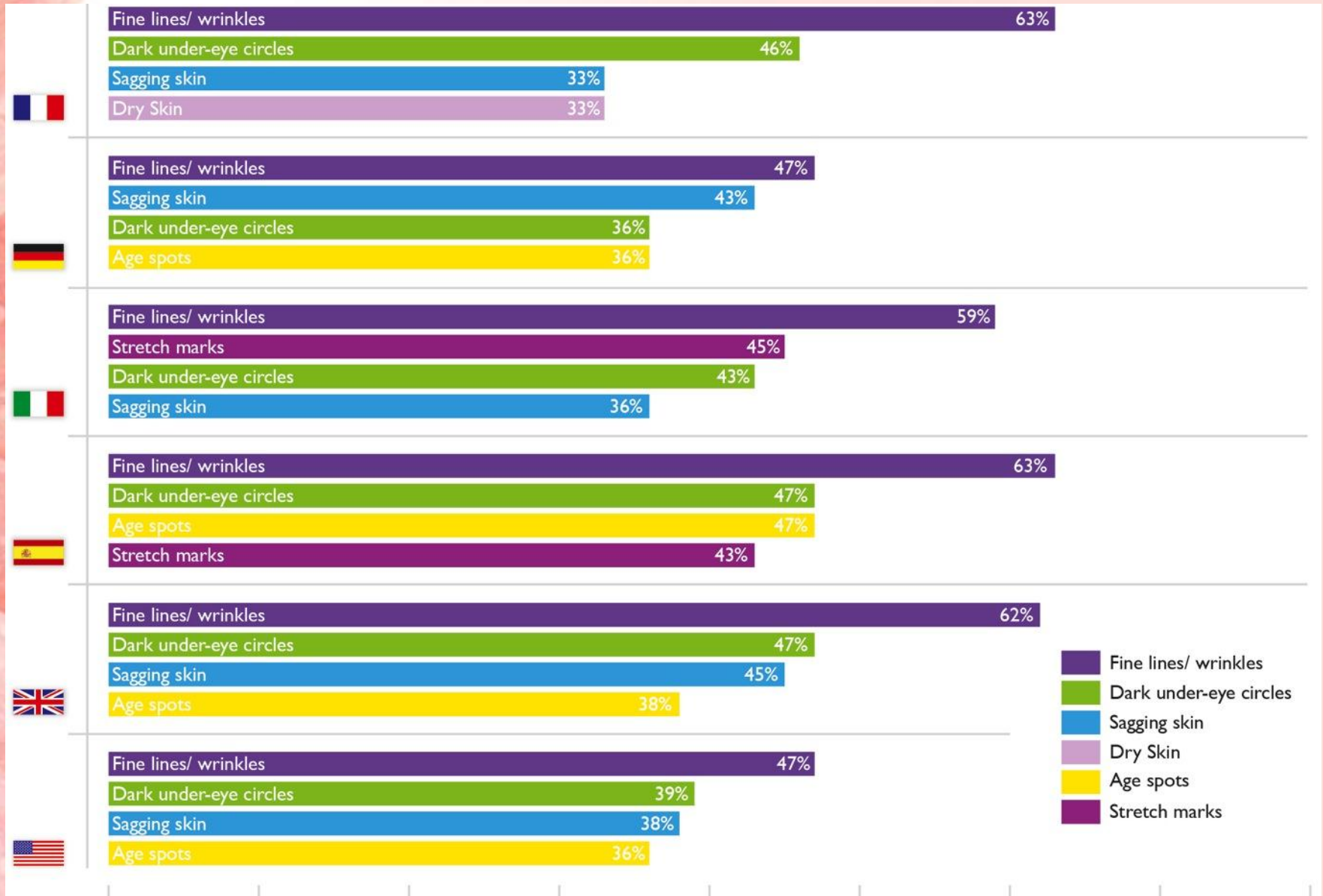
Associated Skin Care Professionals

Peptides

And How They Work

with Kristina Kannada,
Hydropeptide

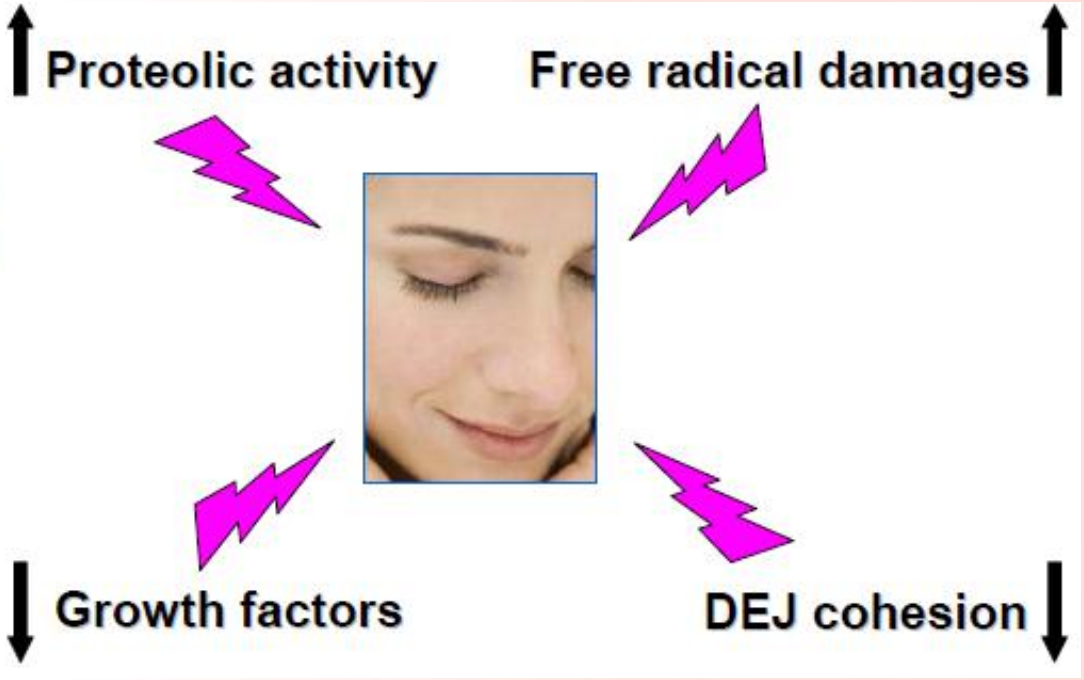
Fine lines and wrinkles are the #1 concern for skin care consumers



Chronological vs. Photoaging

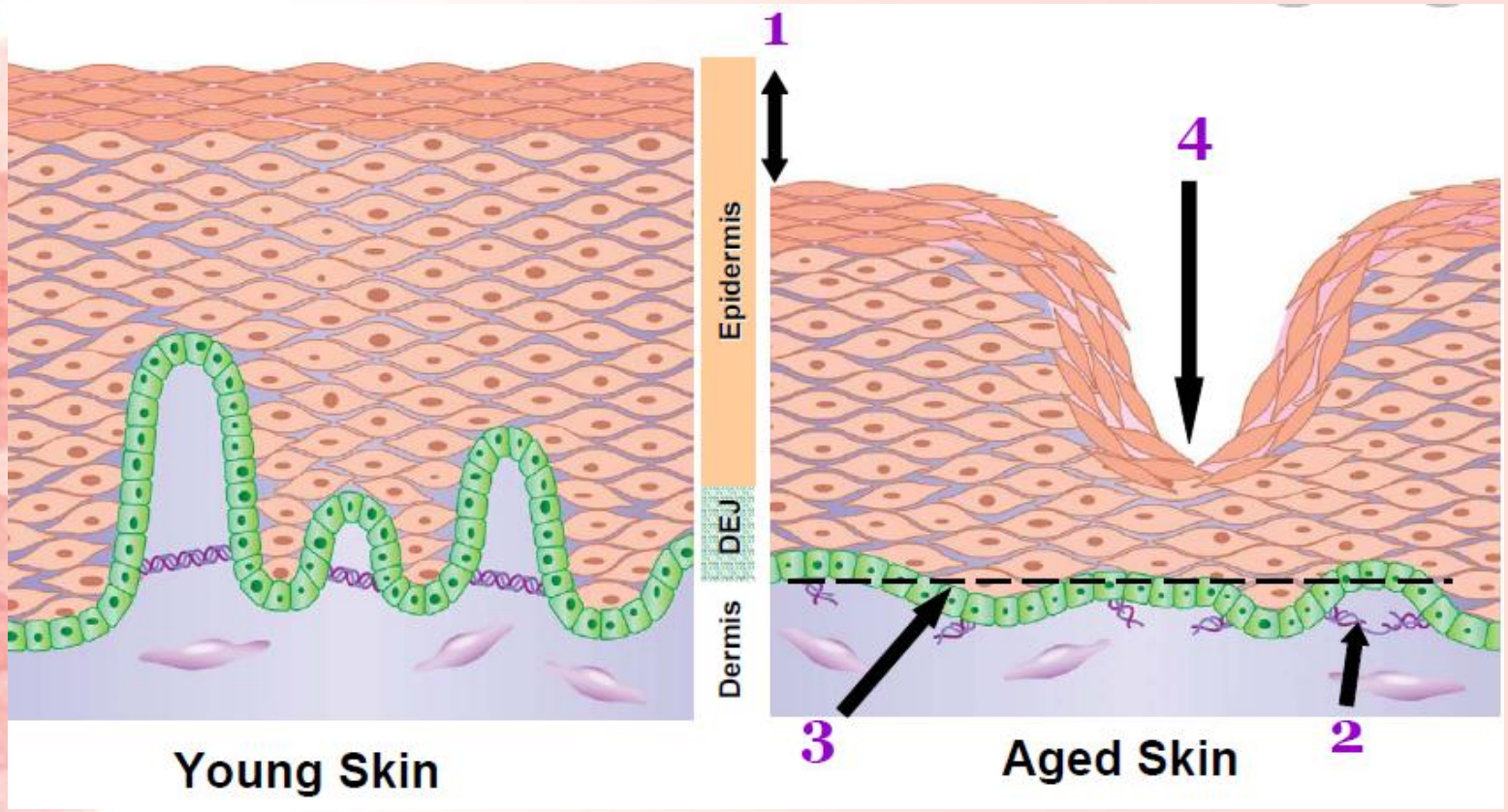
	 Chronological aging	 Photoaging
Causes	-Passage of time -Genetic background	-Sun exposure -Genetic background (skin type)
Manifestations at the skin level	-Fine wrinkling -Thinning -Reduced elasticity -Dryness -Reduced immune response -Slow cicatrisation	-Deep wrinkling -Sagging -Irregular pigmentation -Brown spot -Roughness -Leathery appearance -Reduced immune response
Manifestations at the histological & cellular level	-DEJ flattening -Loss of dermal papillae -ECM atrophy -Reduced number of fibroblasts -Low levels of collagen & elastin -Reduced cell turnover	-Dermal elastosis (accumulation of proteolized elastin fibers) -Collagen reduction & fragmentation -Reduced cell turnover

Factors Involved in Skin Aging



Proteolic activity: Increase in degradation of proteins by cellular enzymes
Free radical damage: Increase in unpaired electrons that accelerate aging
Growth factors: Decrease in signaling molecules and cellular processes
DEJ: Decrease in skin cohesion

What happens with aging?



1: Thinning of the skin
2: Collagen fragmentation
3: Dermal epidermal junction (DEJ) flattening
4: Wrinkle formation

Collagen and Aging

Collagen gives skin structural support. It is the most abundant form of protein in the ECM, and its decrease is a major factor in wrinkle formation.

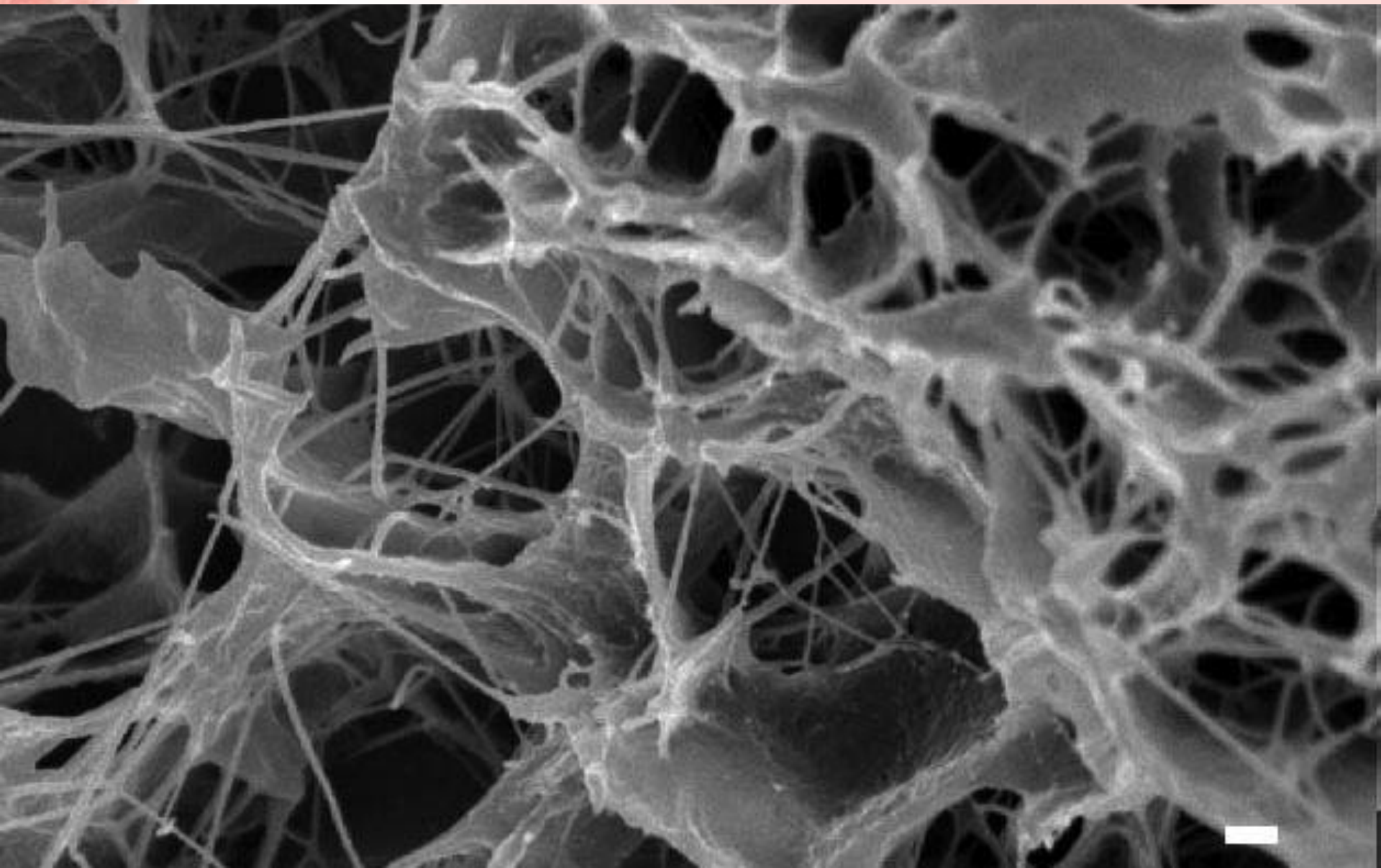
29 types of collagen have been identified. They are divided into five families according to type of structure: **Fibrillar** (Type I, II, III, V, XI), **Facit** (Type IX, XII, XIV), **Short Chain** (Type VIII, X), **Basement Member** (Type IV), and **Other** (Type VI, VII, XIII).

Important types of collagen in terms of skin aging:

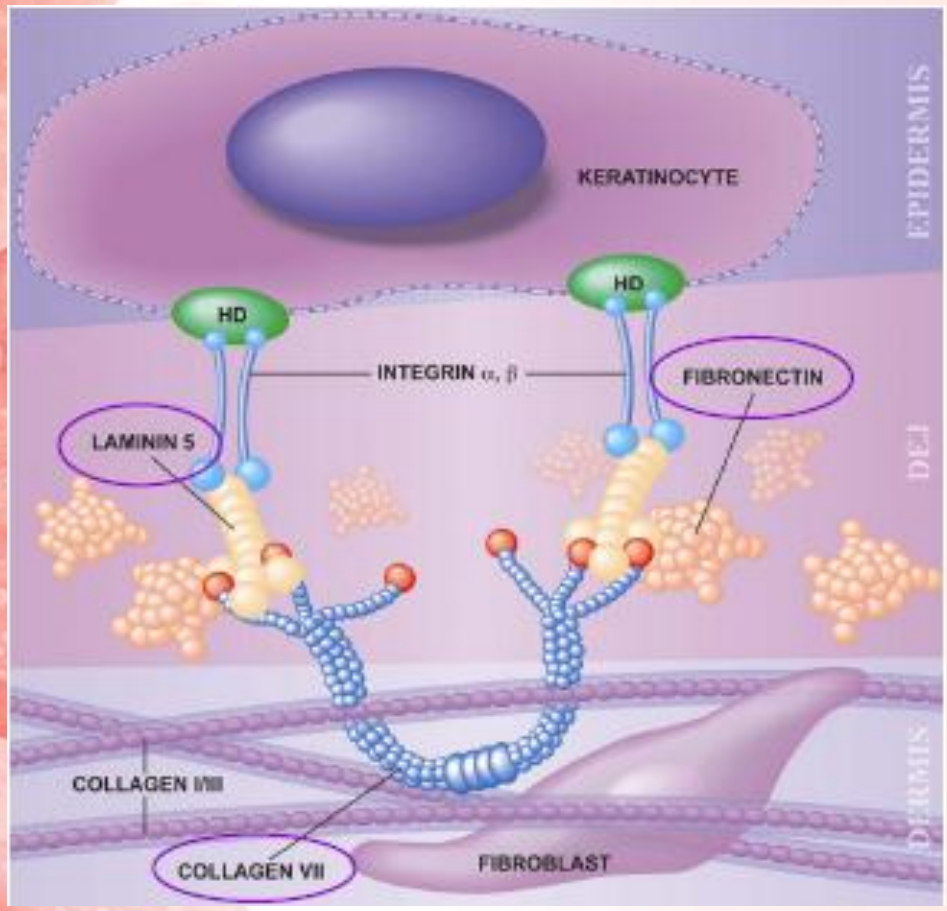
- **I:** Most abundant form. Gives strength to the dermis.
- **III:** Second most abundant form. Gives elasticity to the dermis.
- **IV:** Major component of basement membrane. Forms a "chicken-wire" mesh with laminins and proteoglycans that influence cell adhesion, migration and differentiation.
- **V:** Regulates the diameter of Collagen I and III fibers.
- **VI:** A major component of microfibrils. Increases cell strength.
- **VII:** Provides stability and anchors the dermis to the DEJ.
- **XVII:** A transmembrane protein that is a structural component of hemidesmosomes, improving adhesion of the keratinocytes to the underlying membrane.

A good skin care regimen must support multiple skin proteins for the best results.

Collagen



Improving the DEJ = Firmer Skin



The **Dermal-Epidermal Junction (DEJ)** holds the skin together, improving its compactness, firmness and elasticity.

The DEJ maintains skin cohesion and anchors the epidermis to the dermis.

Imagine the skin as being a series of chain links. If just one of the links break, elasticity would decline and skin would begin to sag.

Improving collagen production is important, but improving the network of collagen and other protein structures is equally important.

How Peptides Enhance Collagen

- When cells detect high levels of collagen type I breakdown products, it tells them too much collagen has been destroyed.
- This triggers the cells to decrease collagen destruction, and increase collagen synthesis.
- Pentapeptide is a fragment of collagen type I and fools the cells into the same response.

Zoe Diana Draelos, “From Proteins to Peptides – What They Mean to the Dermatologist,” *European Dermatology Review* , 31-32 (2006).

The Birth of the Peptide

Yeast extracts were used in medications for wound healing in the 1930s. They increased cellular oxygen consumption, improved collagen synthesis and increased blood vessel development.

Later, research showed these effects came from proteins (made up of peptides), which could be extracted from the yeast.

The peptides were found to have a *low molecular weight* and ability to *up-regulate cellular growth factors* that lead to skin healing.

Today, more than 500 proteins have been derived from yeast (Saccharomyces cerevisiae). Peptides are also derived from casein, cotton, rice, wheat, whey, and many forms of plants.

The First Topical Peptides

Pal-KTTS is also called **Matrixyl** (its trade name) or **palmitoyl pentapeptide**. It is composed of lysine, threonine and serine and palmitic acid.

- First peptide used in skin care
- Retinol alternative, with no side effects or irritation
- After 2 months, Matrixyl was more effective (6.5% increase in skin thickness compared to 4% with Retinol) without any negative side effects
- Stimulates cellular growth
- Increases both collagen and fibronectin synthesis (with cultured lung fibroblasts)
- Increases collagen type I, collagen type IV, and glycosaminoglycans

The First Topical Peptides

Copper peptide GHK-Cu occurs naturally in human blood, saliva and urine. Since it has three amino acides, it is also called **tripeptide**. Its amino acid sequence is glycyl-L-histidyl-L-lysine.

GHK-Cu was isolated from human plasma albumin in 1973 by Loren Pickart. In the late 1980s, French scientists J.P. Borel and F. Maquart found it had many biological actions, including:

- Activation of wound healing
- Attraction of immune cells
- Antioxidant and anti-inflammatory effects
- Simulation of collagen and glycosaminoglycans synthesis in skin fibroblasts
- Promotion of blood vessel growth
- Regulates the skin remodeling process

Tripeptide delivers copper into the skin and assists in wound healing.

Types of Peptides: 4 Categories

Signal Peptides

- Collagen production / stretch marks
- Increased anagen (growth phase) phase
- Feel good / skin defense
- Desquamation (exfoliation/shedding)

Neurotransmitting-Inhibitor Peptides

- Muscle relaxation / wrinkle relaxation

Enzyme Inhibitor Peptides

- Dark circles / puffiness
- Brightening / lightening

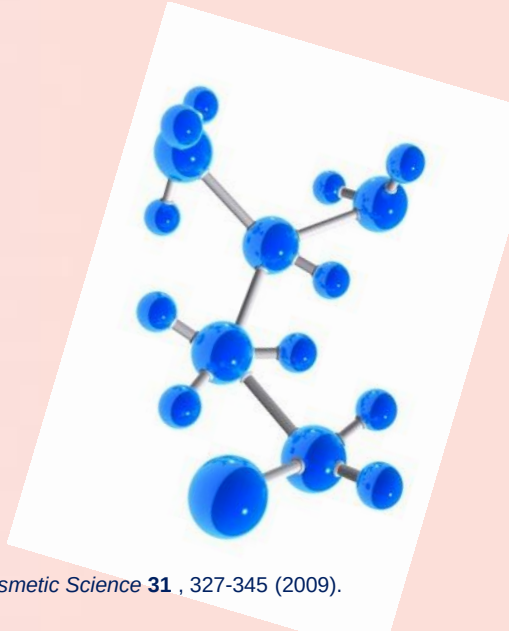
Carrier Peptides

- Enhance delivery

F. Gorouhi, and H. I. Maibach, “Role of Topical Peptides in Preventing or Treating Aged Skin,” *International Journal of Cosmetic Science* **31** , 327-345 (2009).

Why Use Peptides?

- **Ease of Use and Safety:** RIPT (repeat insult patch test) shows no sensitivity or irritation. Compatible with other anti-aging ingredients (Retinol, AHAs, Vitamin C)
- **Penetration:** Small particle size allows for skin permeation
  - <500 Da molecular weight
  - Attached to fatty acid (palmitoyl, acetyl, etc) for delivery
  - Formulated within liposome for delivery
  - Carrier peptides (tripeptide)
- **Stability:** Lab-enhanced to remain stable
- **Efficacy:** Second generation peptides



F. Gorouhi, and H. I. Maibach, "Role of Topical Peptides in Preventing or Treating Aged Skin," *International Journal of Cosmetic Science* **31** , 327-345 (2009).

The Evolution of Anti-Aging Skin Care

Retinols: Developed in 1971 for treatment of acne.

Antioxidants: Before 1972, when Denham Harman wrote “Mitochondrial Theory of Aging,” scientists scoffed at the idea that free radicals might play a role in aging.

Alpha Hydroxy Acids: Discovered in 1974 while looking for a treatment for ichthyoses (dry, thickened, scaly skin). Use in skin care has exploded since 2000.

Peptides: Explosion began in late 1980s when copper peptide was found.

Stem Cells: Stem cells have recently emerged, with the Swiss Apple being the first recognized.

Peptides that RELAX

Minimize the actions that cause wrinkles.

- **Argireline** (Acetyl Hexapeptide-8)
- **SNAP 8** (Acetyl Octapeptide-3)
- **Myoxinol** (Hydrolyzed Hibiscus Esculentus Extract)
- **Syn-Ake** (Dipeptide Diaminobutyrolyl Benzylamide Diacetate)

Peptides that RELAX: Argireline

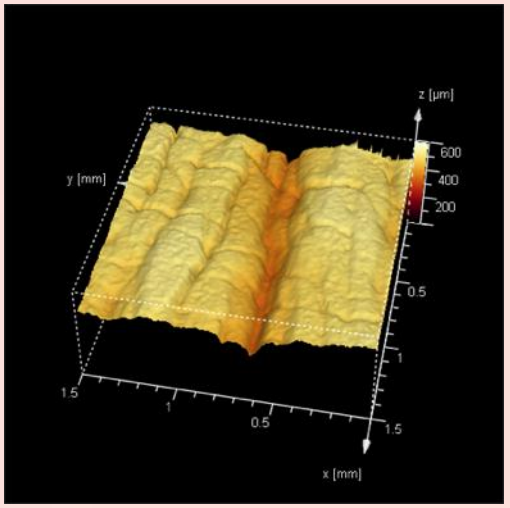
INCI: Acetyl Hexapeptide-8

Benefits: Inhibits the reaction that causes muscle movement. Prevents formation of lines and wrinkles. Expression lines are softened. Wrinkle depth reduced an average of 17% after 15 days.

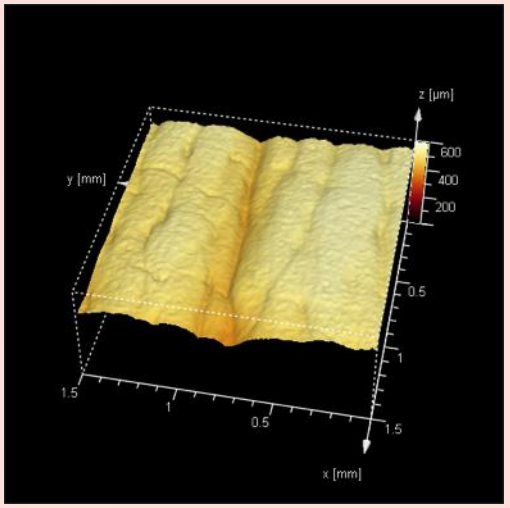
Recommended Level: 5-10%

Clinical Level: 10%

The SNARE (SNAp REceptor) complex is essential for neurotransmitter release when smiling or frowning. When Argireline competes for a position in the SNARE complex, the SNARE complex becomes destabilized, preventing the formation of lines and wrinkles.



Skin topography images, before (above) and after (below) 30 days of treatment with 10% Argireline.



Peptides that RELAX: SNAP-8

INCI: formerly Acetyl Glutamyl Heptapeptide-1, now called Acetyl Octapeptide-3

Benefits: Reduces wrinkle depth

Recommended Level: 3-10%

Clinical Level: 10%

SNAP-8 is an elongation of Argireline. It works in the same manner as Argireline, but has been shown to be 30% more effective, both in vivo and in vitro.

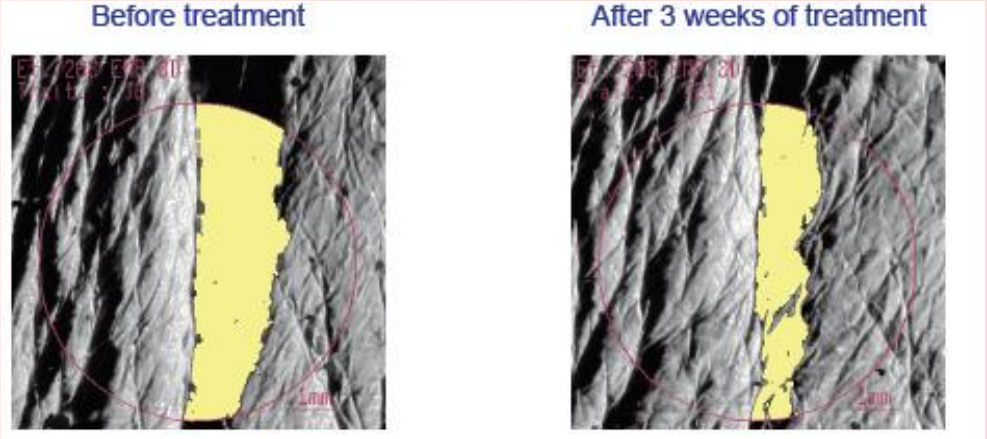
Peptides that RELAX: Myoxinol

INCI: Hydrolyzed *Hibiscus Esculentus* extract, or Dextrin

Benefits: Smooths expression lines, deep wrinkle reduction and lifting of skin surface

Recommended Level: 0.5 to 2%

Clinical Level: 1%



Shown to reduce muscle contractions for up to 24 hours and reduce wrinkles by 26% after 3 weeks with 1% Myoxinol.

Myoxinol is a patented complex of oligopeptides obtained from the seeds of okra (*Hibiscus esculentus L.*) These botanical peptides combat wrinkles in a similar way to the botulinum toxin (Botox), by inhibiting the movement of facial muscles.

Peptides that RELAX: Syn-Ake

INCI: Diaminobutyroyl Benzylamide Diacetate

Benefits: Reduces Wrinkles and Blocks Muscle Contractions

Recommended Level: 4-10%

Clinical Level: 4%

Mimics effects of Waglerin 1, a peptide string of 22 amino acids which is found in the venom of the Wagler's pit viper (temple viper).

Reduces frequency of muscle contractions by 82% after 2 hours by blocking uptake of the Na+ sodium ion, and reduces wrinkles by 52% after 28 days.

Peptides that PURIFY

Exfoliate, brighten, and cleanse skin of impurities.

- **ß-White** (Oligopeptide-68)
- **Perfection Peptide P3** (Hexanoyl Dipeptide-3 Norleucine Acetate)

Peptides that PURIFY: β-White

INCI: Butylene Glycol, Hydrogenated Lecithin, Sodium Oleate, Oligopeptide-68, or Disodium EDTA

Benefits: Inhibits tyrosinase activity, melanin synthesis, and the action of the MITF cellular pathway

Recommended Level: 0.5-5%

Clinical Level: 2.5 - 5%

β-White has demonstrated in vitro efficacy on the inhibition of the expression of MITF, TRP-1, TRP-2, the inhibition of tyrosinase activity, the reduction of dendricity and melanosome content, and reduction of melanin production, with higher activity than vitamin C and Arbutin.
In vivo, it induces significant progressive skin lightening effects on the face and hyperpigmented spots.

MITF: Micorphtalmia-associated transcription factor. Regulates melanocyte pigmentation, proliferation and survival.
TRP-1: Tyrosinase related protein-1. Regulates melanogenic enzymes.
TRP-2: Tyrosinase related protein-2.

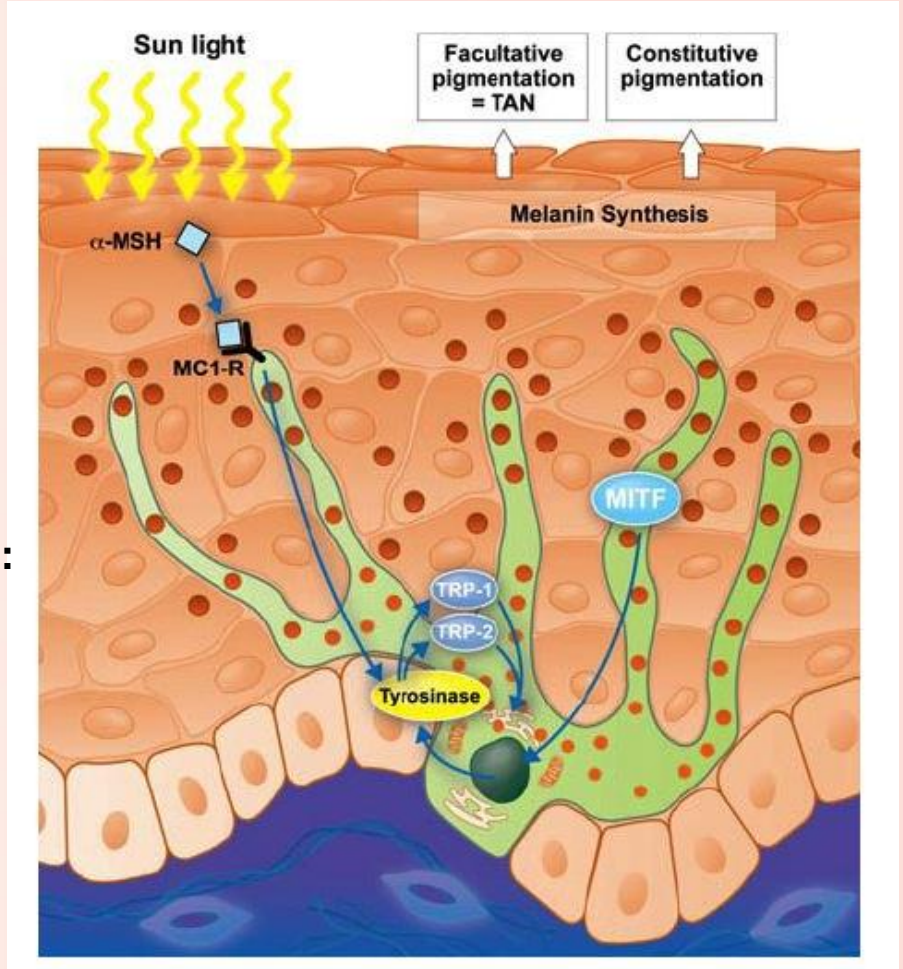
Peptides that PURIFY: β-White

The synthesis and distribution of melanin in the epidermis involves several steps:

- Transcription of melanogenic proteins
- Melanosome biogenesis
- Sorting of melanogenic proteins into the melanosomes
- Transport of melanosomes to the tips of melanocytes dendrites
- Transfer into keratinocytes

Depigmentation can be achieved by regulating:

- Transcription and activity of tyrosinase, TRP-1, TRP-2
- Uptake and distribution of melanosomes in keratinocytes
- Melanin and melanosome degradation and turnover of “pigmented” keratinocytes



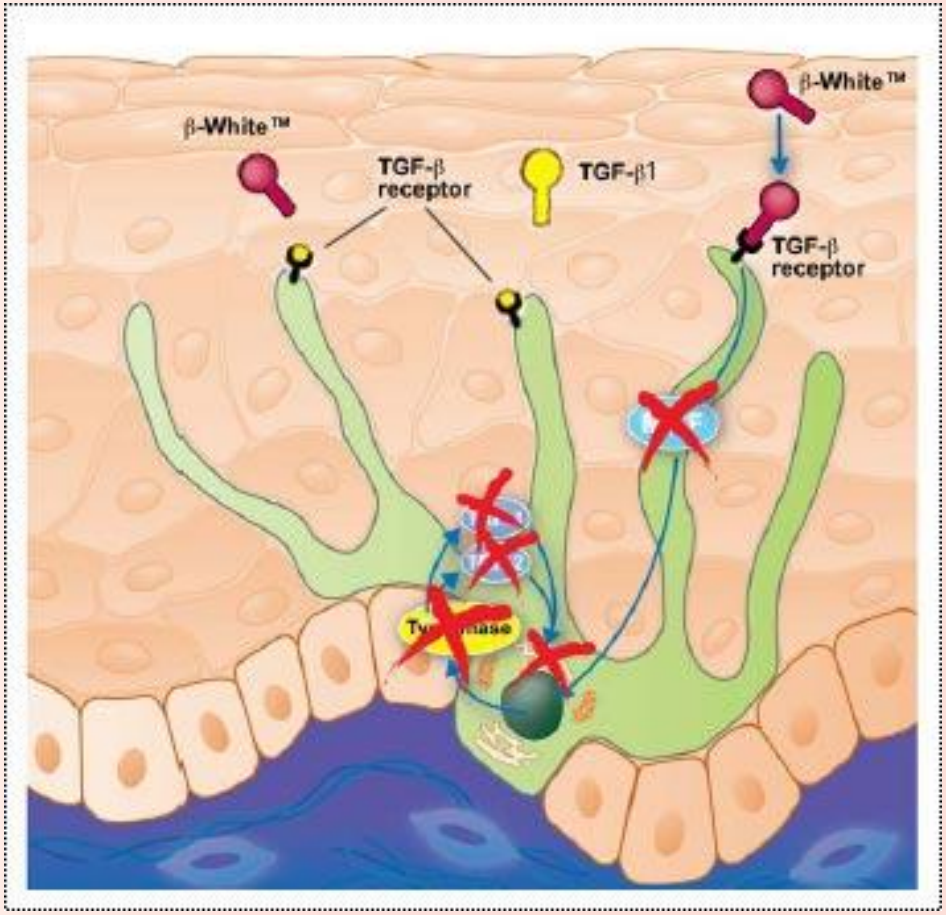
Most products act to reduce the function of tyrosinase. One method of doing this is by modulating the transcription of genes encoding tyrosinase’s and TRP’s enzyme.

Peptides that PURIFY: β-White

How β-White works

β-White acts on TGF-beta receptors, activating TGF-beta to inhibit MITF, TRP-1 and TRP-2.

It differentiates itself from other whitening agents with its unique inhibitory action on the MITF cellular pathway.



MITF is involved in melanocyte development to decrease **constitutive** (genetically determined) and **facultative**(environmental) pigment.

Peptides that PURIFY: Perfection Peptide P3

INCI: Hexanoyl Dipeptide-3 Norleucine Acetate

Benefits: Increased Smoothness, Reduced Wrinkle Depth and Increased Hydration

Recommended Level: 1-2%

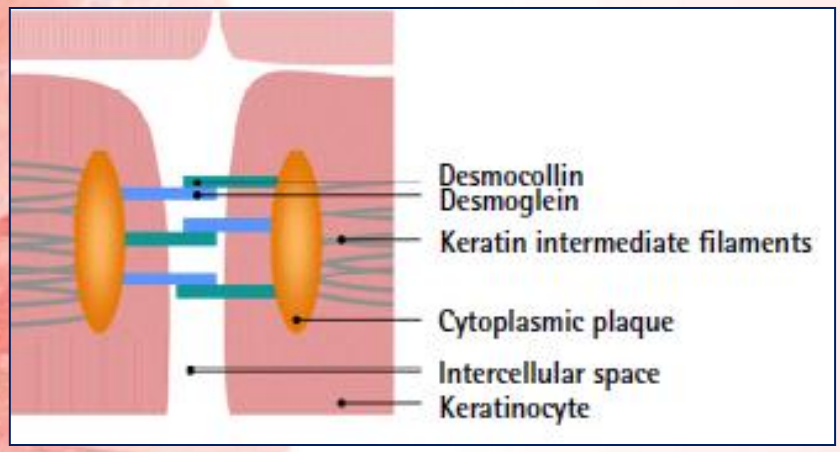
Clinical Level: 1%

In aging skin, desquamation (shedding of old corneocytes) is slowed, leading to dry, rough, scaly skin. The turnover time of the strateum corneum is 2-4 weeks up to age 30. After this, it decreases 30-50%.

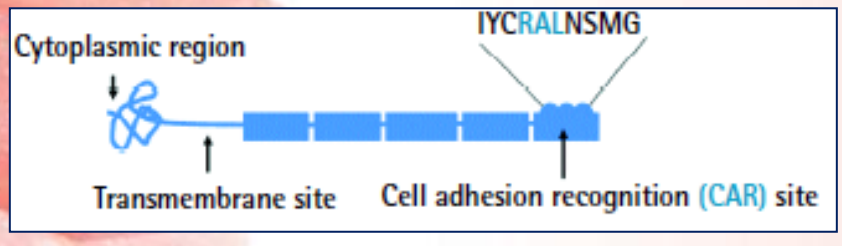
Desquamation requires degradation of connections between the corneocytes. Cell Adhesion Recognition (CAR) sequence is essential to these connections. Peptides containing the CAR sequence compete with the natural cell-to-cell binding, thus promoting desquamation.

Perfection Peptide P3 increases epidermal turnover to values typical for young skin, reducing wrinkle depth from 13.2% to 10.3% after 17 days.

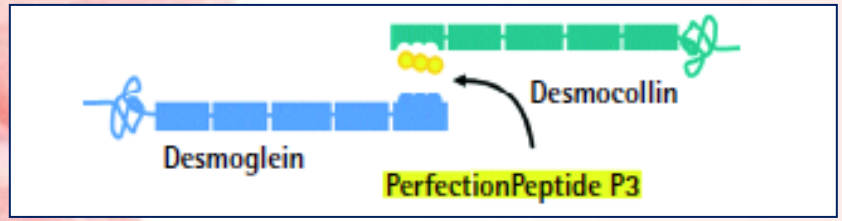
Peptides that PURIFY: Perfection Peptide P3



Corneocytes are held together by corneodesmosomes. The principle link is formed between desmoglein and desmocollin.



Desmoglein is a protein composed of five extracellular domains, with the binding site of desmocollin in the outermost domain.



Perfection Peptide P3 competes with desmoglein in binding to desmocollin.

Peptides that NOURISH

Feed and energize skin with vitamins and other essential nutrients.

- **Milk Peptide Complex** (Whey Protein)
- **Peptamide-6** (Hexapeptide-11)

Peptides that NOURISH: Milk Peptide Complex

Colostral milk (milk that is produced immediately after birth) has an exceptional biological activity which is important for the stimulation of development processes in newborns.

Milk Peptide Complex acts similar to colostral milk by activating cytokines that are responsible for stimulatory signals within the skin.

With twice-daily use:

- Wrinkles were reduced by 20% over placebo after 14 days.
- Skin was smoother by 17% over placebo after 14 days.
- Skin thickness was increased by 10% over placebo after 19 days.
- Skin firmness was increased by 30% over placebo after 10 days.

Peptides that NOURISH: Peptamide-6

INCI: Hexapeptide-11
Benefits: Lightening, firming, healing, anti-stress/relaxing
Recommended Level: 0.5-3%
Clinical Level: 2.8%

Petamide-6 is a product of the fermentation of Saccharomyces yeast (rich in vitamins and proteins).

It influences a number of human skin genes related to stress and extracellular matrix function, and has a powerful influence on a number of skin growth factors.

It has been proven that Peptamide-6 helps to firm the skin. It upregulates skin proteins, growth factors and skin lipids.

Peptides that NOURISH: Peptamide-6

Peptamide-6 upregulates 5 key functional areas:

- Transmembrane protein (moves materials through cell membranes)
- Growth factors (responsible for growth of tissues, including fibroblasts)
- Matrix proteins (important components of ECM, which gives skin elasticity)
- Skin lipid development (make up lipid bilayer)
- Cell shock/cell stress protein (reduces skin stress)

Right: The amino acids found in the hexapeptide of Peptamide-6.

Hexapeptide:

Phe-Val-Ala-Pro-Phe-Pro

Phenylalanine (Phe), Valine (Val), Alanine (Ala), Proline (Pro), Phenylalanine (Phe), and Proline (Pro)

Peptides that STIMULATE

Promote healthy skin functions.

- **AC Collagen PrePeptide** (Tripeptide-29)
- **Dermaxyl** (Palmitoyl Oligopeptide)
- **Matrixyl 3000** (Palmitoyl Oligopeptide, and Palmitoyl Tetrapeptide-3)
- **Regestril** (Palmitoyl Oligopeptide, and Palmitoyl Tetrapeptide-7)
- **Syn-Coll** (Palmityol Tripeptide-3)
- **Syn-Tacks** (Palmitoyl Dipeptide-5 Diaminobutyloyl Hydroxythreonline, and Palmitoyl Dipeptide-6 Diaminohydroxybutyrate)
- **Eyeliss** (Dipeptide-2, and Tetrapeptide-3)
- **Haloxyl** (Palmitoyl Oligopeptide, and Palmitoyl Tetrapeptide-3)

Peptides that STIMULATE: AC Collagen PrePeptide

INCI: Tripeptide-29
Benefits: Plumping, firming, wrinkle reduction
Recommended Level: 0.1-1%
Clinical Level: 1%

Dramatically increases collagen I and III, minimizing fine lines and wrinkles while plumping the lips. Amino acid sequence is Glycine-Proline-Hydroxyproline.

Results after using 3x a day for 29 days:
40% increase in lip volume
60% improvement in hydration
29% decrease in folds and creases

Peptides that STIMULATE: Dermaxyl

INCI: C12-15 Alkyl Benzoate, Tribehenin, Ceramide 2, PEG 10 Rapeseed Sterol, or Palmitoyl Oligopeptide
Benefits: Anti-aging, Wrinkle Smoothing and Repairs Skin Damage
Recommended Level: 2%
Clinical Level: 2%

Repairs age-related skin damage, and boosts cell communication and dermal repair mechanisms.

Dermaxyl is an association of ceramide 2, the stratum corneum cement and the palmitoylated matrikine Pal-Val-Gly-Val-Ala-Pro-Gly. Matrikines are messenger peptides, specifically involved in repairing damage to the cutaneous matrix.

Pal-VGVAPG is chemotactic, attracting fibroblasts and monocytes to the site of matrix repair. VGVAPG is the spring fragment of elastin.

Values After 56 Days	Mean	Maximum
Volume of the main wrinkle	13.7%	-36%
Depth of the main wrinkle	10.1%	-27%
Surface occupied by deep wrinkles	**-40.3%**	**-98%**
Surface occupied by medium wrinkles	-24.5%	-86%

Study performed using 24 female volunteers aged from 42 to 66 years.

Daily application of a liquid foundation (pigmented or non-pigmented) containing 2% Dermaxyl, for two months.

Peptides that STIMULATE: Matrixyl 3000

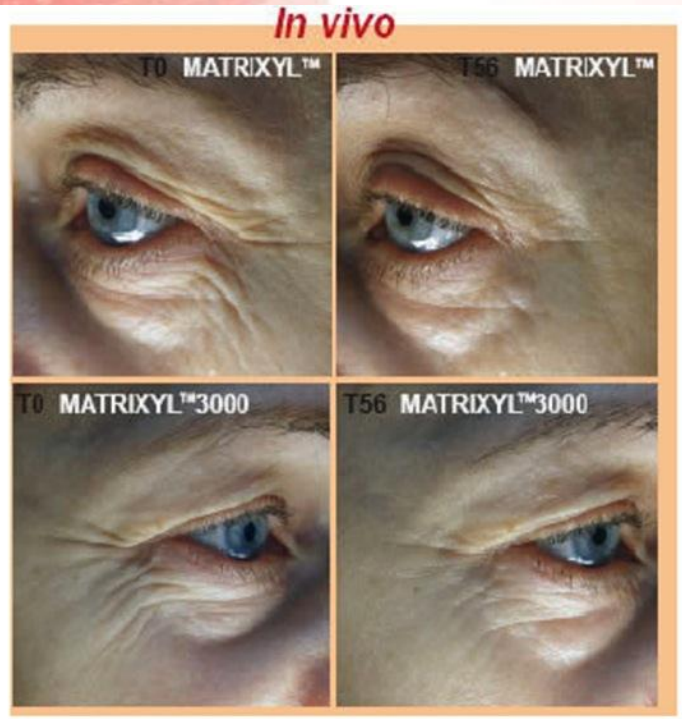
INCI: Glycerin, Water, Butylene Glycol, Carbomer, Polysorbate 20, Palmitoyl Oligopeptide, Palmitoyl Tetrapeptide-7
Benefits: Stimulates collagen I, fibronectin, and hyaluronic acid; restructures damaged skin and reduces wrinkles
Recommended Level: 3-8%
Clinical Level: 3%

Matrixyl 3000 stimulates matrikines to help restructure damaged skin. It contains two matrikines, Pal-GHK and Pal-GQPR, which act in synergy to restore and maintain skin's youthful appearance.

Matrikines are messenger molecules, capable of regulating cell activities. They interact with specific receptors to activate certain genes involved in the process of extracellular matrix renewal and cell proliferation. With age, these mechanisms become progressively weaker.

Matrixyl versus Matrixyl 3000

- Two groups of 23 volunteers, aged between 39 and 74.
- Twice daily application for 2 months, to one half of face, with either 3% Matrixyl or 3% Matrixyl 3000.
- After 56 days, deep wrinkles were reduced by 45% (Matrixyl 3000) compared to 28% (Matrixyl).



Parameter	Matrixyl 3000	Matrixyl	Placebo
Surface occupied by deep wrinkles	**-44.9**	**-27.7**	**4.3**
Main wrinkle density	**-37.0**	-27.3	-9.6
Main wrinkle average depth	**-15.1**	-9.8	-3.2
Main wrinkle average volume	**-18.5**	-14.7	-8.7
Roughness	**-14.4**	-10.8	1.4
Complexity (Lifting)	**-16.6**	-12.7	4.2

Peptides that STIMULATE: Regestril

INCI: Palmitoyl Oligopeptide, Palmitoyl Tertapeptide-7

Benefits: Reduces stretch marks and their discoloration, promotes collagen

Recommended Level: 2-4%

Clinical Level: 2%

Regestril inhibits the formation and effect of proteolytic enzymes, which are involved in stretch mark formation. It also promotes molecule synthesis, speeding up skin recovery.

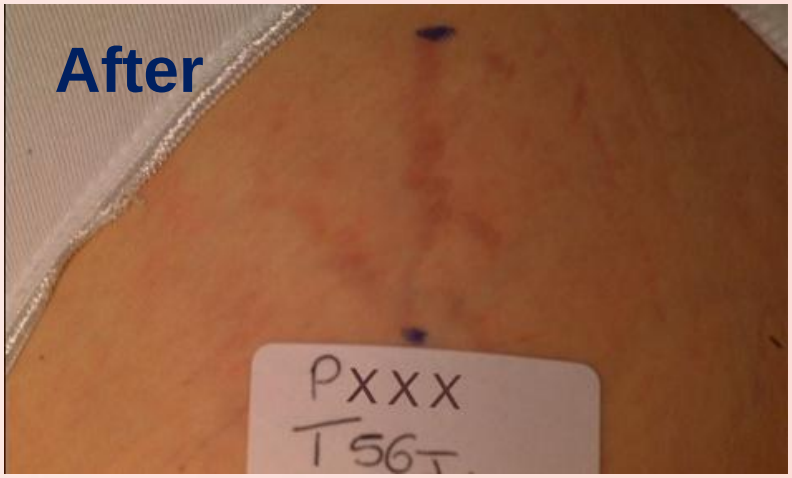
Palmitoyl Oligopeptide and Palmitoyl Tetrapeptide-7 work to increase and boost the growth of the connective tissues while also increasing the production of collagen in the skin.

Peptides that STIMULATE: Regestril

Promotes production of collagen and fibronectin by 100% and reduces collagen breakdown by more than 90%

In a study, after 56 days of use:

- Stretch marks reduced by 72%
- Skin thickened by 11%
- Discoloration of stretch marks reduced by 22%



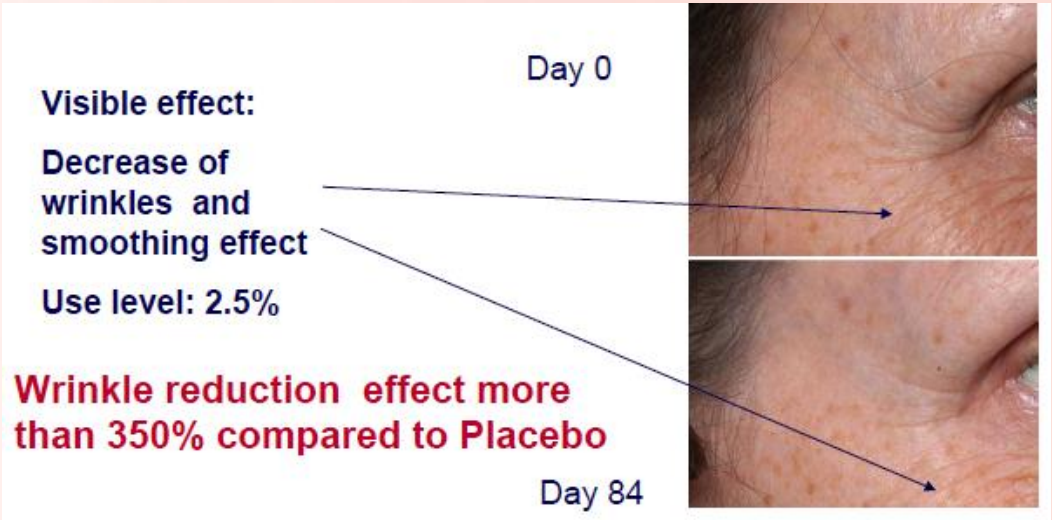
Peptides that STIMULATE: Syn-Coll

INCI: Palmitoyl Tripeptide-5, Glycerin
Benefits: Increases collagen, reduces wrinkles
Recommended Level: 2.5%
Clinical Level: 2.5%

Syn-Coll activates TGF-ß, the key element in collagen synthesis. It works similarly to thrombospondin (TSP).

Syn-Coll at 2.5% was shown to increase collagen I by 119%.

After 84 days of use, it reduced wrinkles 350%.



Peptides that STIMULATE: Syn-Tacks

INCI: Palmitoyl Dipeptide-5 Diaaminobutyloyl Hydroxythreonine, Palmitoyl Dipeptide-6 Diaminohydroxybutyrate
Benefits: Stimulates proteins, improves skin tone and cell cohesion
Recommended Level: 1%
Clinical Level: 1%

Stimulates proteins (laminin V, collagen IV, VII, XVII, and integrin) to help bind the cellular structure of the skin where the dermis meets the epidermis, leading to improved structural integrity, better nutrition for the top layers of skin, and a reduction of lines and wrinkles.

In studies, Syn-Tacks improved skin tone by 32%, cell cohesion by 23%, and the organization of collagen fibers (anisotropy) by 62%.

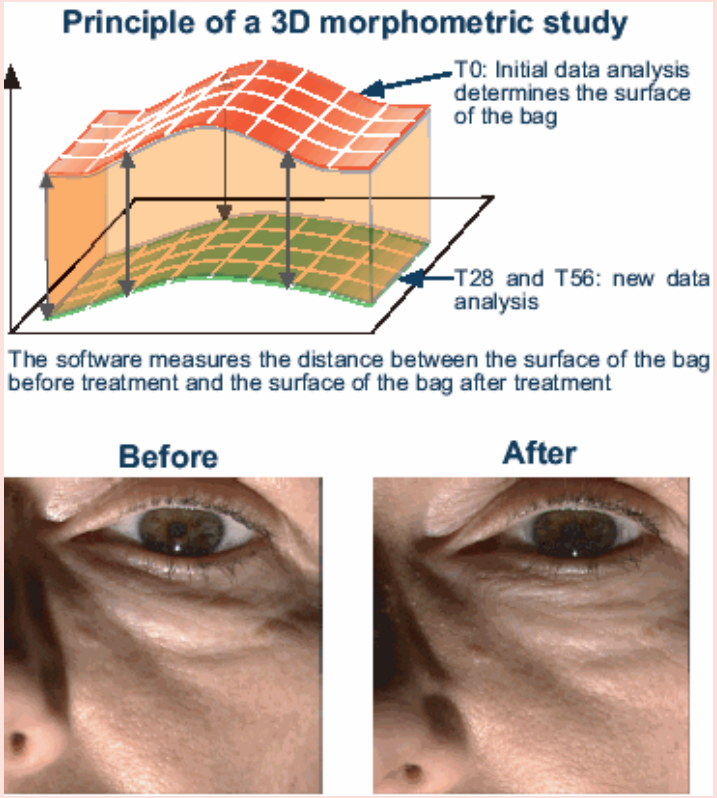
Peptides that STIMULATE: Eyeliss

INCI: Glycerine, Hesperidin Methyl Chalcone, Steareth-20, Dipeptide-2, Palmitoyl Tetrapeptide-3
Benefits: Strengthens capillaries, improves elasticity, de-puffs
Recommended Level: 3%
Clinical Level: 3%

Drains a puffy eye area by inhibiting Angiotensin Converting Enzyme (ACE), causing arteries and veins to dilate, decrease blood pressure and reduce extracellular volume.

Anti-inflammatory effect of 33% by regulating interlukin-6, a protein that stimulates immune response.

After 56 days, 70% of subjects showed measurable improvement.



Peptides that STIMULATE: Eyeliss

Eyeliss has three active ingredients:

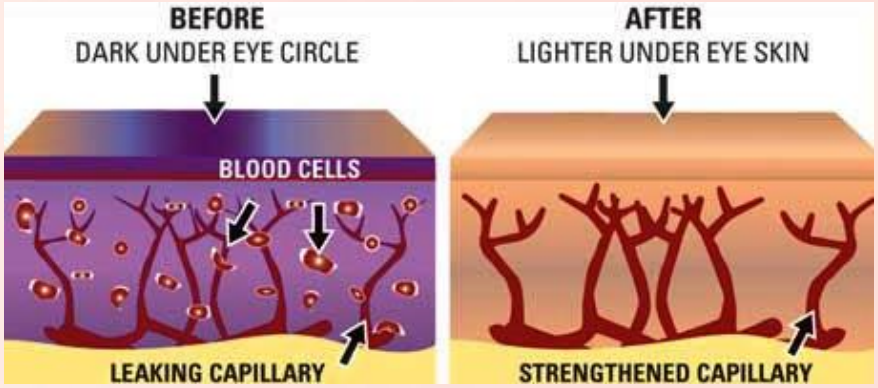
Hesperidin: Flavanone glycoside (flavonoid) found in citrus fruits. Its aglycone form is called hesperetin. It acts as an antioxidant and helps strengthen under eye capillaries.

Lipopeptide: Reduces inflammation around the eye area and improves the elasticity of the skin. Because of the fat and water balance, lipopeptides more easily penetrate into the skin, which helps to reduce fine lines and wrinkles, making skin look more firm.

Dipeptide: Molecule consisting of two amino acids joined by a single peptide bond. Dipeptides are produced from polypeptides by the action of the hydrolase enzyme dipeptidyl peptidase. Dipeptide improves lymphatic drainage, resulting in less puffiness.

Peptides that STIMULATE: Haloxyl

INCI: Glycerin, Steareth-20, N-hydroxysuccinimide, Chrysin, Palmitoyl Oligopeptide, Palmitoyl Tetrapeptide-7, Chlorhexidine Digluconate (20% in Water): 1%, Potassium Sorbate: 0.1%
Benefits: Reduces dark circles, firms and tones eye area
Recommended Level: 2%
Clinical Level: 2%



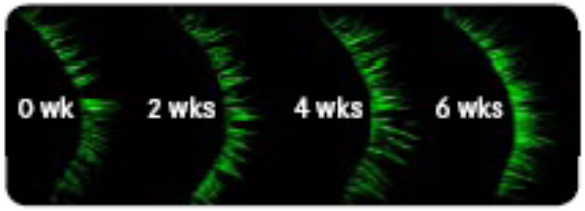
Haloxyl is a combination of ingredients. It absorbs blood pigments that are responsible for dark circles under the eyes. Peptides reinforce skin firmness and tone by strengthening capillaries. Chrysin and hydroxysuccinimide activate the elimination of blood originated pigments responsible for dark circles. In a study with 22 female volunteers, 56 days of use resulted in 19% reduction in dark circles and red and blue coloration.

Peptides that STIMULATE: Sympeptide 226

INCI: Myristoyl Pentapeptide-17
Benefits: Thicker, longer eyelashes
Recommended Level: 2-10%
Clinical Level: 10%

Significantly stimulates keratin genes in the anagen stage (kRT3, kRT4, KRTHP 1.5, KRTHB1, 2 and 4), promoting hair growth.

- Panel: 2 subjects; application: once a day for 6 weeks
- Test product: eyeliner with 5% and 10% SymPeptide® 226EL (100ppm peptide)



Thicker and longer eyelash – 72% increase – after 6 weeks of use

EYELASH ENHANCEMENT *IN VIVO* DATA

- Panel: 15 subjects, 24-82 years old; application: once a day for 2 weeks
- Test product: conditioner with 10% SymPeptide® 226EL (100ppm peptide)
- Eyelash measurement by SigmaScan software

Thicker and longer eyelash – 25% increase – after 2 weeks of use

Peptides that STIMULATE: Sympeptide 226

Hair grows in cycles of various phases:

Anagen is the active/growth phase. Lashes and brows have a short anagen phase (30 to 45 days), which explains why lash hair is shorter than what's on the scalp. 40% of upper lash and 15% of lower lashes are in anagen phase.

Catagen is the transition/regression phase. Lashes stop growing and follicle shrinks. Lasts between 2-3 weeks.

Telogen, the resting phase. Can last more than 100 days before the lash falls out and a new one begins.

Entire duration of cycle for lashes is 3 to 4 months, whereas the cycle for the scalp is 3 to 6 years.

Peptides that STIMULATE: Sympeptide 235

INCI: Myristoyl Hexapeptide-16
Benefits: Stimulates hair growth, reduces depigmentation in hair
Recommended Level: 2-10%
Clinical Level: 10%

Growth factor-like peptide that helps stimulate natural hair growth by antagonizing the inhibitory effects of BMP4 on hair follicle development.

Peptides that STIMULATE: Proharin β4

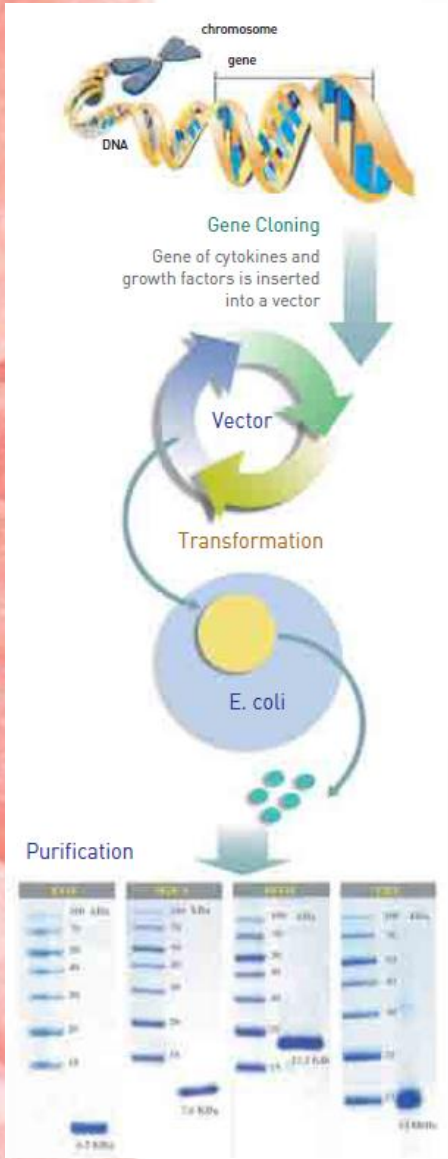
INCI: Octapeptide 2
Benefits: Promotes hair growth, nourishes and strengthens
Recommended Level:
Clinical Level:

Octapeptide-2 is a synthetic peptide composed of glutamic acid, glutamine, leucine, lysine and threonine.

Proharin β4 is a chain of eight amino acids which activates stem cells of the hair follicle to promote hair growth. After 5 days of treatment, hair is noticeably longer and thicker.

Acts as a stimulator of hair growth by antagonizing the inhibitory effects of BMP4 on hair follicle development. Helps reduce depigmentation in hair.

Growth Factors



Growth factors are another type of stimulating ingredient. Polypeptide growth factors, **epidermal growth factors** (EGF) and **transforming growth factors** (TGF) act as regulators in wound healing. EGF also increases the tensile strength of skin.

EGF and TGF receptors are expressed by many types of cells, including skin keratinocytes and fibroblasts.

Growth factors are extracted from cultured epidermal cells, placental cells, colostrum, and plants.

Recombinant growth factors are made by inserting a specific growth factor into *E.coli* to create multiple copies.

Oliopeptide-1 is an EGF that supports cell renewal and wound repair. Contains 53 amino acids. Its production in the body slows signifcantly in the presence of UV rays.

TGF-ß is essential for normal production of collagen and elastin, and supports wound healing.

Sarika Namjoshi, et all, "Skin Peptides: Biological **Activity and Therapeutic Opportunities**," *Journal of Pharmaceuticals Sciences* **97** , 2524-2542 (2008)

Peptides that HYDRATE

Perfectly balance and moisturize the skin.

- **Trylagen** (Tripeptide 10 Citrulline and Tripeptide-1)

Peptides that HYDRATE: Trylagen

INCI: Hydrolyzed Wheat Protein, Hydrolyzed Soy Protein, Tripeptide-10 Citrulline, Tripeptide-1
Benefits: Reduces wrinkle depth, boosts collagen, reduces collagen degrading
Recommended Level: 1-5%
Clinical Level: 5%

- Boosts collagen I (for elasticity) by 128% , collagen III (for skin thickness) by 300%, collagen IV (for skin structure) by 81%
- Inhibits enzymatic destruction by reducing collagen-degrading enzymes MMP-2 by 74% and MMP-3 by 57%
- Controls fibril dimensions and organization

Peptides that PROTECT

Prevent collagen breakdown and inflammation while strengthening skin defenses.

- **Aldenine (**Tripeptide-1)
- **Thermostressine** (Actyle Tetrapeptide-22)

Peptides that PROTECT: Aldenine

INCI: Hydrolysed Wheat Protein, Hydrolysed Soy Protein and Tripeptide-1
Benefits: Prevents free radicals, boosts collagen, protects skin cells
Recommended Level: 2-5%
Clinical Level: 2%

The combination of hydrolysed wheat protein and hydrolysed soy protein creates a peptide called hydrolysed vegetable protein (HVP). HVP is a stimulator of collagen III.

Tripeptide-1 (GHK) is a cellular detoxifier, shown to be more active than carnosine.

Peptides that PROTECT: Thermostressine

INCI: Acetyl Tetrapeptide-22
Benefits: Stabilizes skin in extreme temperatures and stress
Recommended Level: 2-5%
Clinical Level: 2%

A tetrapeptide proven to stimulate the synthesis of heat shock protein (HSP70), giving the cell a greater tolerance of everyday stressful stimuli.

Protects skin against proteotoxic stress side effects. Keratinocytes' ability to withstand heat and cold is enhanced.

Other protecting ingredients

Antioxidants protect against free radicals. Free radicals are also called Reactive Oxygen Species (ROS) or Reactive Carbonyl Species (RCS). They cause more than 60 different diseases, can damage DNA, or alter DNA to produce potential carcinogens.

- **Enzyme Antioxidants:** Superoxide dismutase, co-enzyme Q10 (ubiquinone)
- **Vitamin Antioxidants:** Tocopherol (Vitamin E), retinol (Vitamin A), magnesium ascorbyl phosphate (Vitamin C)
- **Metabolite Antioxidants:** Magnesium, zinc, lipoic acid
- **Botanical Antioxidants:** Green tea, white tea, resveratrol

Sunscreens

- **Titanium Dioxide:** UV light reflecting capabilities. Used in products for infants and those with sensitive skin, because it is unlikely to cause skin irritation. Does not penetrate skin.
- **Zinc Oxide:** UV light reflecting capabilities. Has no risk of skin irritation. It can be used as an anti-irritant and is potentially an antioxidant.

Peptides in Products From

HydroPeptide
Scientific Beauty Made Simple

1. **AC Collagen** – Helps smooth the appearance of lip lines and wrinkles by improving Collagen I. **Found in: Lip.**
2. **Aldenine** – Counteracts effects of aging by enhancing Collagen III and protects against the effects of glycation, AGEs, free radicals and ROS. Found in: **Face, Eye and Moisturize.**
3. **Argireline**– Softens the look of expression lines around the eyes. **Found in: Cleansing Gel, Cleanse, Tone and Eye.**
4. **ß-White** – Helps fade the appearance of age spots and discoloration. **Found in: Even Out.**
5. **Dermaxyl** – Counteracts signs of aging by boosting cell communication and improving elasticity. **Found in: Face, Eye and Moisturize.**
6. **Eyeliss** – Combats under-eye puffiness by improving elasticity, strengthening blood vessels and enhancing drainage. **Found in: Eye.**
7. **Haloxyl** – Helps diminish the appearance of dark under-eye circles while firming and toning. **Found in: Eye.**
8. **Matrixyl 3000** – Enhances smoothness, complexion and tone while helping to reduce the appearance of deep wrinkles. **Found in: Face and Eye.**
9. **Myoxinol** – Softens the look of expression lines around the eyes and contains free radical neutralizing antioxidants. **Found in: Mask and Serum.**
10. **Peptamide-6** – Helps minimize the appearance of fine lines, wrinkles and wounds while enriching firmness and elasticity. **Found in: Anti-Stress Mask (Professional Only).**
11. **Perfection Peptide P3** – Improves skin renewal and hydration. **Found in: Apple Peel 1 (Professional Only).**
12. **Proharin** – Helps prevent pigment loss in hair and improves fullness of lashes. **Found in: Lash.**
13. **Regestril** – Helps fade the appearance and discoloration of stretch marks. **Found in: Moisturize.**
14. **Snap-8** – Softens the look of expression lines. **Found in: Peel, Mask, Serum and Power Lift.**
15. **Sympeptide 226** – Helps enrich keratin genes for fuller looking hair. **Found in: Lash.**
16. **Sympeptide 235** – Helps improve the look and fullness of lashes and brows. **Found in: Lash.**
17. **Syn-Ake** - Tightens facial contours and is effective in minimizing forehead wrinkles. **Found in: Peel, Mask, Serum and Power Lift.**
18. **Syn-Coll** – Lifts and smoothes wrinkles by enriching the growth factor that increases Collagen I. **Found in: Serum, Face, Eye and Moisturize.**
19. **Syn-Tacks** – Advances skin communication, organization and cohesion. **Found in: Soufflé Mask (Professional Only) Serum and HydroStem+6.**
20. **Thermostressine** – Fights cell stress and keeps skin stable against hot and cold shocks. **Found in: Anti-Stress Mask (Professional Only).**
21. **Trylagen** –Battles the appearance of wrinkles by improving elasticity and smoothness, preventing collagen loss and reinforcing the collagen network. **Found in: Apple Peel 1 and Anti-Stress Mask (Professional Only), Cleansing Gel, Cleanse, Tone, Peel, Mask and Power Lift.**

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