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**UMC** Ingredients  
160 Chubb Ave., Ste. 206  
Lyndhurst, NJ 07071  
(201) 896-8666



# Cosmetic portfolio

# Overview of Contipro cosmetic products



**Hyaluronic acid**  
+ derivatives

**Peptides**

**Natural polysaccharides**  
+ derivatives

**Nanofiber cosmetics**

# Hyaluronic acid + derivatives

# Overview of hyaluronic acid-based products



## Hyaluronic acid (HA):

- **Hyaluronic acid** 1300 - 2300 kDa
- **HySilk** 150 - 1300 kDa
- **HyActive** 10 - 150 kDa
- **OligoHyaferre** 0,4 - 5 kDa

## Derivatives of HA with hydrophobic acids:

- **HyRetin** (+ retinoic acid) => acne, wrinkles
- **HA-OIL:** (+ caproic acid) in oil => hair, decorative cosmetics
- **HyWhite** (+  $\alpha$ -linolenic acid) => whitening

## Crosslinked HA

- **Crosslinked<sup>HA</sup>:** Powder, after dissolution forms „solution“ of microscopic hydrogel microparticles  
For TOPICAL use only (it is NOT dermal filler!)

Hyaluronic acid

HySilk

HyActive

OligoHyaferre



# Hyaluronic acid (HA) of different molecular weight (MW)



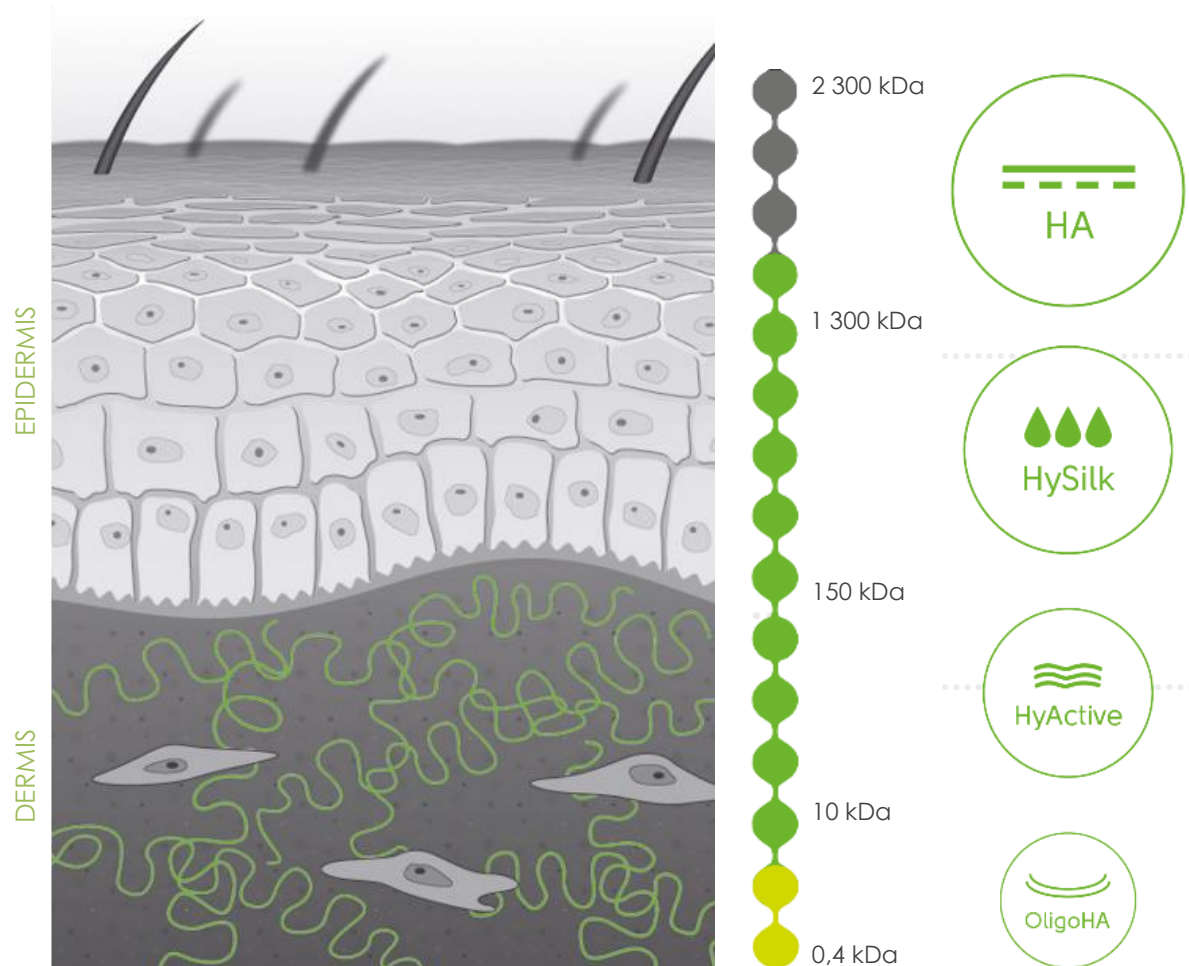
Hyaluronic acid, HySilk, HyActive, OligoHyaferre

## Common properties

- **Biotechnological** production by microorganisms
- **Sustainable**, ecological production
- Nonpathogenic *Streptococcus equi subsp. zooepidemicus*
- High MW HA produced first  
=> cleavage by acid hydrolysis=> lower MWs
- **Water-soluble powders**
- **Natural** polysaccharide – COSMOS APPROVED



# HA of different MW



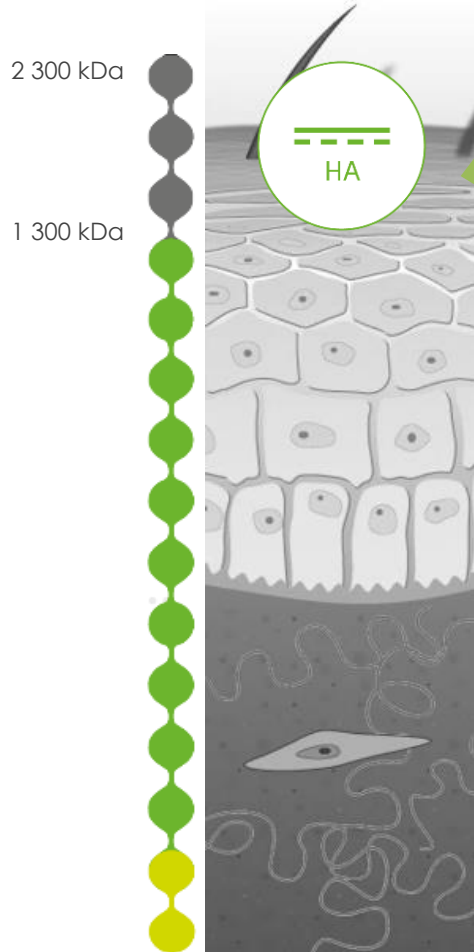
## HYDRATION, FILM-FORMING EFFECT

- Immediate hydration
- Protective superficial film
- Skin microbiome support
- Viscosity

- Active stimulation of skin cells
- Active improvement of skin barrier
- Improvement of skin atrophy
- Wrinkle reduction, elasticity improvement
- Skin nourishment

## SKIN PENETRATION, BIOLOGICAL ACTIVITY

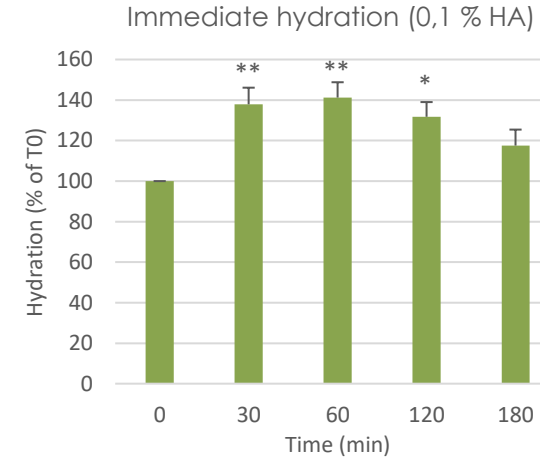
# Hyaluronic acid



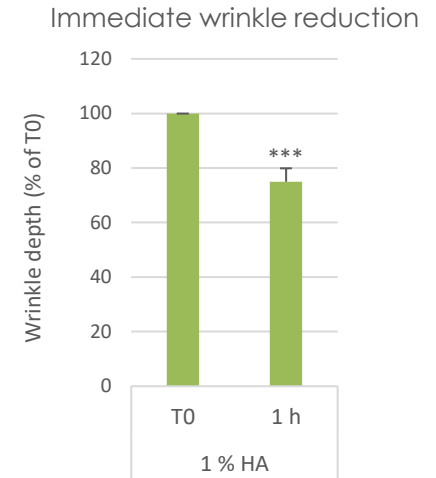
## Key properties

- > 1300 kDa
- Immediate hydration
- Superficial film
  - => Protection against pollutants, allergens
  - => Immediate tightening, wrinkle reduction
  - => Skin microbiome support
- Reduction of skin pores and sebum

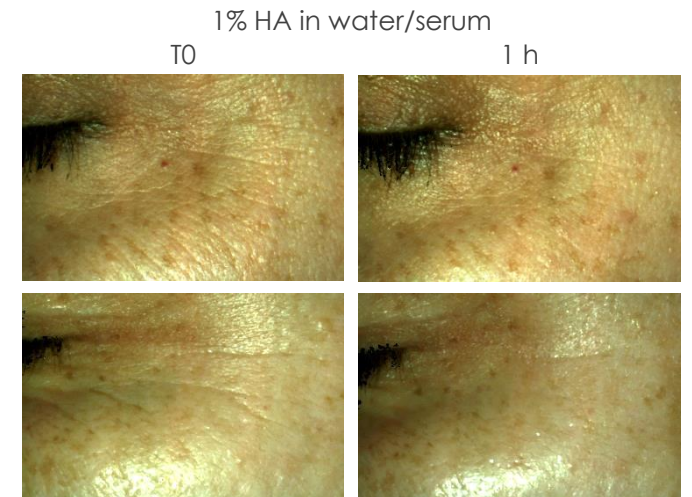
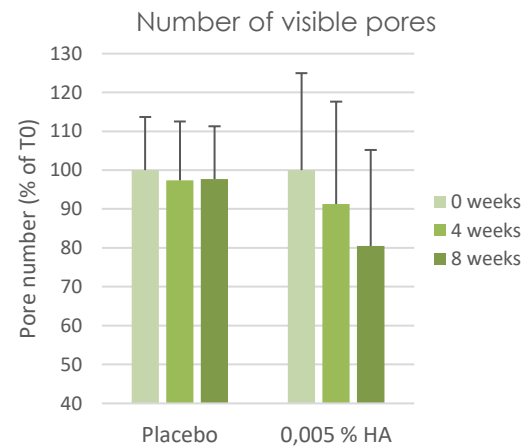
- 8 subjects
- 0,005 % HA in emulsion
- Visioface (pores)



- 6 subjects
- 0,1% HA in emulsion
- Volar forearm
- Corneometer



- 11 subjects
- 1% HA in water/serum
- Crow's feet wrinkles
- Primos 3D camera



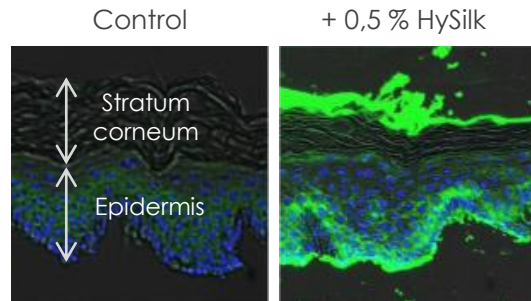
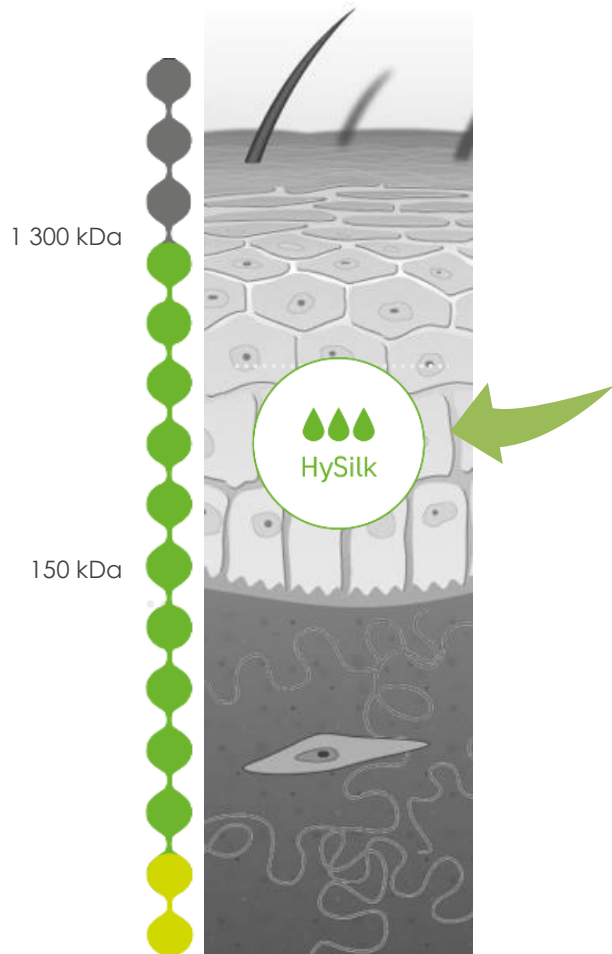


# HySilk

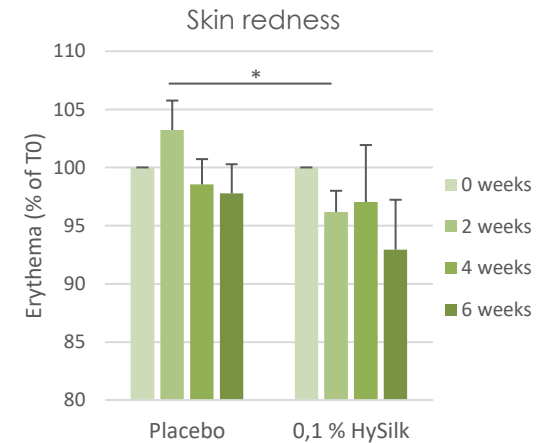
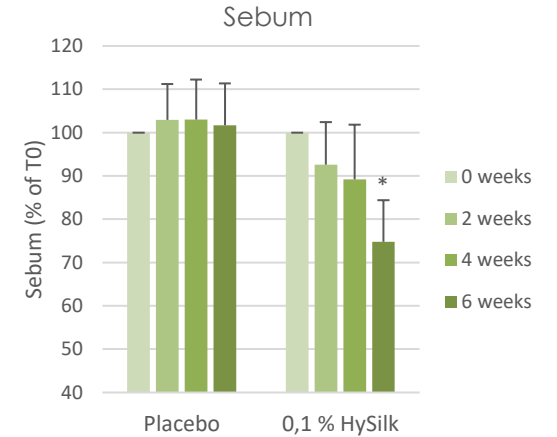


## Key properties

- 150-1300 kDa
- Penetration to epidermis
- Active stimulation of keratinocytes:
  - ↑ Skin barrier components
  - ↑ Natural antioxidant enzymes
- Active improvement of hydration and skin barrier
- Reduction of sebum
- Skin smoothing (decreased roughness)
- Skin calming (decreased redness)

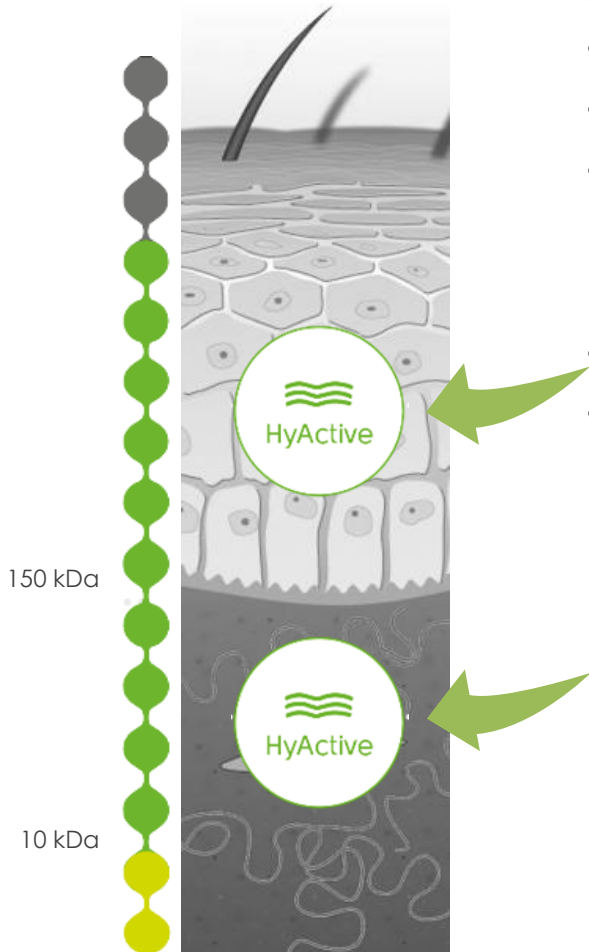


- Skin explants (epidermis only)
- 0,5 % HySilk in buffer
- 24 h, 37 °C
- Immunofluorescence staining (detection of HA-binding protein)



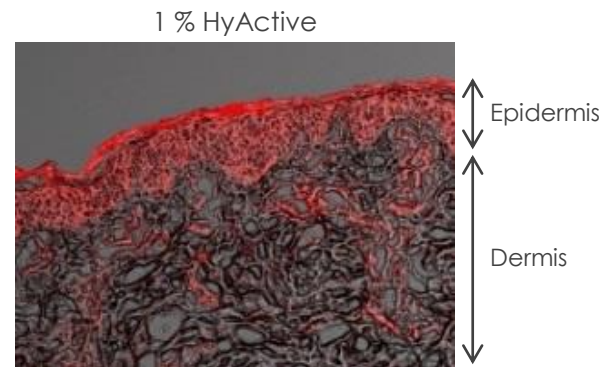
- 6 subjects
- 0,1 % HySilk in emulsion
- Sebumeter, Mexameter (erythema index)

# HyActive



## Key properties

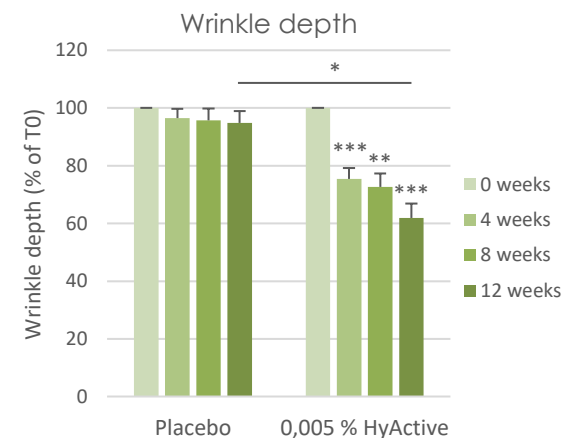
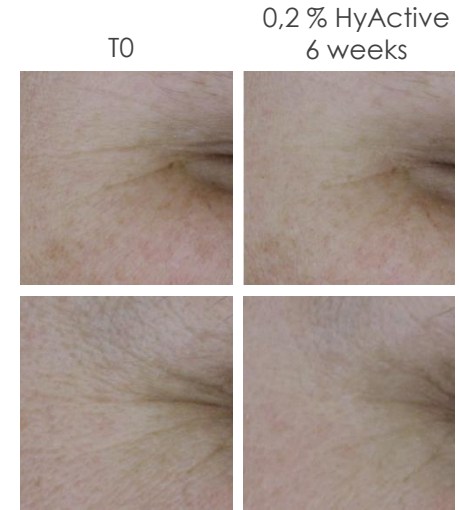
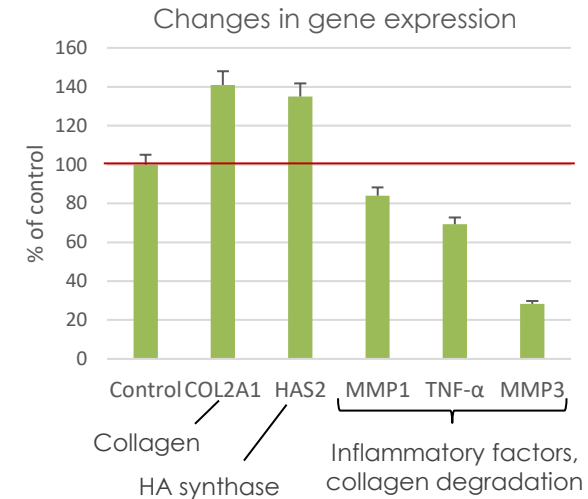
- 10-150 kDa
- Penetration to dermis
- Wrinkle reduction, elasticity improvement
  - ↑ Collagen
  - ↑ Production of body's own HA
- Epidermal atrophy improvement
- Anti-inflammatory effect



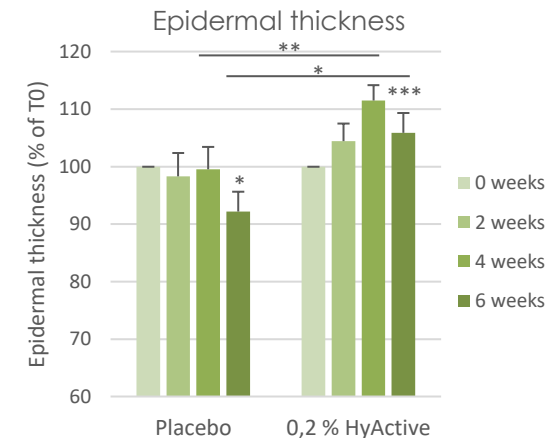
- Skin explants
- 1 % HyActive fluorescently labelled (red)
- 20 h, 37 °C
- Fluorescence microscope



- HaCaT cells
- 0,05 % HyActive, 48 h
- Microarray analysis

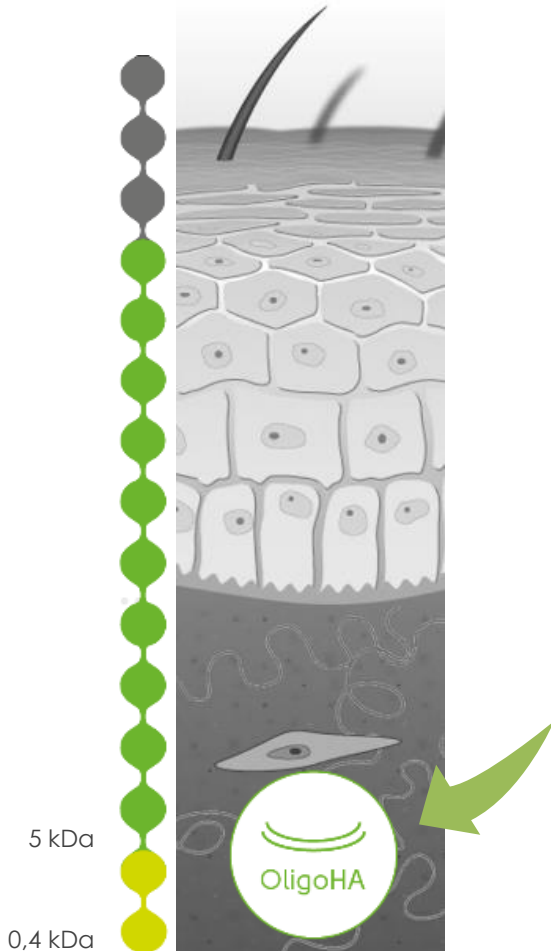


- 8 subjects
- 0,005 % HyActive in emulsion
- 3D LifeViz (crow's feet wrinkles)



- 28 subjects
- 0,2 % HyActive in emulsion
- Vivascope

# OligoHyaferre



## Key properties

- <5 kDa
- Penetration to dermis
- Wrinkle reduction, elasticity improvement
  - ↑ Collagen
  - ↑ Production of body's own HA
- Support of skin regeneration, wound healing
- Angiogenesis (formation of new blood vessels) for skin nourishment
- Skin calming (decreased redness)

The JOURNAL OF BIOLOGICAL CHEMISTRY  
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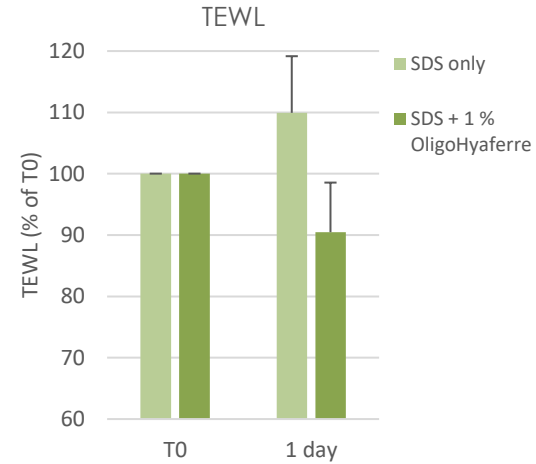
Vol. 277, No. 43, Issue of October 25, pp. 41046-41050, 2002  
Printed in U.S.A.

### Angiogenic Oligosaccharides of Hyaluronan Induce Multiple Signaling Pathways Affecting Vascular Endothelial Cell Mitogenic and Wound Healing Responses\*

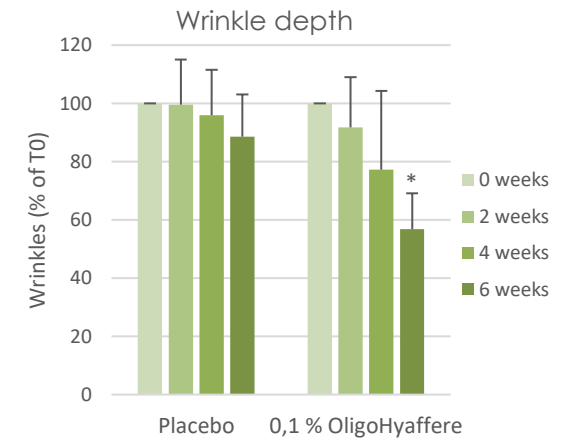
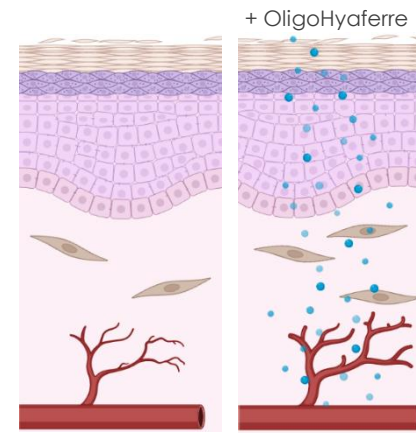
Received for publication, October 1, 2001, and in revised form, August 22, 2002  
Published, JBC Papers in Press, August 22, 2002, DOI 10.1074/jbc.M109443200

Mark Slevin<sup>§§</sup>, Shant Kumar<sup>¶</sup>, and John Gaffney<sup>‡</sup>

From the <sup>‡</sup>Department of Biological Sciences, Manchester Metropolitan University, Manchester M1 5GD, United Kingdom and the <sup>§</sup>Department of Pathological Sciences, Stopford Building, Manchester Victoria University, Manchester M1 5GD, United Kingdom



- 3 subjects
- Volar forearm
- Skin damage: 0,75 % SDS in occlusion (patch) 16 h
- Wash
- + 1% OligoHyaferre in water
- 3x daily
- Tewameter



- 6 subjects
- 0,1 % OligoHyaferre in emulsion
- 3D LifeViz (crow's feet wrinkles)

# „Anti-pollution,, effect of Contipro ingredients

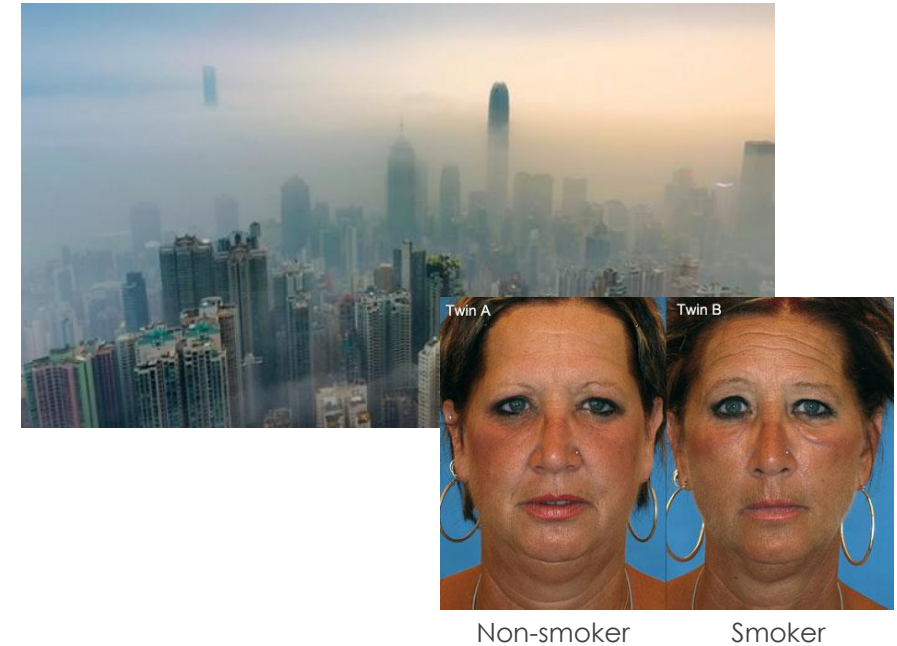


## Protection against air pollution-induced skin damage

- Current cosmetic trend
- Origin in Asia => worldwide

Reasons:

- Air pollution induces skin damage and premature skin ageing
- Number of people living in polluted areas is increasing
- Increased awareness of negative effect of air pollution in the skin



**AmorePacific Future Response Age Defense Crème**- A soothing cream that protects the skin against environmental aggressors and guards against the appearance of aging.



**Tata Harper Purifying Cleanser**- A hydrating cleanser that combats the daily wear and tear of environmental exposure and pollution by effectively clearing pores of excess oil, dead skin, and buildup.

**REN Evercalm™ Global Protection Day Cream**- An antiaging moisturizer for skin that is delicate or affected by everyday stressors like smoke and pollution



**Clarins Extra-Comfort Anti-Pollution Cleansing Cream**- The anti-pollution cream cleanser for skin challenged by a polluted urban environment.



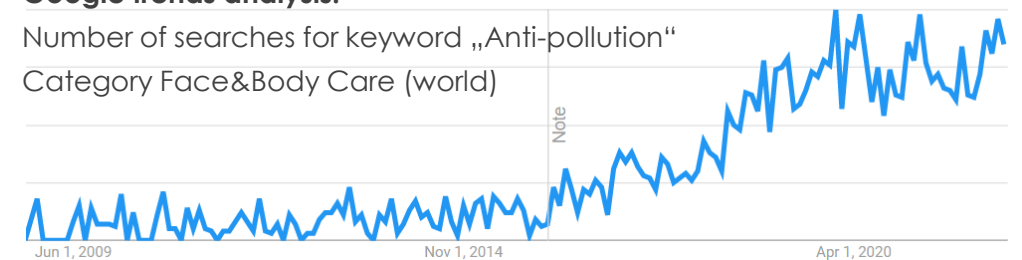
**Shiseido White Lucent Brightening Protective Cream Broad Spectrum SPF 18**- Achieve comprehensive skin protection against UV rays, air pollution, and dryness.



**Etude House Dust Cut Facial Mist**- A facial mist that protects skin from environmental pollutants by skin shield formed with fitting polymer

## Google trends analysis:

Number of searches for keyword „Anti-pollution“  
Category Face&Body Care (world)



# „Anti-pollution,, effect of Contipro ingredients



## Formation of superficial protective film

- \*\*\*\* HA
- \*\*\* HySilk
- \*\*\* CrossLinked<sup>HA</sup>
- \*\* HyActive
- \*\* OligoHyaferre

## Active improvement of the skin barrier

- \*\*\* HySilk
- \*\* HyActive

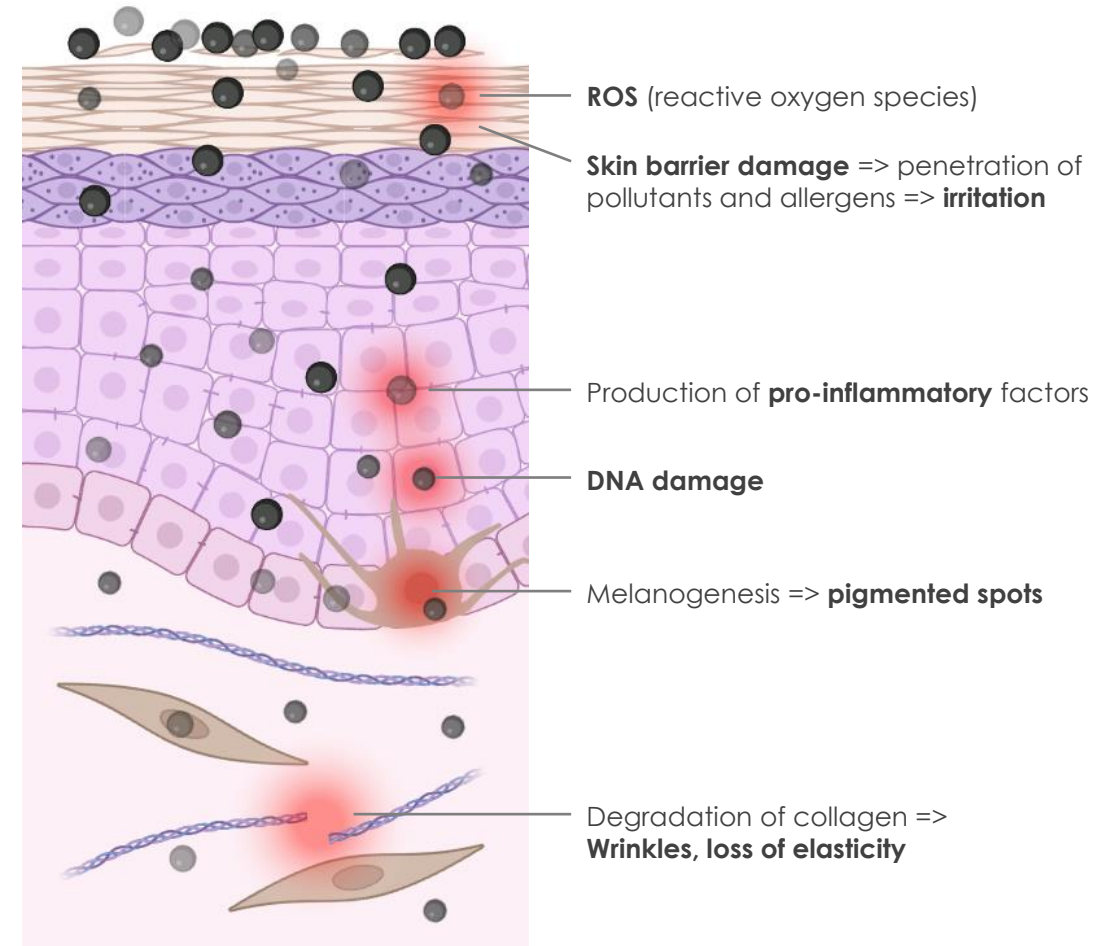
## Anti-inflammatory effect

- \*\*\* Schizophyllan
- \*\* Carboxymethylglucan
- \*\* TanActine

## Other mechanisms

- \*\* Recelline (proteasome activator)

## Air pollution-induced skin damage



# „Anti-pollution,, effect of Contipro ingredients



Anti-pollution effect confirmed by all tested ingredients:

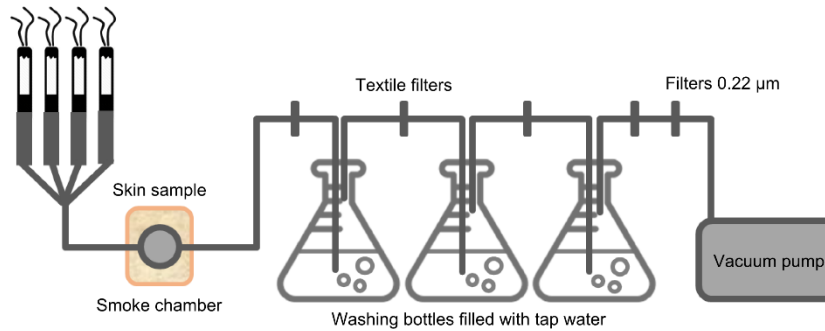
HA (standard)

>

HySilk

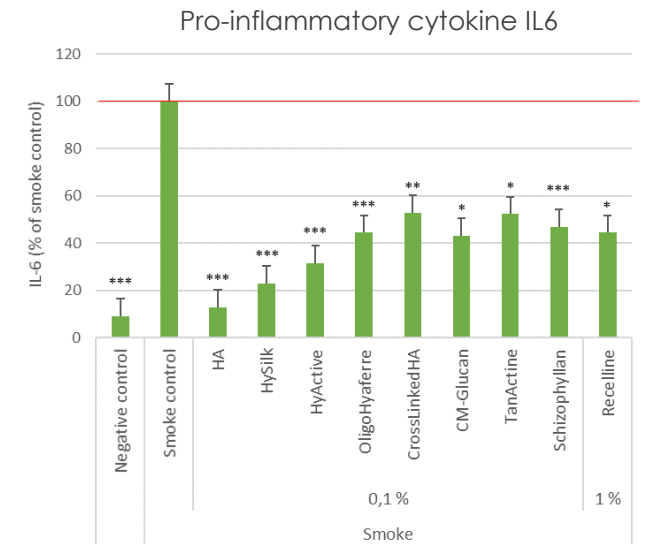
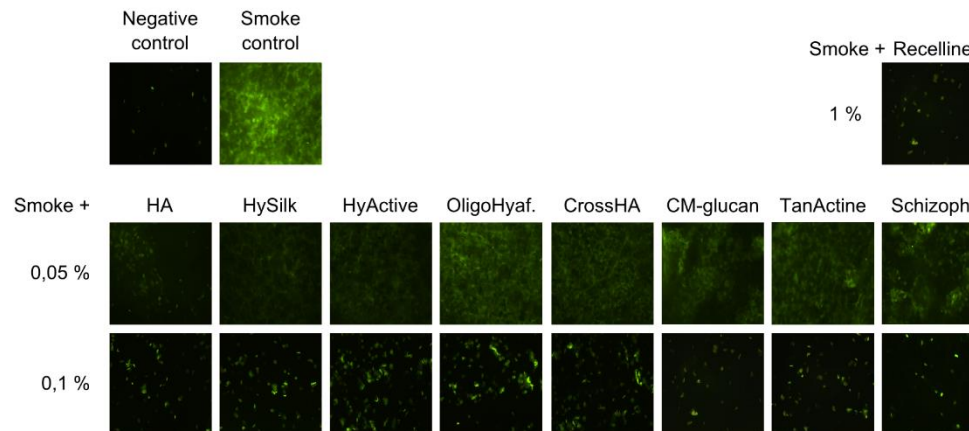
>

HyActive, CrossLinked<sup>HA</sup>,  
OligoHyaferre, Schizophyllan,  
Carboxymethylglucan,  
TanActine, Recelline



- Skin explants
- + Ingredients in a buffer
- 24 h, 37 °C => washing, drying
- Smoke application
- Analyses:
  - ROS (fluorescence microscopy, DCFH-DA)
  - Lipid peroxidation (TBARS from strips)
  - Gene expression of pro-inflammatory cytokine IL6 (qRT-PCR)

Production of reactive oxygen species (ROS)  
(View on the skin from above (in microscope), ROS green)



# Skin microbiome support by Contipro ingredients

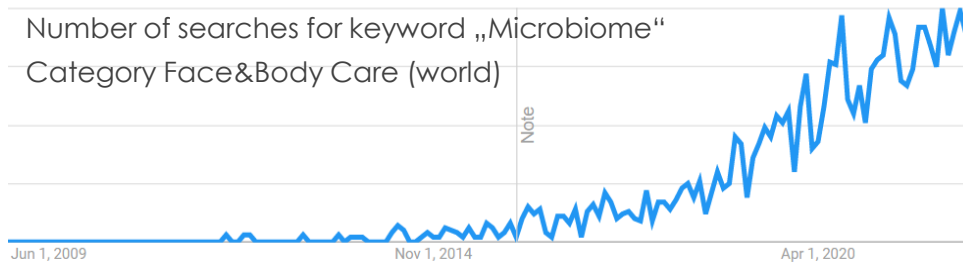


## Skin microbiome

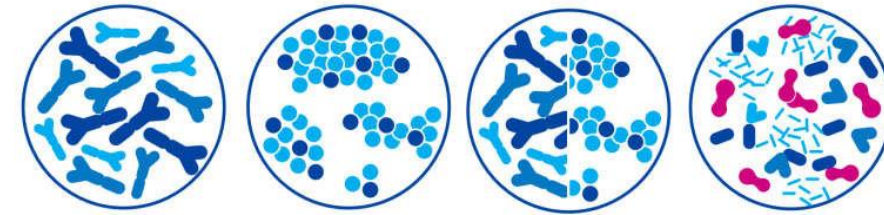
- All microorganisms living on/in the skin
- Current cosmetic trend
- Important for the skin properties, function, health, appearance

### Google trends analysis:

Number of searches for keyword „Microbiome“  
Category Face&Body Care (world)



Ingredients used in cosmetics for the skin microbiome support



**Probiotics**  
Live microorganisms

**Prebiotics**  
Substrates for microorganisms

**Synbiotics**  
Combination of prebiotics and probiotics

**Postbiotics**  
Non-viable microorganisms or their products

Contipro cosmetic polysaccharides?

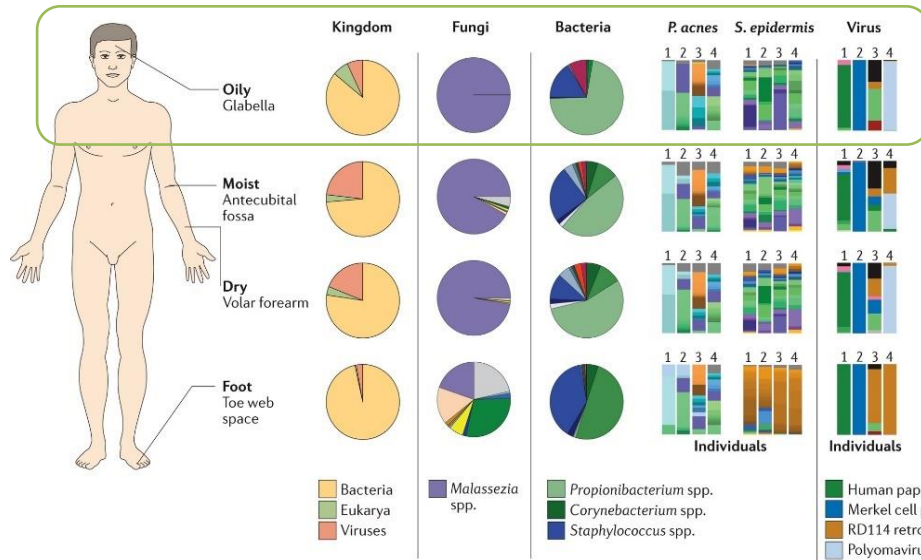


# Skin microbiome support by Contipro ingredients



## Skin microbiome composition

**Bacteria** >>>> viruses > fungi, parasites



## Main function of the skin microbiome:

- Protects against pathogens
- Educates immune system, interacts with it
- Products of microorganisms:
  - => Optimal, slightly acidic pH
  - => Hydration
  - => Skin barrier

Nature Reviews | Microbiology

### Bacteria

*Cutibacterium acnes*



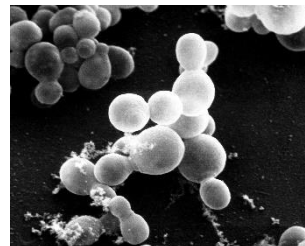
### Bacteria

*Staphylococcus epidermidis*



### Fungi

*Malassezia*



### Parasites

*Demodex folliculorum*





# Skin microbiome support by Contipro ingredients



## Contipro polysaccharides tested as the skin prebiotics:

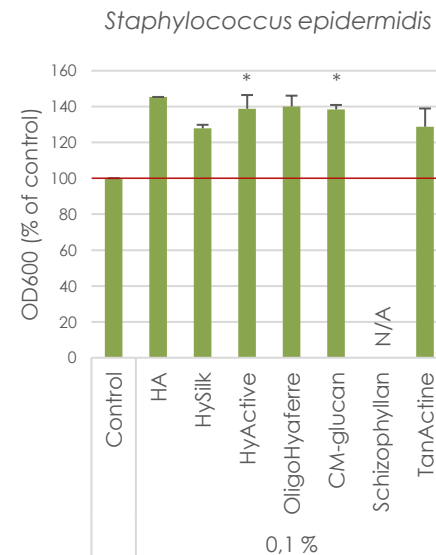
- HA:
  - Hyaluronic acid
  - HySilk
  - HyActive
  - OligoHyaferre
- Carboxymethylglucan
- Schizophyllan
- TanActine

} Known gut prebiotics

## In vitro cell cultures

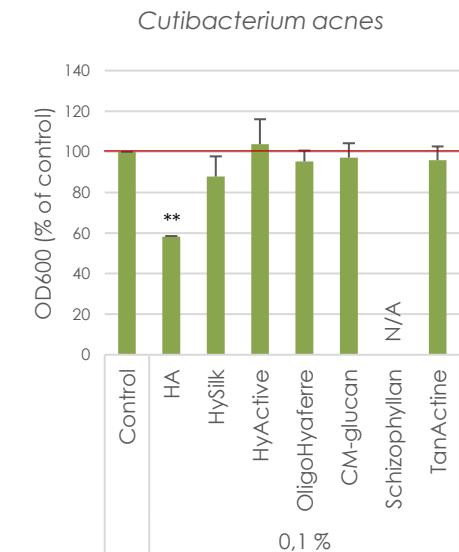


- *S. epidermidis*, *C. acnes*
- Cultivation with 0,1 % polysaccharides
- Incubation 4 h (*S. epidermidis*), 40 h (*C. acnes*)
- Optical density measurement



### *S. epidermidis*:

- Growth support



### *C. acnes*:

- No effect
- HA (standard): inhibition

# Skin microbiome support by Contipro ingredients



## Skin cleansing

- All bacteria => significant reduction
- Remaining bacteria:
  - *S. epidermidis* => relative decrease
  - *C. acnes* => relative increase

=> Skin is free for colonization by pathogens = risk

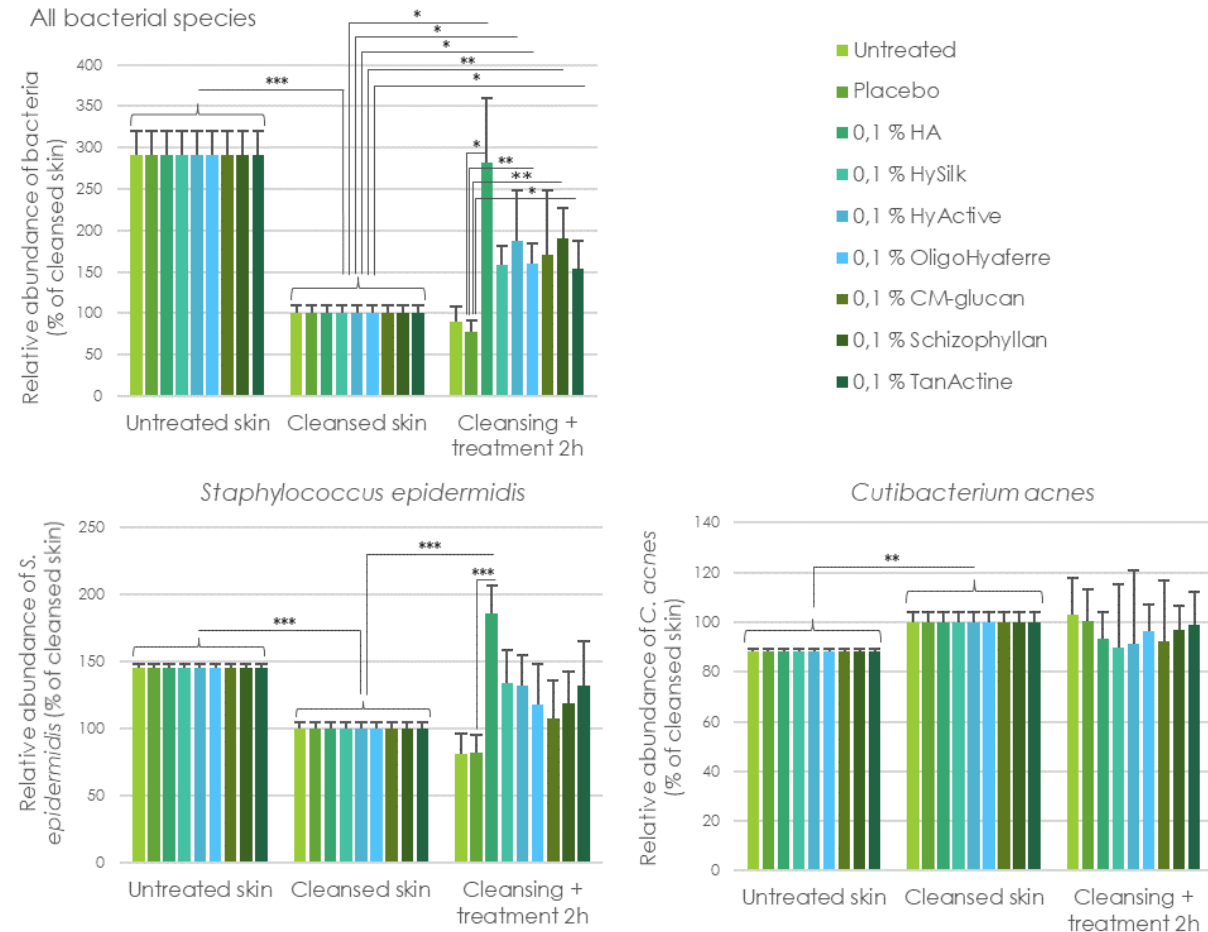
=> Microbial dysbiosis, risk for acne-prone skin

## Effects of polysaccharides

- All bacteria => Faster recovery by all polysaccharides
- Faster normalization of bacterial ratio:
  - *S. epidermidis* => increase
  - *C. acnes* => slight decrease

**Hyaluronic acid** (standard) the best

(Due to its high MW? Stays on the skin surface => more available for microbial consumption)



## In vivo study

- 11 subjects
- 1/2 forehead wiped 5x with cellulose soaked with 1 mL 10 % detergent
- After 15 min: application of 0,5 g of emulsions with 0,1 % polysaccharides for 2 h
- Overall number of bacteria, *S. epidermidis*, *C. acnes*: qPCR

# HA of different MW



## SUMMARY

	Hyaluronic acid	HySilk	HyActive	OligoHyaferre
<b>INCI:</b>	Sodium Hyaluronate	Sodium Hyaluronate	Sodium Hyaluronate	Hydrolyzed Sodium Hyaluronate
<b>MW:</b>	1300-2300 kDa	150-1300 kDa	10-150 kDa	<5 kDa
<b>Viscosity of solutions</b>	Highest	High	Low	Low
<b>Main place of action:</b>	Skin surface, stratum corneum	Epidermis	Dermis	Dermis
<b>Main effects</b>	<ul style="list-style-type: none"> <li>• <b>Immediate hydration</b></li> <li>• <b>Protective superficial film</b></li> <li>• <b>Immediate wrinkle reduction</b></li> <li>• Anti-pollution effect</li> <li>• Skin microbiome support</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Sebum reduction</b></li> <li>• <b>Active improvement of hydration</b></li> <li>• <b>Active improvement of skin barrier</b></li> <li>• Anti-pollution effect</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Wrinkle reduction</b></li> <li>• <b>Elasticity improvement</b></li> <li>• <b>Improvement of epidermal atrophy</b></li> <li>• Skin calming, anti-inflammatory effect</li> <li>• Collagen increase</li> <li>• Production of body's own HA</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Wrinkle reduction</b></li> <li>• <b>Elasticity improvement</b></li> <li>• <b>Support of skin regeneration, wound healing</b></li> <li>• Angiogenesis, skin nourishment</li> <li>• Skin calming</li> <li>• Collagen increase</li> <li>• Production of body's own HA</li> </ul>
<b>Other effects</b>	Skin pore and sebum reduction, long-term hydration and skin barrier improvement	Decreased skin roughness, skin calming, anti-inflammatory effect, stimulation of natural antioxidant enzymes, wrinkle reduction, elasticity improvement, skin microbiome support	Skin pore reduction, active improvement of hydration and skin barrier function, support of desquamation => decreased roughness, anti-pollution effect, skin microbiome support	Pore and sebum reduction, active improvement of hydration and skin barrier function, anti-pollution effect, skin microbiome support

# HA of different MW – technical information



Hyaluronic acid, HySilk, HyActive, OligoHyaferre

## INCI:

- HA, HySilk, HyActive: Sodium Hyaluronate
- OligoHyaferre: Hydrolyzed Sodium Hyaluronate

**Minimal ordering quantity:** 1 kg

**Samples:** 1 g

**Recommended concentration:** 0.01 – 0.1 %  
(up to 2 % for which we have safety data)

**Expiration:** 2 years (OligoHyaferre 3 years)

## Compatibility and processing:

- Incompatible with cationic substances (e.g. surfactants or polymers, Polyquaternium-4, Polyquaternium-10, etc.)
- Prolonged heating and low pH leads to decrease in MW and viscosity (mainly in the case of high MW/standard HA). E.g. 45 min at 90°C => 20 % reduction in MW.

## Solubility

- Fully-soluble in water
- **Always add HA to water little by little while stirring!**
- Higher MW: more viscose solutions, slower dissolution (it can take even hours)
  - HA: commonly 1 % (up to 2 % - turax, short heating)
  - HySilk: commonly 2 % (up to 5 % - turax, short heating)
  - HyActive: commonly 5 % (up to 30 %)
  - OligoHyaferre: commonly 10 % (up to 30 %)
- Soluble in water solutions of alcohols (max. 50 % ethanol, isopropanol etc.) and glycols (max. 50 % propylene glycol, butylene glycol)
- Insoluble in solvents non-miscible with water

**Video of HA dissolution + common mistakes (youtube):**

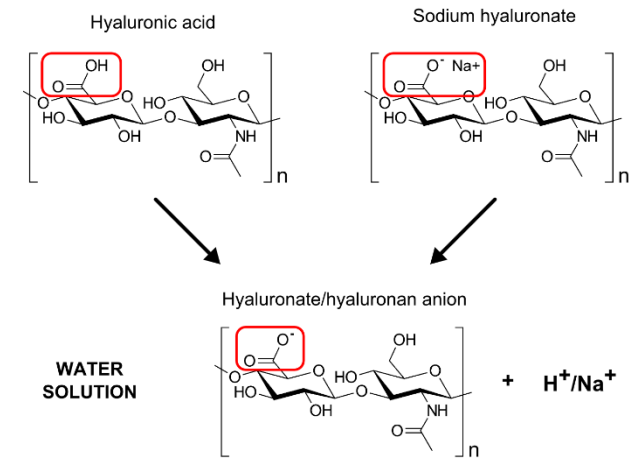
<https://www.youtube.com/watch?v=iWthYx-qvVY>

# HA – myths and facts

## 1. HYALURONIC ACID (HA) VS SODIUM HYALURONATE (SH)

INCI „Hyaluronic Acid“ and „Sodium Hyaluronate“ are synonyms in cosmetics

(INCI is not a chemical nomenclature)



Claims found on the internet	True/false	Comment
<i>SH is a salt derived from HA</i>	True	
<i>Only HA can be found in nature including human body whereas SH is not present in nature.</i>	False	Oppositely. You will never find hyaluronic acid in the acid form in nature. It is always present in a form of salt. A salt consists of anion hyaluronan and a cation (most commonly sodium). Hyaluronic acid itself also exists, but only in chemical laboratories because it undergoes fast degradation, and its solutions are very acidic. Our organic chemists sometimes use hyaluronic acid form, but they prepare it by themselves from its salts using ion exchangers which exchange sodium for hydrogen cations. Both HA and SH are soluble in water where they dissociate to the same anion hyaluronan.
<i>SH has a smaller molecular weight (MW) than HA</i>	False	Both molecules can have different MWs.
<i>HA cannot be absorbed when applied topically, it can only be injected, whereas SH penetrates skin.</i>	False	Absorption depends more on the MW of HA. (btw injected HA is usually crosslinked HA)
<i>SH is chemically synthesized from HA.</i>	False	SH is not synthesized chemically, it is always extracted from organisms, usually from microorganisms, or sometimes (rather historically) from rooster combs or eye vitreous. In these organisms, there is only the SH form, therefore, the extracted HA is always in the form of SH (with both possible INCI: „SH“ or „HA“ based on the company decision).

# HA – myths and facts



## Low MW HA/HA oligosaccharides/HA fragments

**cause inflammation or skin irritation**

**NO!!! HA of all MW is completely safe!**

- When human body is in homeostasis, it contains mostly high MW HA. If the skin is injured, HA is cleaved to low MW HA/HA fragments, even oligosaccharides which serve as signaling molecules promoting skin regeneration and wound healing. Because some of these processes are also involved in skin inflammation and irritation, some people misinterpret it and conclude that these HA fragments induce inflammation or irritation when applied on the skin. NO!
- Oppositely, the stimulation of these processes is beneficial for the skin regeneration and healing after skin disruption.
- Also, there is a long history of using low MW HA with no observed negative side effects. HA regardless its MW is considered as safe (Becker et al. 2009)
- We even observed skin calming effect after OligoHyaferre or HyActive long-term treatment.
- Contamination of HA by endotoxins has been shown to be responsible for the pro-inflammatory effects observed in some cases.

## Final Report of the Safety Assessment of Hyaluronic Acid, Potassium Hyaluronate, and Sodium Hyaluronate

Lillian C. Becker, MS, Wilma F. Bergfeld, MD, Donald V. Belsito, MD, Curtis D. Klaassen, PhD, James G. Marks Jr, MD, Ronald C. Shank, PhD, Thomas J. Slaga, PhD, Paul W. Snyder, DVM, PhD, Cosmetic Ingredient Review Expert Panel, and F. Alan Andersen, PhD

Hyaluronic acid, sodium hyaluronate, and potassium hyaluronate function in cosmetics as skin conditioning agents at concentrations up to 2%. Hyaluronic acid, primarily obtained from bacterial fermentation and rooster combs, does penetrate to the dermis. Hyaluronic acid was not toxic in a wide range of acute animal toxicity studies, over several species and with different exposure routes. Hyaluronic acid was not immunogenic, nor was it a sensitizer in animal studies. Hyaluronic acid was not a reproductive or developmental toxicant. Hyaluronic

acid was not genotoxic. Hyaluronic acid likely does not play a causal role in cancer metastasis; rather, increased expression of hyaluronic acid genes may be a consequence of metastatic growth. Widespread clinical use of hyaluronic acid, primarily by injection, has been free of significant adverse reactions. Hyaluronic acid and its sodium and potassium salts are considered safe for use in cosmetics as described in the safety assessment.

**Keywords:** cosmetics; hyaluronic acid; safety

International  
Journal of Toxicology  
Volume 28 Number 4S  
July/August 2009 5-67  
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10.1177/1091581809337738  
http://ijt.sagepub.com  
hosted at  
http://online.sagepub.com

## SCIENTIFIC REPORTS

**OPEN** Endotoxin free hyaluronan and hyaluronan fragments do not stimulate TNF- $\alpha$ , interleukin-12 or upregulate co-stimulatory molecules in dendritic cells or macrophages

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Yifei Dong<sup>1</sup>, Arif Arif<sup>1</sup>, Mia Olsson<sup>1,2</sup>, Valbona Cali<sup>3</sup>, Blair Hardman<sup>1</sup>, Manisha Dosanjh<sup>1</sup>, Mark Lauer<sup>3,4</sup>, Ronald J. Midura<sup>3</sup>, Vincent C. Hascall<sup>5</sup>, Kelly L. Brown<sup>2</sup> & Pauline Johnson<sup>1</sup>

# HA – myths and facts



## Plant-based, botanical HA?

Unfortunately not

- HA is not produced by plants in nature
- Rather marketing term
- Usually completely different compounds (extracts, other polysaccharides etc.) with ability to stimulate production of HA in our body
- Or they call it botanical because HA is produced by microbial „fermentation“ (probably sounds botanical, but it is incorrect)



## Plant Based Vegan Skincare

1% Botanical Hyaluronic Acid

- Centella Asiatica Extract
- Amino Acid
- Peptide
- Collagen
- Niacinamide

The infographic features a central illustration of a large, clear, bubbly water droplet. Surrounding it are several smaller, stylized representations of various ingredients: a green plant sprout, a cluster of white spheres, a molecular structure, a glowing sphere, and a blue crystalline structure. Each representation is connected to a text label by a thin line.

# Hyaluronic acid derivatives



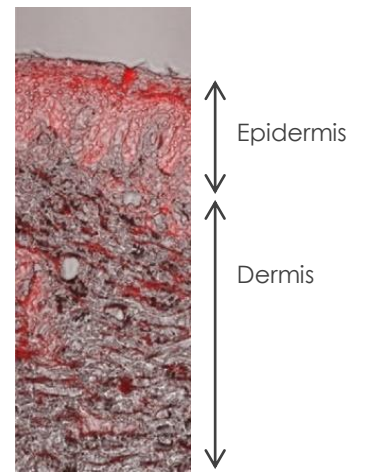
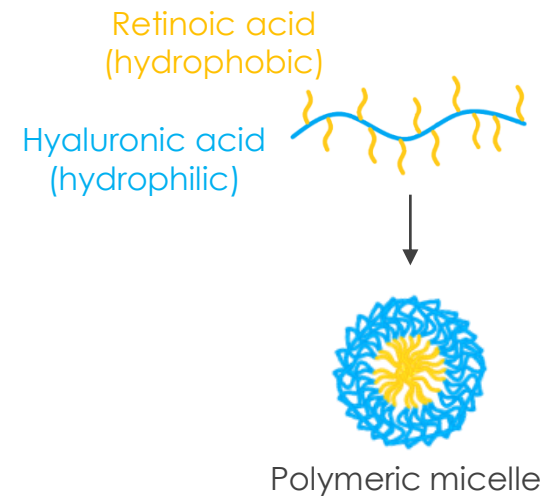
# HyRetin

## Key properties

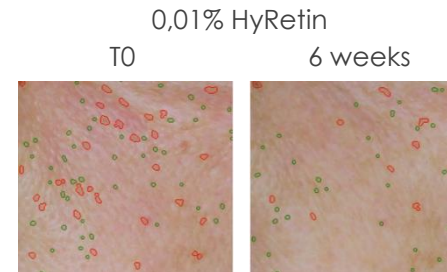
- Derivative (ester) of HA (10-20 kDa) and retinoic acid
- **INCI:** Sodium Retinoyl Hyaluronate
- **Form:** water-soluble, slightly yellow powder
- Effective penetration into dermis

## Effects

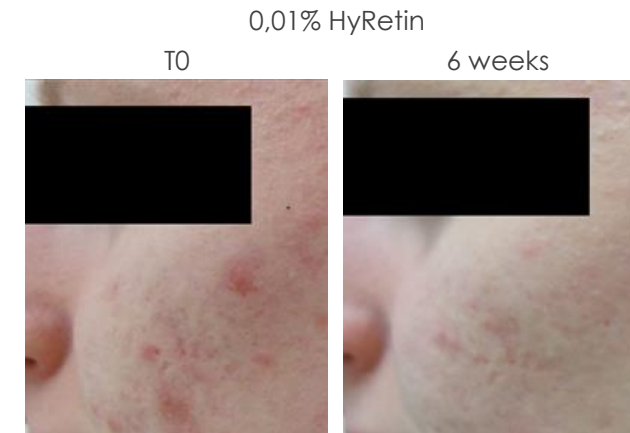
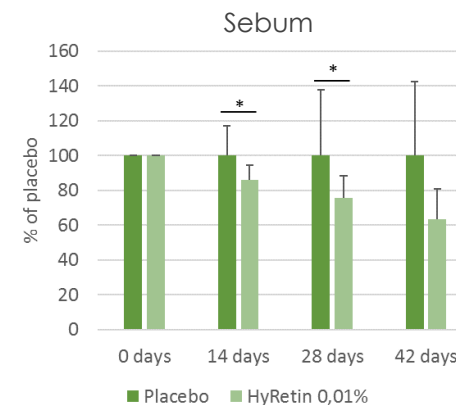
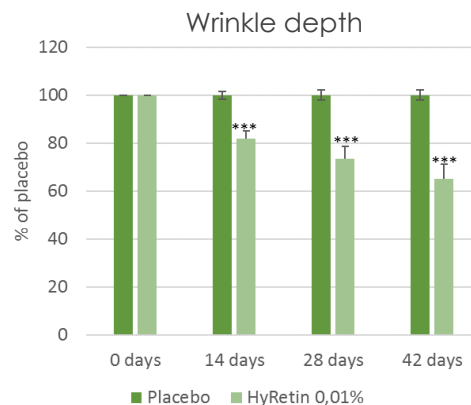
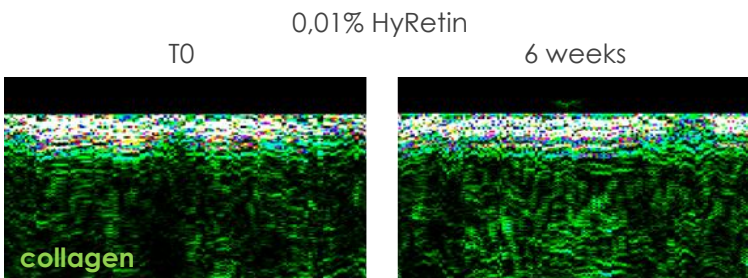
- Anti-acne activity: reduction of acne lesions, pores, sebum, inflammation
- Anti-ageing activity: stimulation of collagen, wrinkle reduction, elasticity improvement
- More effective than HA or retinoids
- Safer than retinoids



- Skin explants
- HyRetin + Nile red
- 24 h, 37 °C
- Confocal microscopy



- 14 women
- 0,01 % HyRetin in emulsion
- 6 weeks



# HA-OIL



## Key properties

- **Form:** homogenous dispersion of hydrophobized HA in oil
- Derivative of HA (200-300 kDa) and caproic (hexanoic) acid
- **INCI:** Ricinus communis seed oil, sorbitan olivate, sodium hyaluronate, caproic acid
- Suitable for lipophilic, anhydrous products based on oils/waxes
  - Haircare (hair oils, masks, balms...)
  - Decorative cosmetics (make-up, lip-balms, lipsticks...)
- Natural (Cosmos)
- China compliant
- Preservative-free



Composition	%
Castor oil	93
Sorbitan olivate	6
Sodium caprooyl hyaluronate	1

# HA-OIL



## Effects

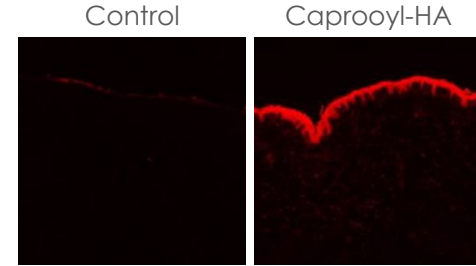
- **Penetration** to skin, hair, nail
- **Hair:** stimulation of hair growth, increased hair strength and smoothness
- **Lips:** increased lip volume (plumping effect) and smoothness

## Lip balm

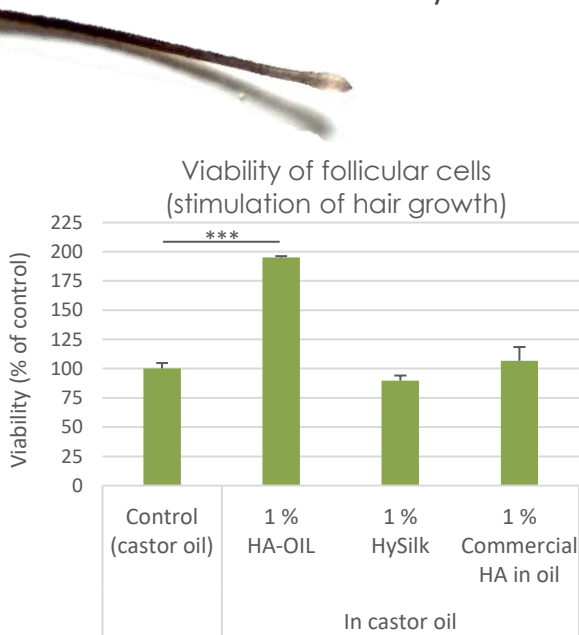
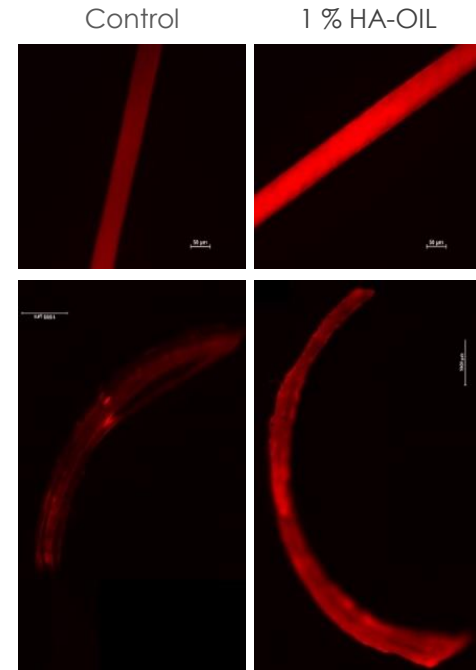
- 15 women
- + lip balm
- 30, 60 min
- Primos 3D camera (volume), Visioface (smoothness)

## Penetration

- Skin explants
- Caprooyl-HA + Nile red
- 0,1 % in buffer
- 20 h, 37 °C
- Confocal microscopy

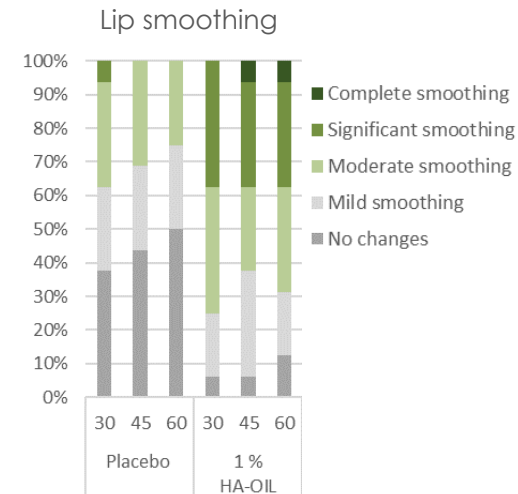
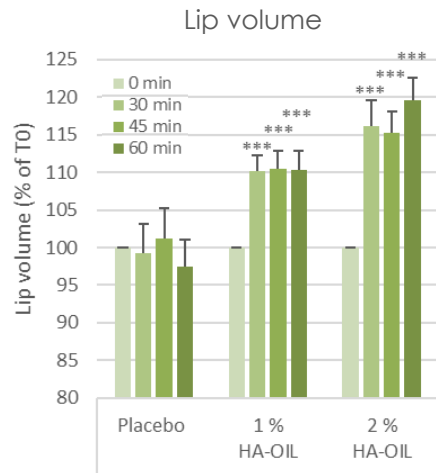


- Hair/nails
- HA-OIL + Nile red
- 30 min, 37 °C, wash
- Confocal microscopy

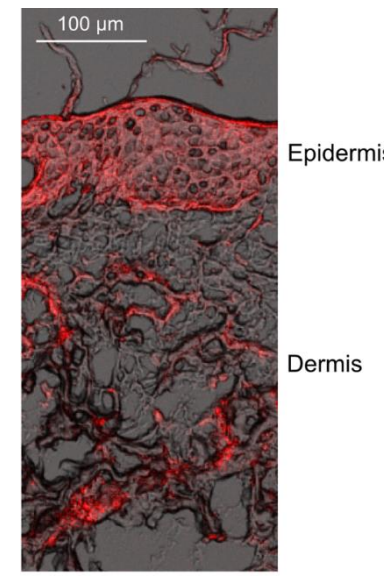
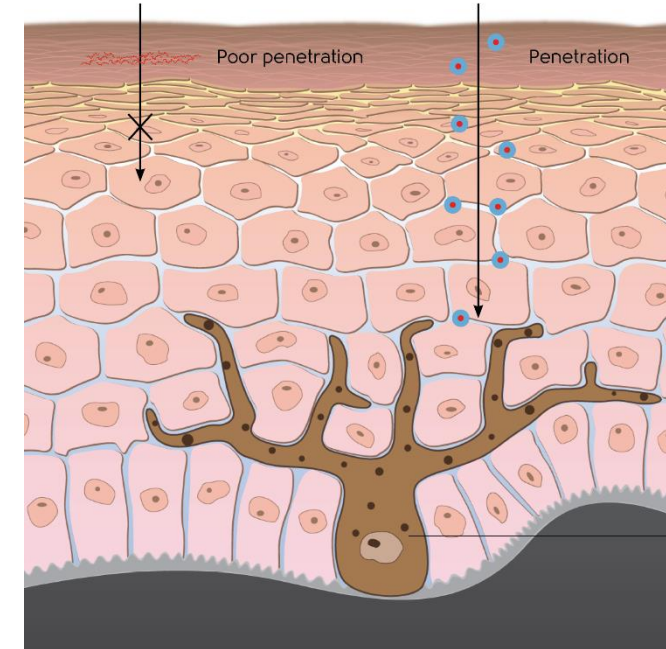
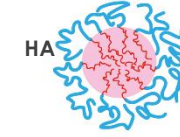
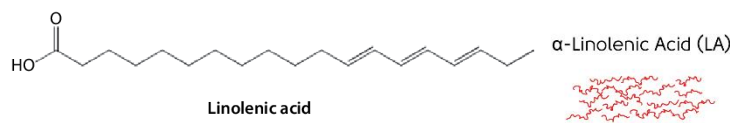


## Hair follicles

- + 1 % HA-OIL in oil
- 30 min, wash
- 18 h in culture medium, 37 °C
- MTT cell viability test



# HyWhite



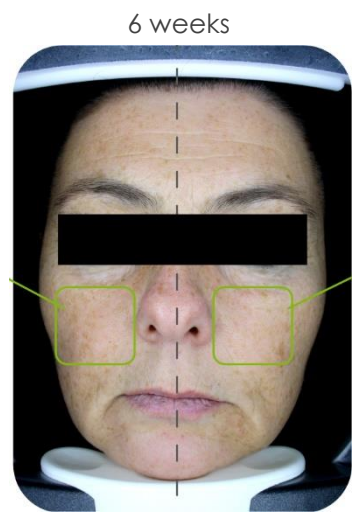
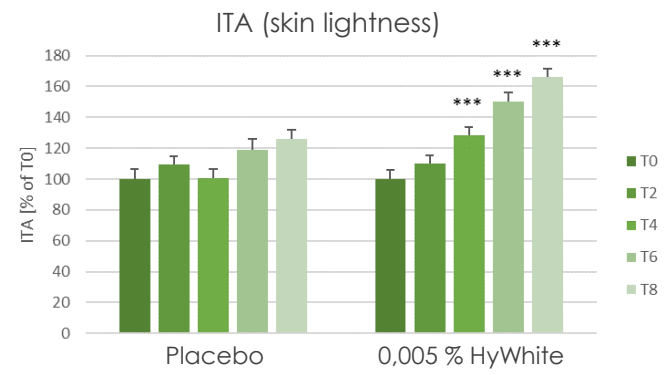
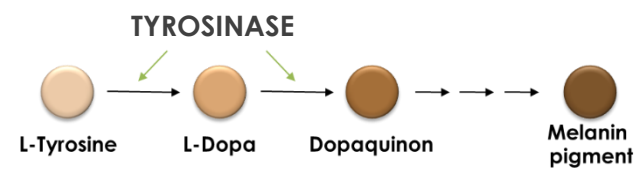
- Skin explants
- Fluorescently-labelled (red) HyWhite
- 0,5 mg/mL
- 24 h, 37 °C
- Confocal microscopy

## Key properties

- Derivative of HA (10-15 kDa) and α-linolenic acid
- INCI: Sodium Hyaluronate, Linolenic Acid
- Natural (COSMOS), China compliant

## Effects:

- Skin whitening, reduction of pigmented spots
- Increased degradation of tyrosinase, key enzyme in melanogenesis
- α-Linolenic acid: whitening effect (in vitro only, it does not get to the melanocytes in the skin in vivo)
- HA 10-15 kDa => formation of micelles => skin penetration



- 35 women (Chinese)
- 0,005 % HyWhite in emulsion
- 8 weeks
- Colorimeter (ITA)

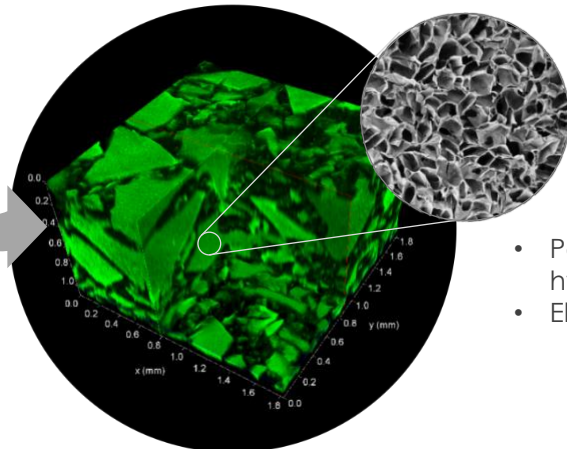
- 15 women (Czech)
- 0,005 % HyWhite in emulsion
- 6 weeks

# CrossLinked<sup>HA</sup>

- **INCI:** Sodium Hyaluronate, Sodium Hyaluronate Crosspolymer
- China compliant
- **Use:** for TOPICAL application (not dermal filler!)
- **Form:** water-soluble powder => after dissolution => „solution“ of microscopic hydrogel particles

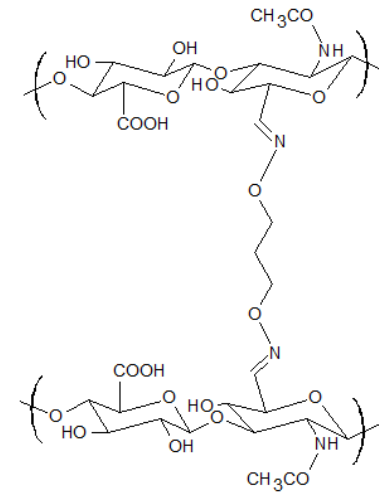
## Effects:

- Immediate hydration better than standard HA
- Higher stability than HA => longer effect
- Hydrogel particles absorb water and other actives => gradual, long-term release into the skin => enhanced activity
- Immediate and long-term wrinkle reduction



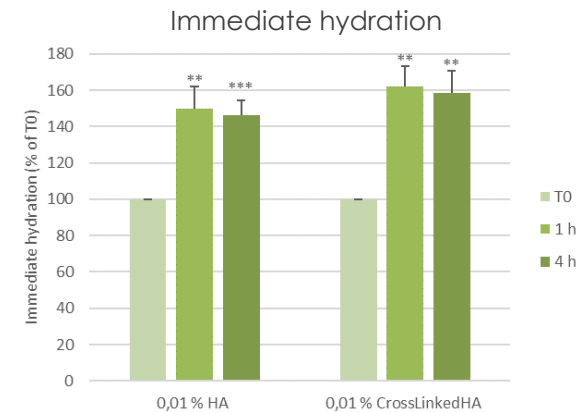
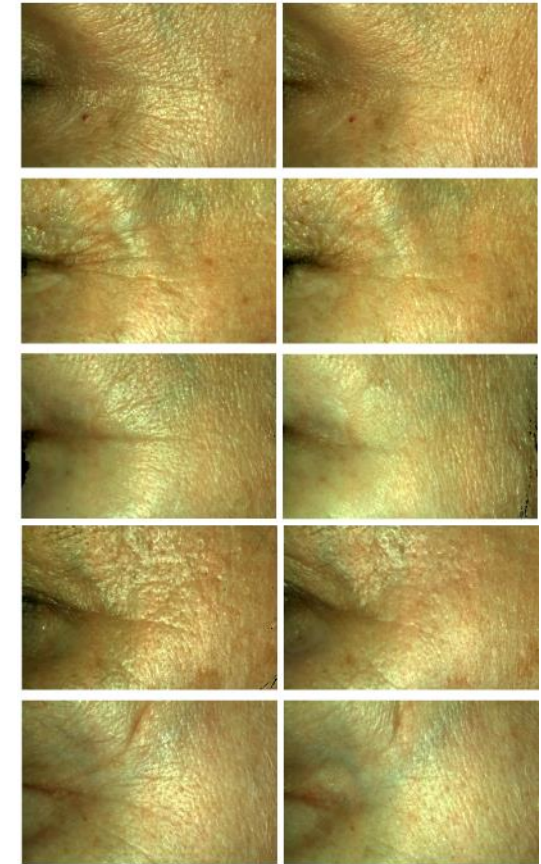
- Porous structure of hydrogel microparticles
- Electron microscopy

- Fluorescently-labelled CrossLinked<sup>HA</sup>
- 4% „solution“ in water
- Confocal microscopy



0,1 % CrossLinked<sup>HA</sup>

T0                      2 weeks



- 8 subjects
- 0,01 % CrossLinked<sup>HA</sup> and HA (1,6 MDa)
- In emulsion
- 1 h, 4 h
- Corneometry

- 15 women
- 0,01 % CrossLinked<sup>HA</sup> in emulsion
- 6 weeks
- Primos 3D camera (crow's feet wrinkles)

# Natural polysaccharides + derivatives

# Natural polysaccharides + derivatives



## Beta-glucans/glucomanan

- Biotechnological production
- Very effective **immunomodulators**
- Long history as **dietary supplements**
  - => immunity boosters
- New post-covid cosmetic trend
  - => **Skin immunity support**
  - => Immunocosmetics
  - => Increased awareness of  $\beta$ -glucans
- China compliant

*Saccharomyces cerevisiae*  
(baker's yeasts)

Carboxymethylglucan

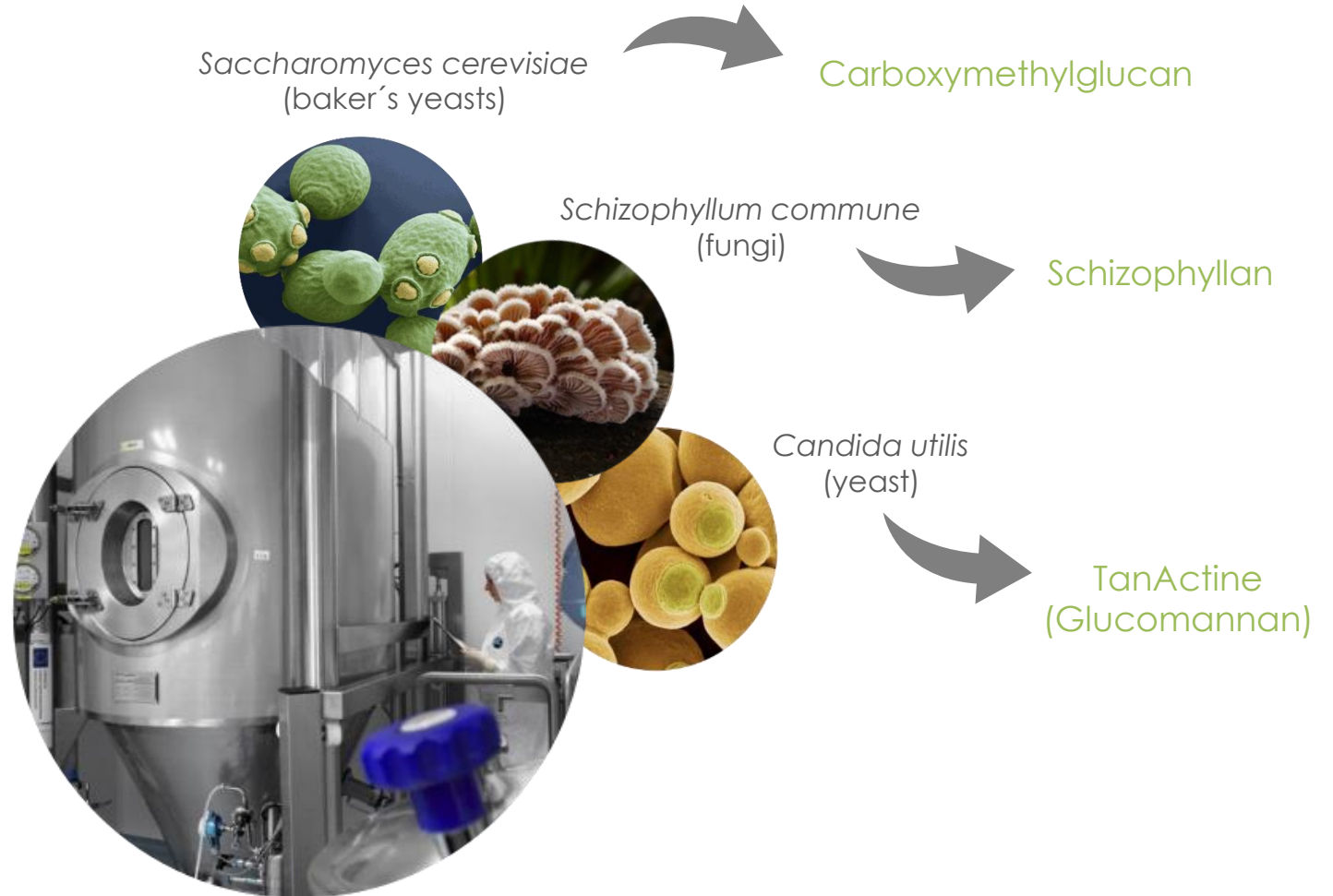
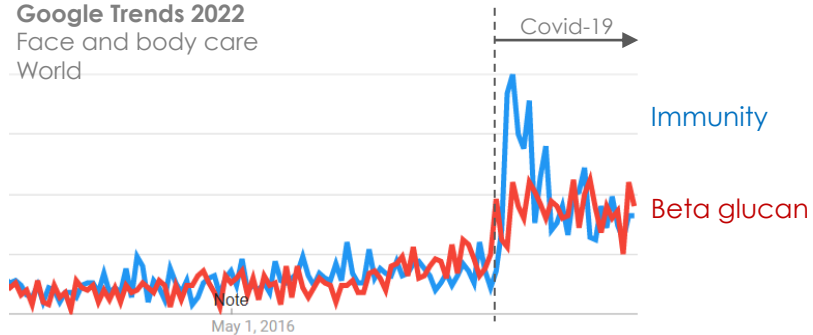
*Schizophyllum commune*  
(fungi)

Schizophyllan

*Candida utilis*  
(yeast)

TanActine  
(Glucomannan)


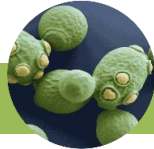
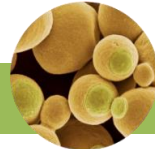
Google Trends 2022  
Face and body care  
World



# Natural polysaccharides + derivatives



## SUMMARY:

	Schizophyllan 	Carboxymethylglucan 	TanActine 
<b>INCI:</b>	Schizophyllan	Sodium Carboxymethyl Beta-Glucan	Glucomannan
<b>Source</b>	<i>Schizophyllum commune</i> (fungi)	<i>Saccharomyces cerevisiae</i> (baker's yeasts)	<i>Candida utilis</i> (yeast)
<b>Modification</b>	-	Carboxymethylation necessary for solubility of originally insoluble beta-glucan	-
<b>Cosmos/ECOCERT</b>	Yes	No	Yes
<b>Main effects</b>	<ul style="list-style-type: none"> <li>• <b>Skin barrier</b> improvement</li> <li>• <b>Skin calming</b> (suitable for <b>atopic skin</b>)</li> <li>• Hydration</li> <li>• Skin microbiome support</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Wrinkle reduction</b></li> <li>• <b>Elasticity improvement</b></li> <li>• Skin microbiome support</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Skin calming after UV</b></li> <li>• Long-term skin calming</li> <li>• Skin microbiome support</li> </ul>
<b>Other observed effects</b>	<ul style="list-style-type: none"> <li>• Wrinkle reduction</li> <li>• Anti-pollution effect</li> </ul>	<ul style="list-style-type: none"> <li>• Pore reduction</li> <li>• Skin smoothing</li> <li>• Calming effect</li> <li>• Skin barrier improvement</li> <li>• Hydration</li> <li>• Anti-pollution effect</li> </ul>	<ul style="list-style-type: none"> <li>• Anti-pollution effect</li> </ul>
<b>Mechanism of action</b>	<ul style="list-style-type: none"> <li>• Stimulates skin immunity</li> <li>• Helps to overcome chronic inflammation</li> <li>• Stimulates TGF-β and collagen</li> <li>• Inhibits MMPs (collagen degradation)</li> </ul>	<ul style="list-style-type: none"> <li>• Antioxidant (direct + stimulates natural antioxidant enzymes)</li> <li>• Anti-inflammatory effect</li> <li>• Fights „Inflammaging“ = skin ageing due to chronic inflammation</li> <li>• Stimulation of collagen</li> </ul>	<ul style="list-style-type: none"> <li>• Anti-inflammatory effect</li> <li>• Reduces DNA damage after UV</li> <li>• Increases cell viability after UV</li> </ul>

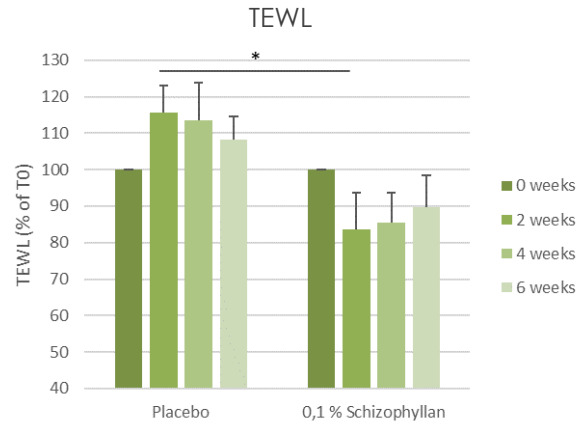


# Natural polysaccharides + derivatives

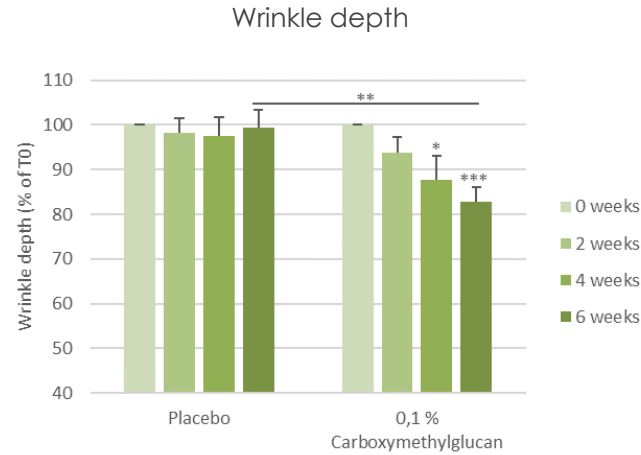


## EXAMPLES OF RESULTS:

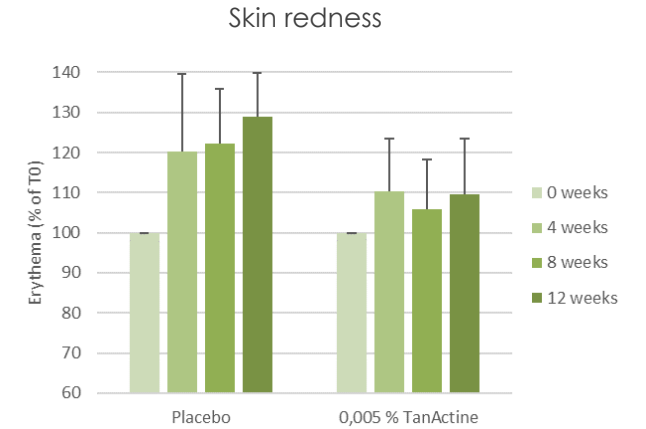
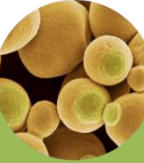
### Schizophyllan



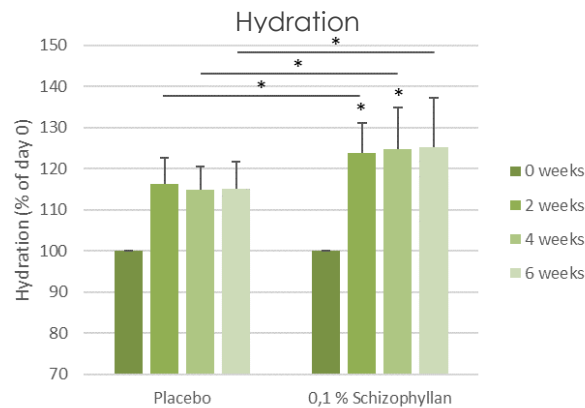
### Carboxymethylglucan



### TanActine



- 8 subjects
- 0,005 % TanActine in emulsion, 12 weeks
- Mexameter (redness)



### 0,1 % CM-gluca

T0

6 weeks



- 30 subjects
- 0,1 % CM-gluca in emulsion, 6 weeks
- Primos 3D camera

### 24 h after UV irradiation



Placebo      0,5 % TanActine

- 5 subjects (volar forearm)
- 0,5 % TanActine daily for 7 days
- + UVB irradiation (1.25 MED)
- Camera

- 7 subjects
- 0,1 % Schizophyllan in emulsion, 6 weeks
- Tewameter (TEWL), corneometer (hydration)

# Peptides

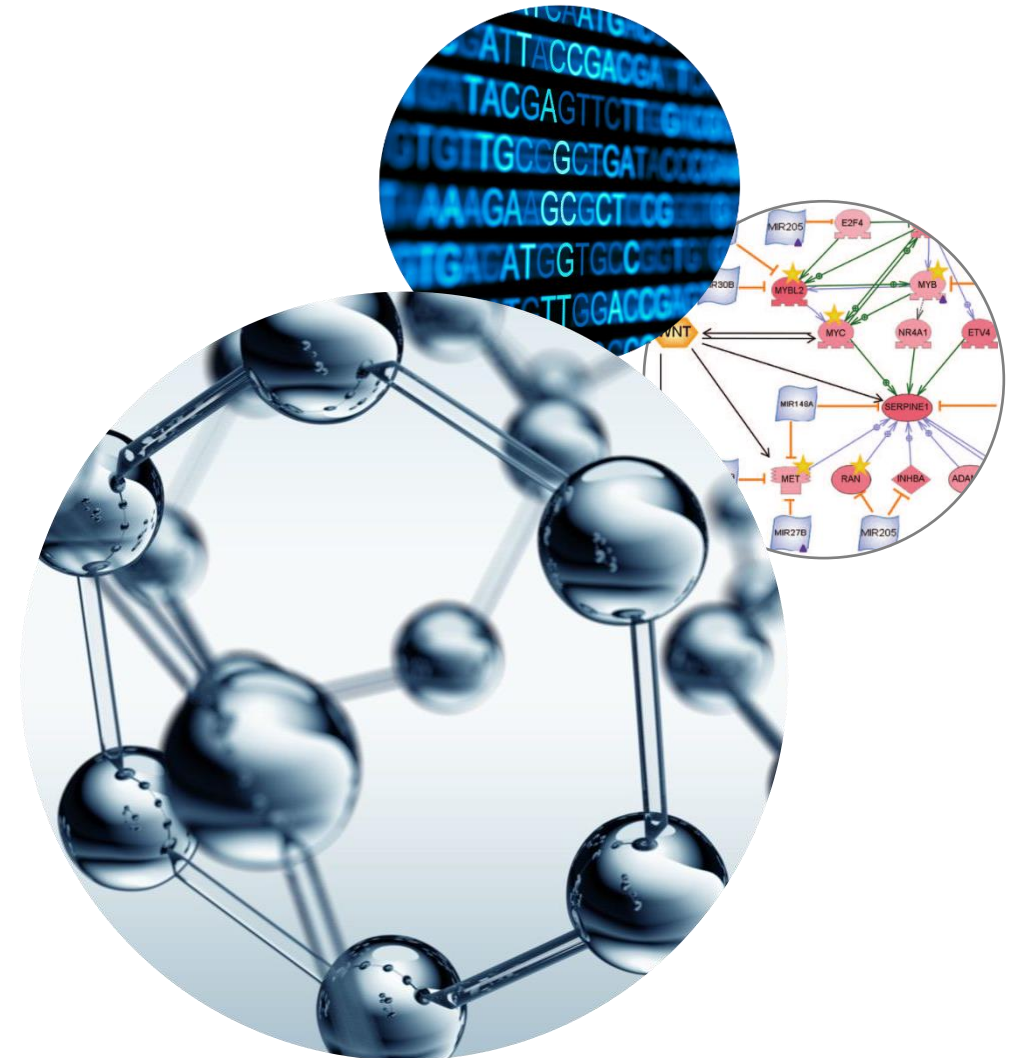
# Peptides



## General properties

- **Peptide** = short chain of amino acids (2 to approx. 20)
- **Origin:** synthetic, but they are composed of body's own amino acids, fully biodegradable
- **Form:** solution in water/water-based buffers with a preservative (phenoxyethanol, phenethyl alcohol, pentylene glycol)
- **Highly effective** in very low concentrations
- **Highly specific** for selected processes in the skin

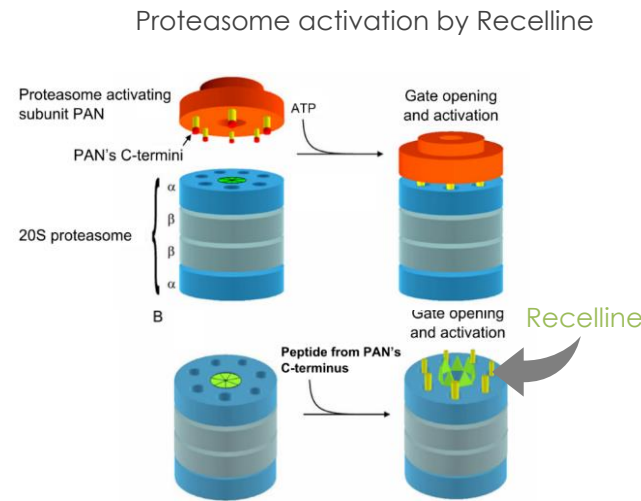
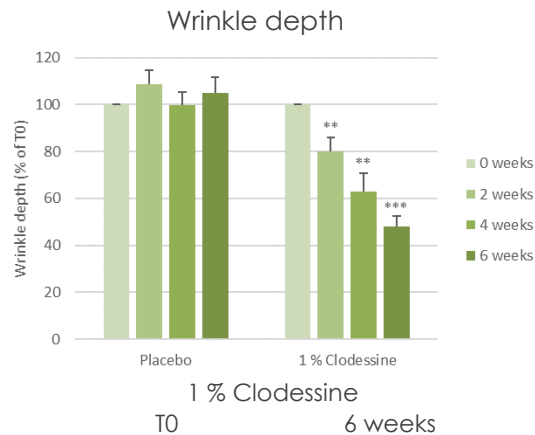
**Each peptide has different biological activities!**



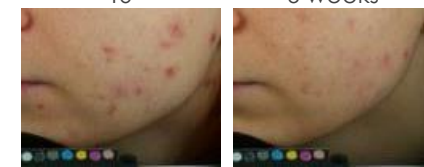
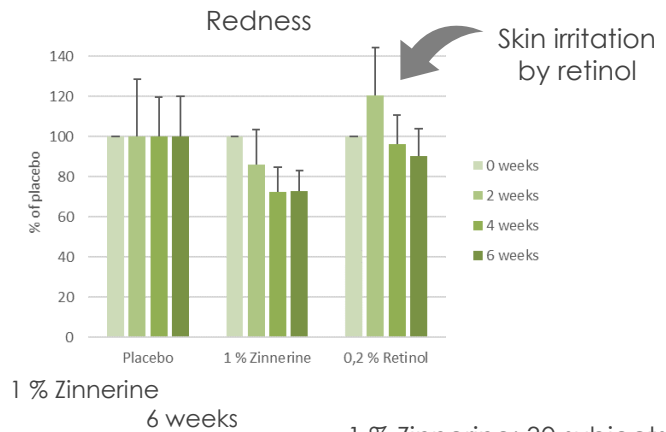
# Peptides



	Clodessine	Recelline	Zinnerine
<b>INCI</b> (peptide only)	sh-Nonapeptide-4	Pentapeptide-60 s-Methanocaldococcus Jannaschii Heptapeptide-1	Hexapeptide-2, Zinc Sulfate
<b>Mechanism of action:</b>	Fragment of natural <b>anti-ageing protein klotho</b> circulating in human body. Stimulates natural defensive mechanisms in the skin. Prolongs life of skin cells.	Specific <b>activator of proteasomes</b> degrading damaged proteins for their recycling and renewal. Decreases negative impact of UV/air pollution in the skin.	Complex of hexapeptide and zinc. <b>Targets all key processes in acne development:</b> reduces sebum production and hyperkeratinization, has anti-inflammatory and antimicrobial effects.
<b>Main effects</b>	<ul style="list-style-type: none"> <li>• <b>Wrinkle reduction</b></li> <li>• Elasticity improvement</li> <li>• Decreased roughness</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Anti-pollution</b> effect</li> <li>• Skin calming</li> <li>• Reduction of skin pores and sebum</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Safe retinol alternative for sensitive skin</b></li> <li>• <b>Anti-acne effect</b></li> <li>• Anti-ageing effect</li> </ul>
<b>Other effects</b>	Increased size of dermal papillae, pore reduction	Wrinkle reduction, elasticity improvement, stimulation of collagen, skin smoothing	Reduction of acne lesions, redness, sebum, skin pores, <i>Cutibacterium acnes</i> number. Stimulation of collagen, wrinkle reduction, elasticity improvement. Skin barrier improvement



Smith et al., 2007 Docking of the proteasomal ATPases' carboxyl termini in the 20S proteasome's alpha ring opens the gate for substrate entry



- 1 % Zinnerine: 30 subjects
- 0,2 % retinol: 10 subjects
- In emulsion
- 6 weeks
- VisiaCR

- 30 subjects
- 1 % Clodessine
- In emulsion
- 6 weeks
- Primos 3D camera

# Peptides



## Elaself

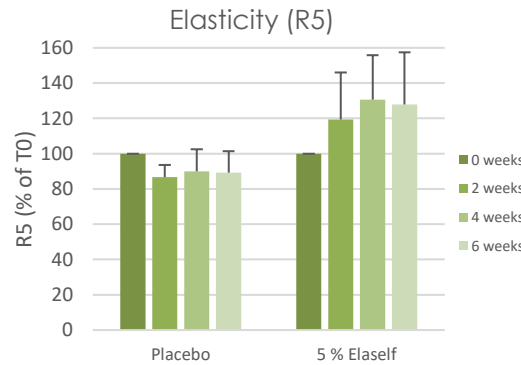
**INCI** (peptide only) sh-Pentapeptide-3

**Mechanism of action:** Fragment of natural protein MFAP-4, key protein for elastic fibers assembly. Strong **stimulator of elastic and collagen fibers**.

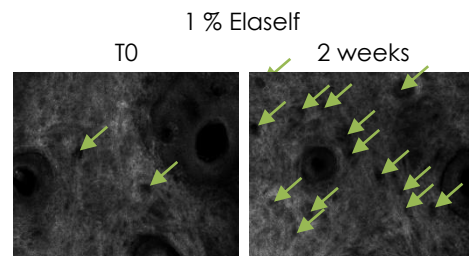
- Main effects**
- **Elasticity improvement**
  - Wrinkle reduction
  - Increased number of dermal papillae

**Other effects**

- 13 subjects
- 5 % Elaself in emulsion
- 6 weeks
- Cutometer



- 11 subjects
- 1 % Elaself in emulsion
- 6 weeks
- Vivascope



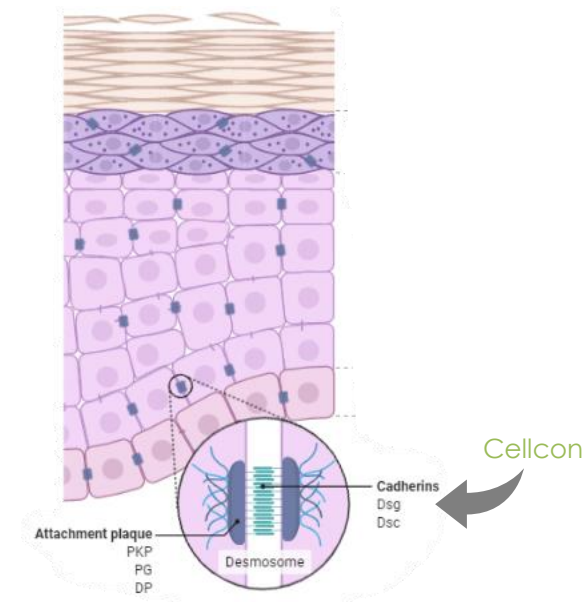
## Cellcon

sh-Hexapeptide-1 (+ Hyaluronic Acid)

Fragment of natural protein desmoglein 1 in **intercellular junctions – desmosomes**. Increases epidermal integrity. HA present in the product ensures hydration for proper desquamation.

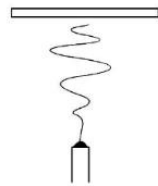
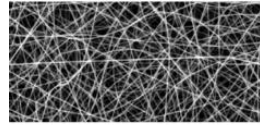
- **Skin barrier improvement**
- Hydration
- Sebum reduction

Elasticity improvement



# NanoDelivery<sup>HA</sup>

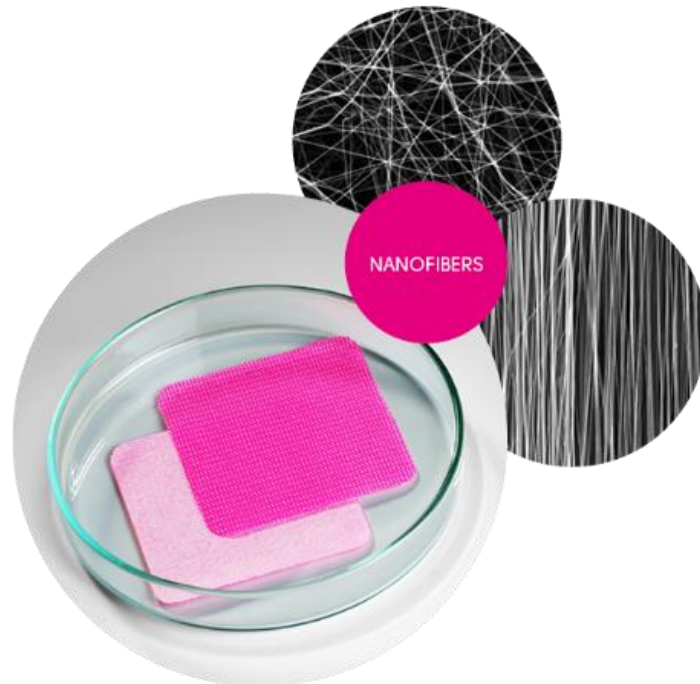
# Nanofibers from hyaluronic acid



Electrospinning

## Key properties

- Fibers with diameter  $< 100$  nm
- Produced into thin layers
- Fully soluble in water, biodegradable
- Not nanoparticles!
- Not nanomaterial in terms of cosmetic legislation (EU 1223/2009) as it is water-soluble and not biopersistent



4SPIN<sup>®</sup> CONTI



4SPIN<sup>®</sup> LAB  
Laboratory device  
(for sale)

# NanoDeliveryHA



## „Dry serums“

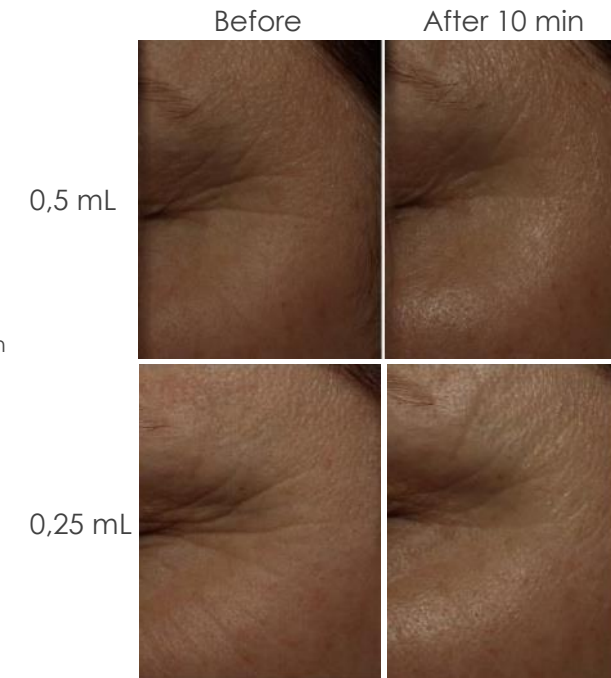
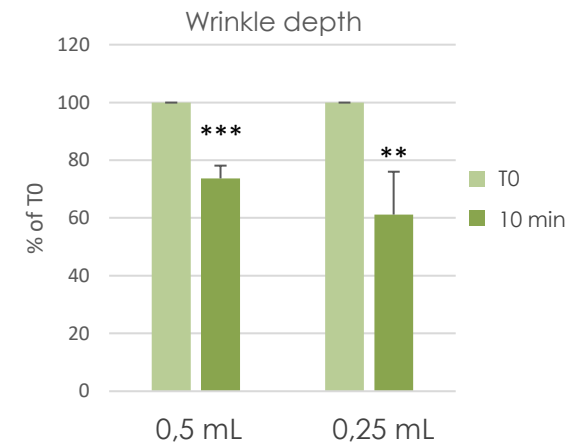
- Dry, thin nanofiber layers (circles)
- In blisters
- Suitable for homecare

## Application:

- Open 1 blister
- Add water => immediate dissolution => serum
- Apply on the face



Final concentration of serum is customized – based on the amount of added water:



- 10 women
- Square 2x2 cm
- + 0,25/0,5 mL of water
- 10 min
- 3D LifeViz camera



# NanoDelivery<sup>HA</sup>

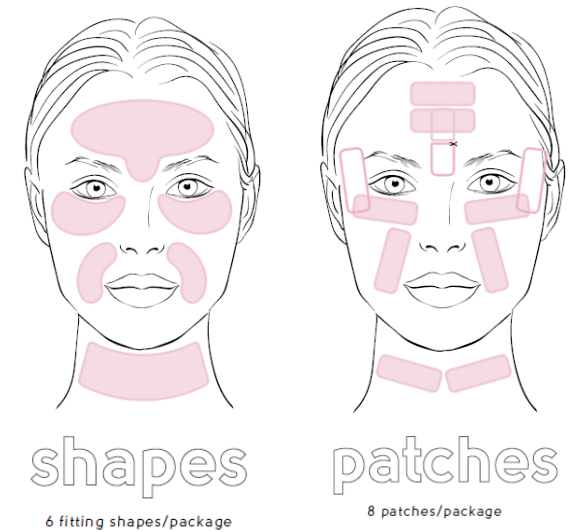


## „Masks“

- Dry, thin nanofiber layers on supporting porous textile
- Various shapes available
- Suitable for professional care (needs assistance)

## Application:

- Moisturize the face
- Apply masks
- Nanofibers immediately dissolve => serum
- Remove supporting textile
- Spread the serum



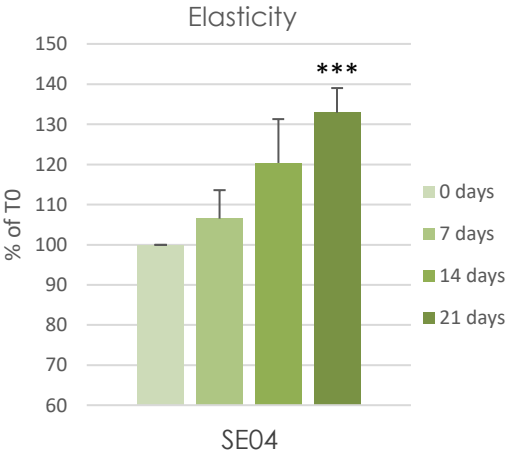
# NanoDelivery<sup>HA</sup> – formulations



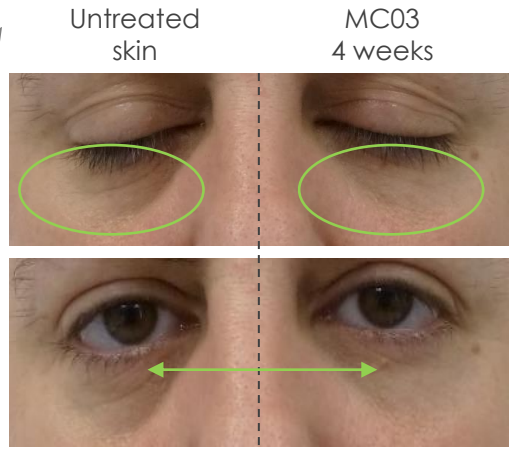
	AW11 Anti-wrinkle	SE04 Skin elasticity	AW14 Anti-wrinkle	MC03 MultiComplex	WH02 Whitening	AP01 Anti-pollution
<b>Key actives</b>	<b>HyActive</b> (basic part of all formulations)	HyActive, Elasef	HyActive, Clodessine	HyActive, Clodessine, Recelline, Elasef, niacinamide, vit. C, vit. E, D-panthenol, Q10	HyActive, HyWhite	HyActive, Hyaluronic acid, vit.C, vit.E, Recelline, Schizophyllan, TanActine
<b>Main effects</b>	Wrinkle reduction (immediate + long-term)	Elasticity improvement (long-term)	Enhanced wrinkle reduction (long-term)	Complex care (long-term)	Whitening	Anti-pollution



- 20 women
- AW11: square 2x2 cm + 0,5 mL water
- 1x daily
- 3D LifeViz camera



- 20 women
- SE04: square 2x2 cm + 0,5 mL water
- 1x daily
- Cutometer



- 15 women
- MC03: square 2x2 cm + 0,5 mL water
- 1x daily
- Camera

# Contipro



- World leader in research and manufacturing of hyaluronic acid.
- Innovations in biotechnologies since 1990.
- Reliable partner of successful brands.