**AC HYA Solution 1%**	**Water & Hyaluronic Acid**	**Active Concepts**
PHASE C			
2.00	symbio®solv clear plus MB	*Caprylyl/Capryl Glucoside (and) Aqua (and) Sodium Cocoyl Glutamate (and) Glyceryl Caprylate (and) Citric Acid (and) Polyglyceryl-6 Oleate (and) Sodium Surfactin*	Evonik
0.10	Vitamin E Acetate USP	*Tocopheryl Acetate*	Kraft Chemicals
0.50	Coastal Sunrise	*Fragrance*	COSMO International Fragrances

Procedure

1. In a main beaker, combine Phase A ingredients and mix using a prop [300-400 rpm]. Mix until Carbopol is completely dispersed and batch is homogeneous.
2. In a separate container, pre-mix Phase B to create a slurry and add to Phase A with continuous prop mixing [300-400 rpm]. Mix until homogeneous.
3. In a separate container, pre-mix Phase C to create a slurry and add to Phase AB with continuous prop mixing [300-400 rpm]. Mix until homogeneous

Active Concepts

AC ExoRoot

Active Concepts

Code: 60202

INCI: Water & Chlorella Vulgaris Extracellular Vesicles & Phospholipids & Lactobacillus Ferment

CHI INCI: Water & Chlorella Vulgaris Extract & Phospholipids & Lactobacillus Ferment

Appearance: Liquid Exosomal Dispersion, Tan to Dark Brown

Suggested Use Level: 1-5%

Suggested Applications: Promotes Hair Longevity | Supports Hairspan | Scalp Pro-Aging

Standardized for: IGF-1, PDI, Protein Content, Particle Size, RNA Identification

In Vitro
In Vivo
ISO 16128 NI & NOI
Vegan Compliant
COSMOS Compliant
China Compliant
Product Passport
Sephora Clean
Credo Clean

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