

FK ScalpTM



Full Spectrum
Scalp Care

Keraplast

keraplast.com



Keratin is a natural wonder.

Keratin proteins are the building blocks of life and are vital to the biology and physiology of every animal on our planet.

Keratin is the key structural material making up hair, wool, feather, nails, horns and the outer layer of skin. It protects the surfaces of internal organs from damage or stress, and it is one of the toughest biological materials in the world.

Keratins play a physical role in maintaining cell structure as well as a biological role helping cells make a range of essential proteins for healthy skin structure.

Chinese herbalists have known about the beneficial properties of keratin for over 500 years, using a substance made from the ground ash of human hair to heal wounds and clot blood. But it wasn't until the 1930s that scientists demonstrated that there are actually many different types of keratin, with different molecular weights and different properties.

At Keraplast, we unlock the power of keratin proteins from regeneratively grown wool so that these can be redeployed as beneficial bioactive ingredients. Our proprietary Functional Keratin® technology platform has evolved from decades of scientific research, including over 20 years of fundamental and applied keratin science. We have the technological capability to accurately and skillfully recover a range of specific keratin proteins, with specific molecular weights, that have specific beneficial properties.

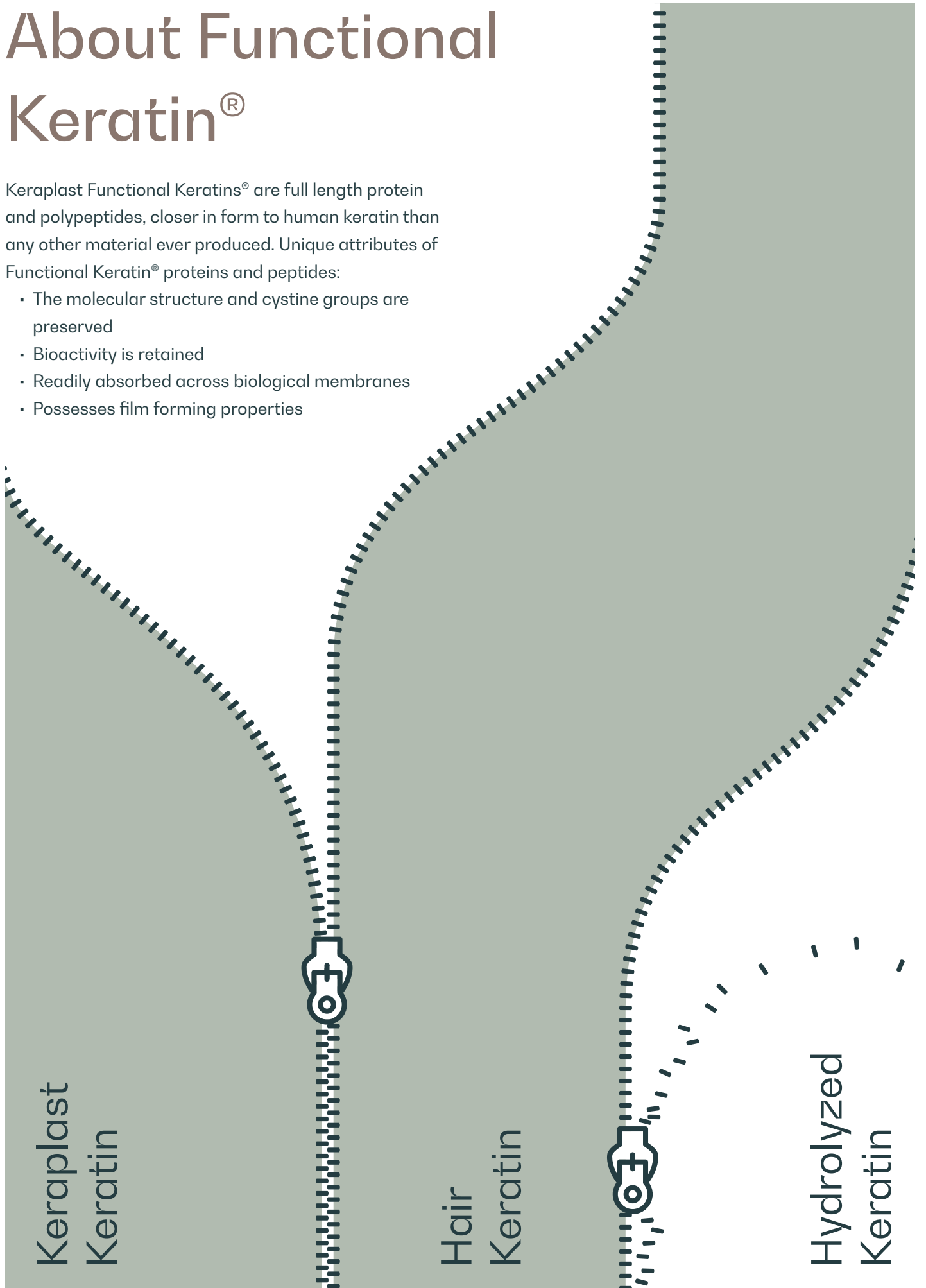
We are world experts in bioactive keratin recovery and formulation.



About Functional Keratin®

Keraplast Functional Keratins® are full length protein and polypeptides, closer in form to human keratin than any other material ever produced. Unique attributes of Functional Keratin® proteins and peptides:

- The molecular structure and cystine groups are preserved
- Bioactivity is retained
- Readily absorbed across biological membranes
- Possesses film forming properties



Keraplast
Keratin

Hair
Keratin

Hydrolyzed
Keratin



How Functional Keratin[®] Works

Functional Keratin[®] has high cystine content

- Strong homology with human keratin, a core component of skin
- Maintains structure of hair, nails and skin
- Repairs damage

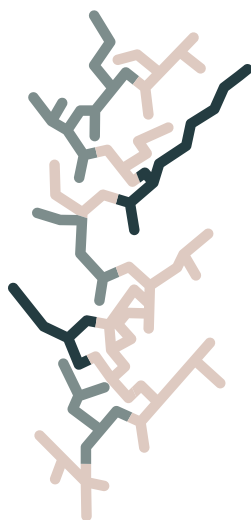
Functional Keratin[®] has specific amino acid sequences binding to hair strongly

- Similar to a zip structure
- Electrostatic bonding
- Hydrophilic and hydrophobic bonding

Superior to poorly functioning hydrolyzed keratin in the market Molecular Weight 1,000 Da (Peptide) to 60,000 Da (Film Former)

- Biological activity well established
- Anti-aging, anti-pollution activity well established
- Collagen production demonstrated
- Protects and controls the amino acid cystine

Functional Keratin

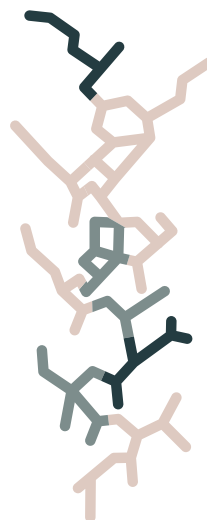


+ve to -ve

hydrophobic

+ve to δ -ve

Hair Keratin

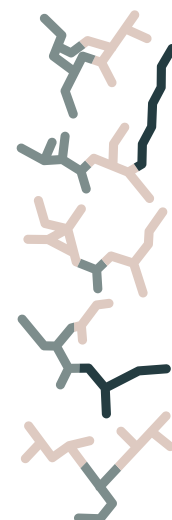


+ve to -ve
disrupted

weakened
hydrophobic

+ve to δ -ve
disrupted

Hydrolyzed Keratin





Functional Keratin® Vs Hydrolyzed Keratin Fragments

	Functional Keratin®	INCI Hydrolyzed Keratins
Functional Protein	Y	N
Proprietary amino acid sequences matched to skin structure	Y	N
Full length protein and peptides that form a sacrificial shield to prevent skin damage	Y	N
Stimulates mTOR pathway within cells, increasing synthesis of structural proteins	Y	N
Reduces redness associated with inflammation of sensitive skin	Y	N
Contains highly potent anti-oxidants to protect against pollutants and UV induced free radical damage	Y	N
Data showing quantitative and qualitative improvements in hair and skin	Y	N
Guaranteed sourced from pure NZ Wool, no harm to animals	Y	N
Patent protected	Y	N

FK Scalp™

FK Scalp™ is the result of many years of understanding the impact of bio-active keratin on both skin and hair. The scalp is a unique area of human anatomy and modern day stresses impact on the scalp leaving both skin and hair less resilient and more prone to damage.

Wound Care research has established significant discoveries in how these bioactive proteins can stimulate healing, cell growth and antioxidant production.

Combined with strong research findings in hair care and skin care this portfolio of world class research has led to a product ideally matched to the emerging issue of scalp health in industrialised societies.



Mechanism Of Action

1

Improve Follicle Health and Hair Anchoring

FK Scalp's™ protein and peptide combination stimulates skin cells to proliferate by up to 160% faster than a placebo while simultaneously stimulating human keratinocyte migration, and the expression of collagens IV and VII, thus improving the anchoring of follicles. This promotes scalp health through the shedding of cells and the avoidance of follicle clogging by bringing healthy cells to the surface more quickly.

2

Protect from Scalp Inflammation

FK Scalp's™ anti-inflammatory agent reduces the PGE2 response in cells undergoing inflammatory stress by up to 70%; reducing scalp inflammation, itching and premature hair follicle death. This reduction in PGE2 response enables maintenance of root nourishment and hair density.

3

Pollution and UV Protection

FK Scalp™ protects the scalp from exposure to oxidative stress from pollution such as particulate matter, gases like sulfur dioxide and nitrogen dioxide, as well as heavy metals and volatile organic compounds. FK Scalp™ contains higher levels of cystine than any other protein material, scavenging free radicals before they cause scalp damage.



Increasingly complex lifestyles coupled with the adverse effects of pollution are showing greater incidence of hair and scalp related problems such as hair loss, hair damage, dandruff and itchy scalp. The scalp is the bedrock for the hair follicle and if it isn't in good condition the chances of experiencing problems with hair growth and health increase significantly. The condition of the hair is directly related to the condition (health) of the scalp.

FK Scalp™ Enables The Development Of Formulations That:

- Remove dead skin cells, build-up and impurities that impede hair growth
- Nourish and restore the scalp
- Protect from hair and scalp stress caused by pollution
- Provide anti-aging support for scalp enabling longevity of follicle health
- Relieve scalp discomfort and itching

FK Scalp™ Claims

- 160% increase in cell proliferation
- 70% reduction in PEG2 (inflammation) response
- Improved hair anchoring and follicle health to prevent hair fall
- Pollution protection through film forming anti-oxidant

All combined to improve the health of the scalp, protect from the environment and encourage the proliferation of healthy hair.



Protect against scalp conditions and hair-fall associated with scalp exposure to pollution.

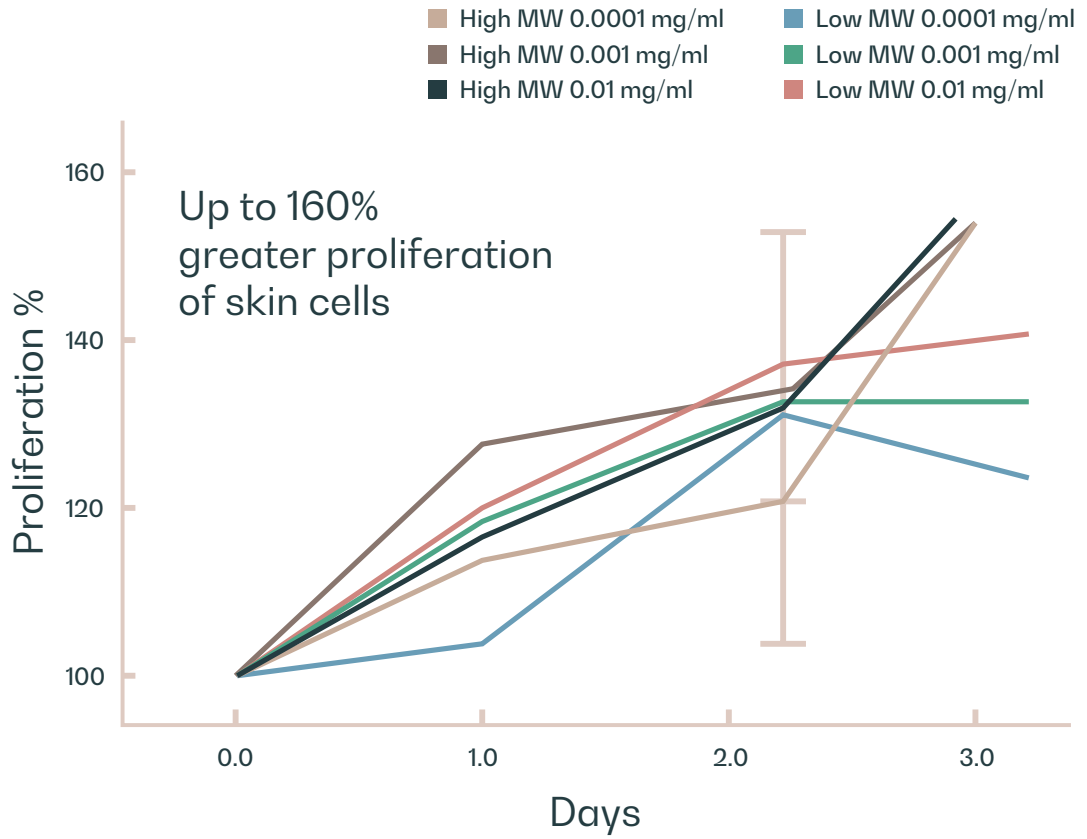
Clinical research into FK Scalp™ was conducted using the Laboratoire BIOEC ex-vivo model to study human skin response to air pollution.

Demonstrated:

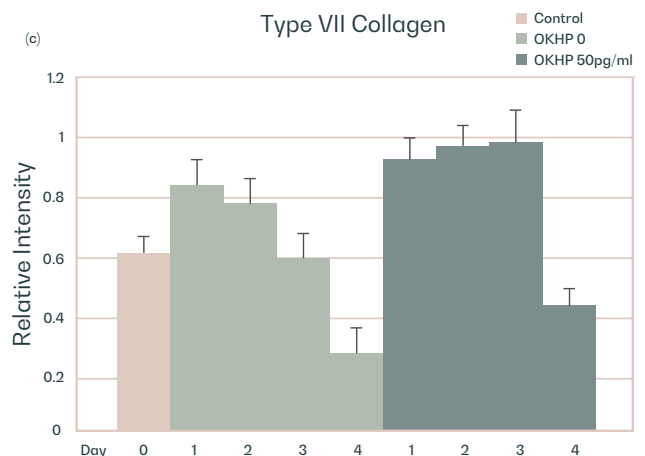
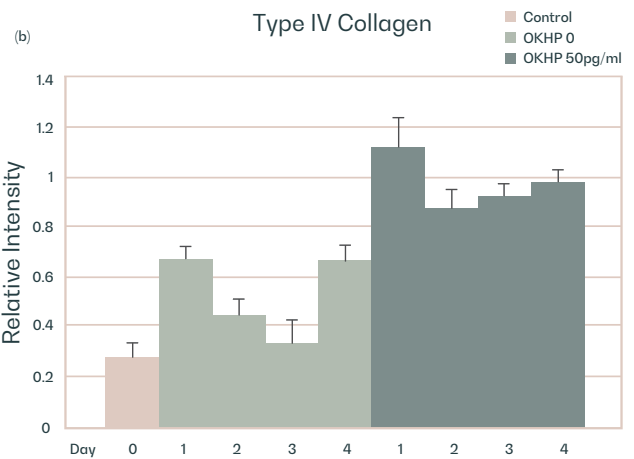
- Improved hair anchoring and follicle health
- Protection of scalp and follicle from pollution damage
- Prevention of hair fall

Therefore:

- Remove dead skin cells
- Remove build-up and impurities that impede hair growth
- Nourish and restore the scalp
- Protect from hair fall and scalp stress caused by pollution
- Provide anti-aging support for scalp
- Enabling longevity of follicle health
- Relieve scalp discomfort and itching



FK Scalp™ contains higher levels of cystine than any other protein material, scavenging free radicals before they cause scalp damage.



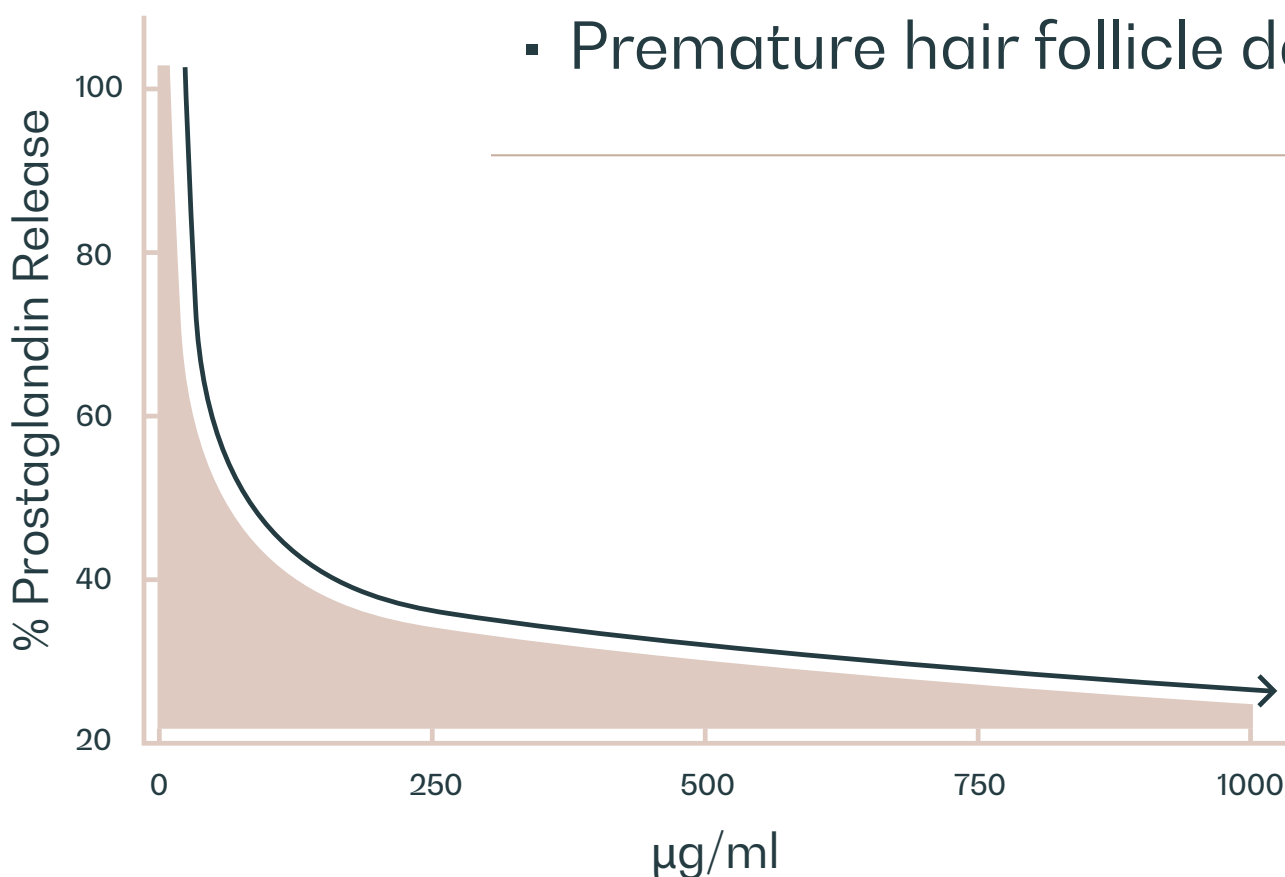


FK Scalp's™ anti-inflammatory agent reduces the PGE2 response by up to 70%.

This reduction in PGE2 response enables maintenance of root nourishment and hair density.

This means significantly less

- Scalp inflammation
- Itching
- Premature hair follicle death





FK Scalp™ Ex Vivo Test Demonstrating On-Scalp Performance

- Ex vivo study conducted by independent test lab BIO EC, using innovative scalp explant model.
- Scalp biopsies are donated following facelift and maintained as full skin, including follicle, in carefully designed culture system that mimics real conditions.

Method

- Skin explants grown for 6 days ex vivo.
- With or without product 1 – FK Scalp
- With or without product 2 – t diluted to 20% in water – example serum formulation
- With or without pollution – a combination of gases, particulate matter, diesel fumes and cigarette smoke with measured components equivalent to the World Health Organisation definition of a polluted city environment.

Schedule

- Tested on day 0 and day 6

End points

- Collagen IV expression – essential for follicle anchoring
- Nrf2 – marker of oxidative stress response in cells
- Cell viability – indicator of follicle and scalp health



- Skin explants can be maintained and subjected to different environmental challenges, such as a controlled polluted atmosphere using the Pollubox® system.

Installation of skin explants in the exposure system Pollubox®



Skin explants

Skin explants exposure to air pollutants



1. Pollutants nebulization
2. Pollutants cloud formation
3. Completely polluted environment
4. Deposition of pollutants on skin explants

1

2

3

4



Collagen IV Expression (violet)

Responsible for anchoring of bulb in follicle,
needed for strong follicle health

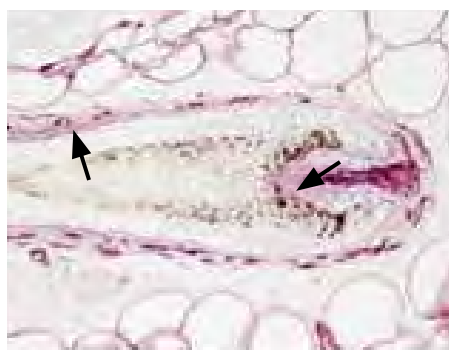
Day 0



Day 6 with product 1



Day 6 with no product



Day 6 with product 2



- More collagen IV shown following product 1 or 2 application through more intense stain in dermal papillae and around the follicle (arrow points to relevant area).
- Collagen IV is responsible for strength of the junction between dermal papillae and follicle, more collagen IV gives stronger junction.
- Supports stronger follicle anchoring as a result of product 1 or product 2 application after 6 days.

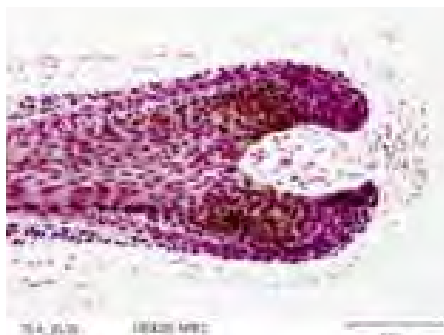
Supports
claim of hair
anchoring
and improved
follicle health.



NRF2 Expression (violet)

Nrf2 present in cells initially and dissociates away from cells in response to oxidative stress/pollution and so stains less.

Day 0



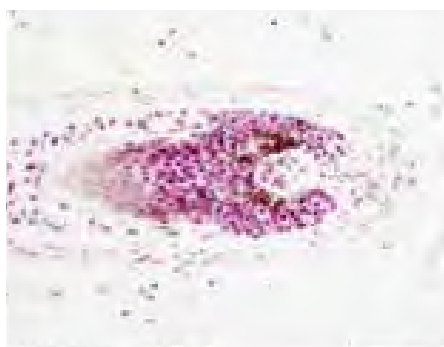
Day 6 with pollution



Day 6 with no pollution



Day 6 with pollution and product 2



- Nrf2 present in follicle at day 0 is substantially reduced by day 6 in response to pollution stress, and moderately reduced in the absence of pollution, due to stress of culture conditions.
- Product 2 maintains Nrf2 very close to no pollution level at day 6 indicating strong protection of follicle from pollution stress.

Supports claim
of protecting
follicle and
scalp from
pollution.



Cell Viability

Overall health of scalp cells response to oxidative stress/pollution. RED STAIN – keratin concentrated in follicle during hair growth process.

Day 0



Day 6 no pollution



Day 6 with pollution



Day 6 with pollution and product 2



Supports claim of protecting follicle and scalp from pollution, preventing hair fall.

- Keratin expression (red stain) in follicle is substantially reduced in day 6 with pollution indicating reduced hair viability.
- Separation between bulb and surrounding tissue and poor cell morphology in the bulb indicates start of hair fall at day 6 with pollution.
- Product 2 maintains keratin expression very close to no pollution level at day 6 indicating strong protection of follicle from pollution stress.
- Product 2 with pollution has less separation between follicle and surrounding tissue, and cell morphology more similar to no pollution, indicating protection of the follicle from pollution stress

About Keraplast

Keraplast is a world-leading biotechnology company. We recover bioactive keratin proteins from regeneratively farmed New Zealand wool and blend these bioactive proteins together to create unique, branded ingredients that are used in the world's leading beauty and personal care products.

We approach the future curiously, pushing ourselves forward whilst contributing to something larger than ourselves. Something that truly matters. Enhancing the future of food and wellness.

We have a long-term vision to be a regenerative business, giving back more than we take. Our ambition is to propel the company beyond sustainability and into regeneration: shifting from a business that “does less harm” into a business that “does more good”.

We know that this will be hard, but we also know that this is right. We are up for the challenge



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