

# FK Restore™

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Full Spectrum  
Hair Care

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Keraplast

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[keraplast.com](http://keraplast.com)

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# 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.

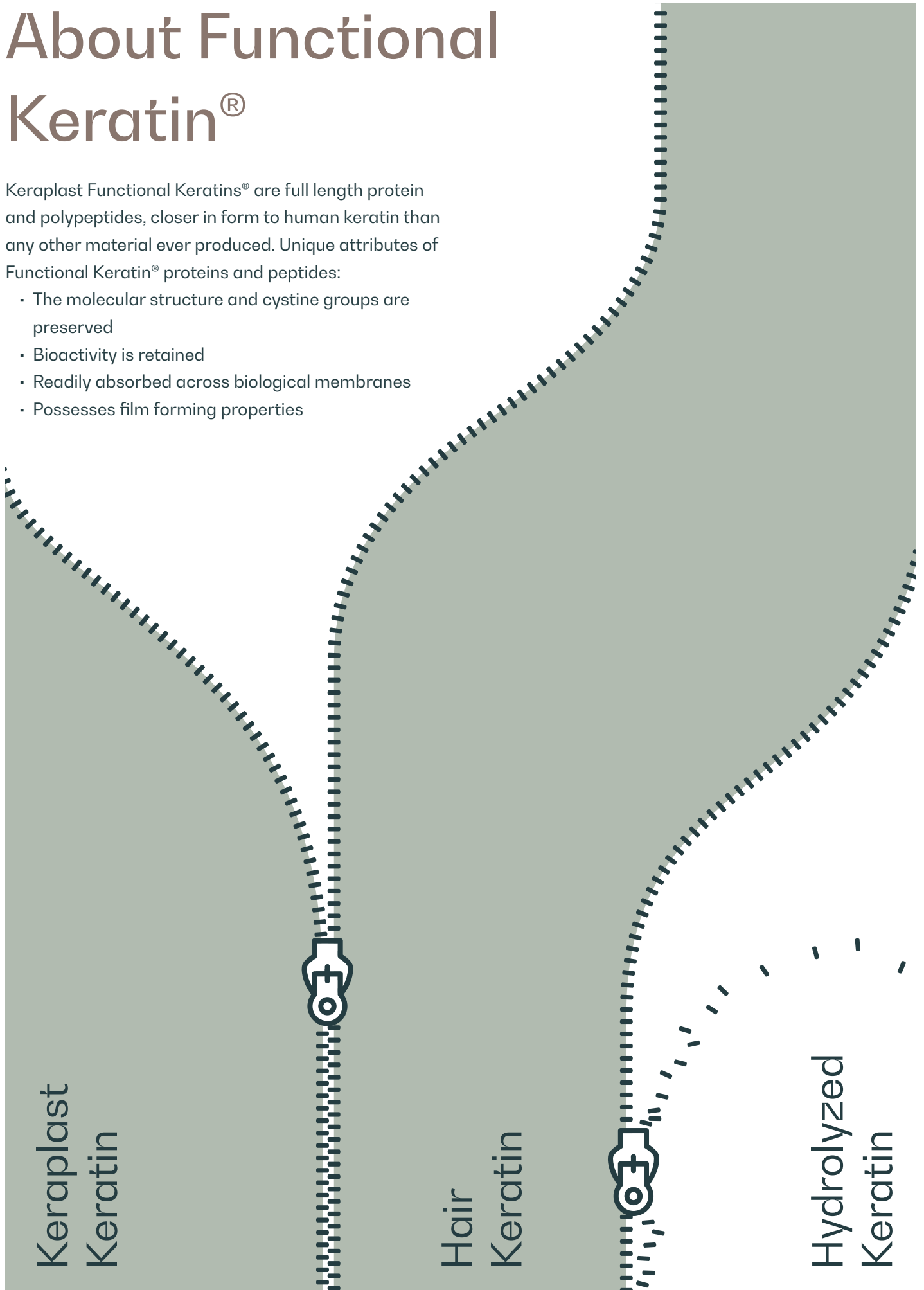
At Keraplast, we unlock the power of keratin proteins from regeneratively grown wool so that these can be redeployed as beneficial bioactive ingredients. Our proprietary Functional Keratin® technology platform has evolved from decades of scientific research, including over 20 years of fundamental and 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<sup>®</sup>

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

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





# How Functional Keratin<sup>®</sup> Works

## Functional Keratin<sup>®</sup> has high cystine content

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

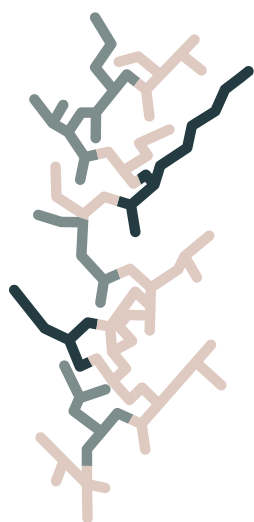
## Functional Keratin<sup>®</sup> has specific amino acid sequences binding to hair strongly

- 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

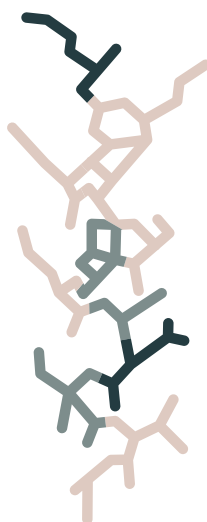


+ve to -ve

hydrophobic

+ve to  $\delta$ -ve

Hair Keratin



+ve to -ve  
disrupted

weakened  
hydrophobic

+ve to  $\delta$ -ve  
disrupted

Hydrolyzed Keratin





# Functional Keratin<sup>®</sup> Vs Hydrolyzed Keratin Fragments

	Functional Keratin <sup>®</sup>	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



# Patented Functional Keratin<sup>®</sup>

## Unique active ingredients

- Repair
- Anti-aging

Keratin is one of nature's most important building blocks providing structure and order. It is fundamental in the development of healthy tissues including skin, hair and nails.

Keratins commonly used by hair care manufacturers are hydrolyzed i.e. they are simply small peptide fragments of one or two amino acids joined together.

Keraplast's proprietary manufacturing and processing technologies gently extract full bioactive Functional Keratin<sup>®</sup> from natural, renewable sources (sheep's wool) for incorporation into product solutions to enhance health, beauty and well-being.

- Fully functional full length protein and polypeptides
- Functional Keratin<sup>®</sup> is closer in form and function to human hair keratin than any other material previously produced.
- Reversal of hair damage can be achieved with Functional Keratin<sup>®</sup> technology.



# Key Ingredients Of FK Restore™

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# 1

## Patented Protein recovery “Repair”

Well preserved amino acid structure 91% homologous to human hair. Binds strongly to exterior of damaged hair with 80% reduction in breakage. Repairs damaged hair close to virgin state.

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# 2

## Patented Protein structure to ‘Anti-age’

Excellent film forming properties create protective barrier. Radical scavenging ability through naturally high cystine content. Unique ability to quench free radical species before they can propagate the generation of reactive oxygen species.

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# 3

## Patented Protein and Peptide mixture “Moisturise”

Low molecular weight peptide can penetrate the cortex of hair resulting in internal repair and moisturization. Nourishment of hair prevents brittleness and strengthens chemically treated hair.

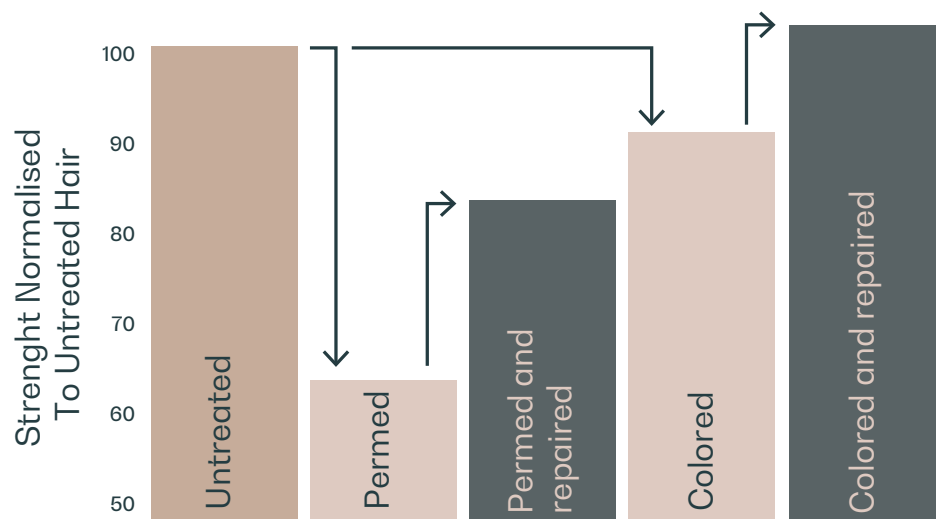


# Repair

Functional Keratin® peptide is able to penetrate directly into the cortex of damaged hair. Particularly useful on chemically treated hair that has an increased tendency to break at low levels of extension. Tensile testing demonstrates a reduction in breakage and minimisation of brittleness in color treated hair, to levels evident in virgin hair, by incorporating Functional Keratin®. Clinically proven results show Functional Keratin® to be a superior performer in-formulation to polymer plexes.

Daily care, chemical treatments, sunlight, environmental conditions, combing and straightening are just some examples of the typical conditions hair is exposed to that cause the keratin structure to become damaged, leading to poor hair condition. Reversal of that damage can only be achieved with a real keratin technology that contains all of the essential components of the native keratin protein. Functional Keratin® has the ability to actively repair the hair shaft, leaving hair shinier, well nourished, with stronger ends, softer and silkier.

## Repair strength testing after chemical treatment



Hair Strength Before & After Rescue Treatment





# Anti-Aging

Three Unique Functional Keratin<sup>®</sup> Proteins combined in one power-packed active hair care ingredient.

- 80% less breakage
- 52% stronger
- 58% better condition after sunlight damage
- 36% better shine
- 67% prevention of color fade

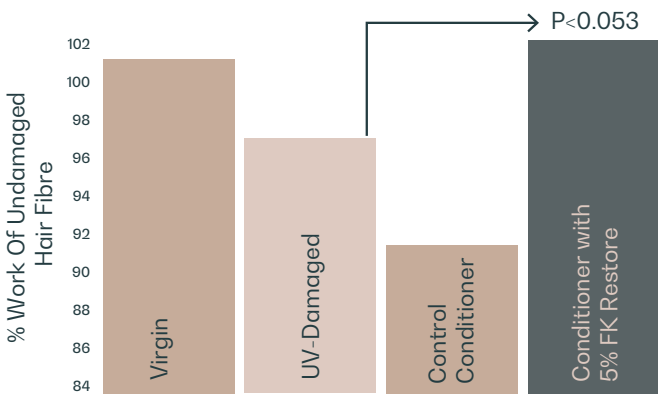
Aging in hair can be caused by environmental factors like pollution and UV exposure, resulting in free-radical damage. FK Restore™ provides naturally high cystine content (4.3mol%) that provides a sacrificial shield against aging activity and the scavenging of radicals.

Damage is caused by degradation of the keratin proteins in the cuticle. Functional Keratin<sup>®</sup> proteins can be introduced through inclusion in product formulations to take over where natural keratin is damaged. If hair is in perfect condition then Functional Keratin<sup>®</sup> will deposit on the surface and form a sacrificial shield, protecting the hair from damage. However, if hair is damaged when the hair structure is opened up, Functional Keratins<sup>®</sup> penetrate into the fibre and bind to the internal structure, rebuilding the damaged proteins to restore strength and condition to the fibre. Other hydrolyzed keratins cannot bind in the same way to the hair as they do not have the molecular structure required. Keraplast have studied the penetration of Functional Keratins<sup>®</sup> into the hair structure using microscopy to prove that they penetrate and stay bound inside the hair.

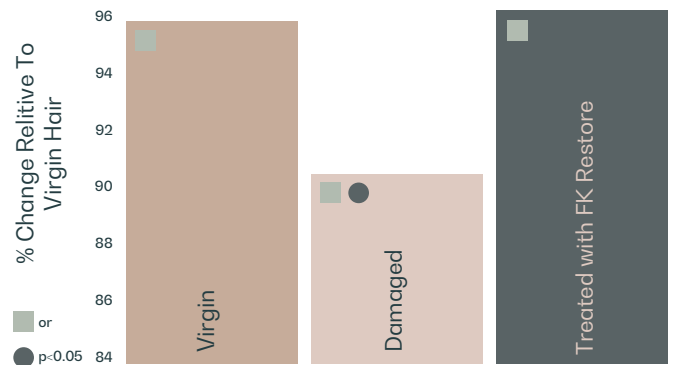


# Keraplast FK Restore™

Function	FK Restore™ is a unique combination of all three Functional Keratin® proteins. It nourishes, strengthens, reduces breakage and restores hair structure. Improves shine and condition with 67% prevention of color fade.
Composition	Intermediate filament protein + peptide + high molecular weight Type 1 Keratin with strong binding properties.
Physical Form	Pale yellow semi-viscous liquid. Low odor.
Inci Name	Keratin, Hydrolyzed Keratin, Oxidized Keratin.
Applications	Shampoos, conditioners, intensive treatments (salon), spray, serums, masques, cream rinses.
Formulations	Can be formulated into a broad range of hair care systems. Some care required in combination with cationic species, and higher pH is preferred at high inclusion levels.
Typical Usage Levels	1% - 2.5%



Hair Fibre Treatment



Hair Energy Nourishment at 20% Extension

# 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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