



**TAOS INC.**  
TECHNICAL ART OF SCIENCE

# Can "Drone delivery" technology make your skin care more efficient ?

## The Cosmetic Drone<sup>®</sup>

Drone-inspired encapsulation to give cosmetic products a fast lane to results

Información B2B



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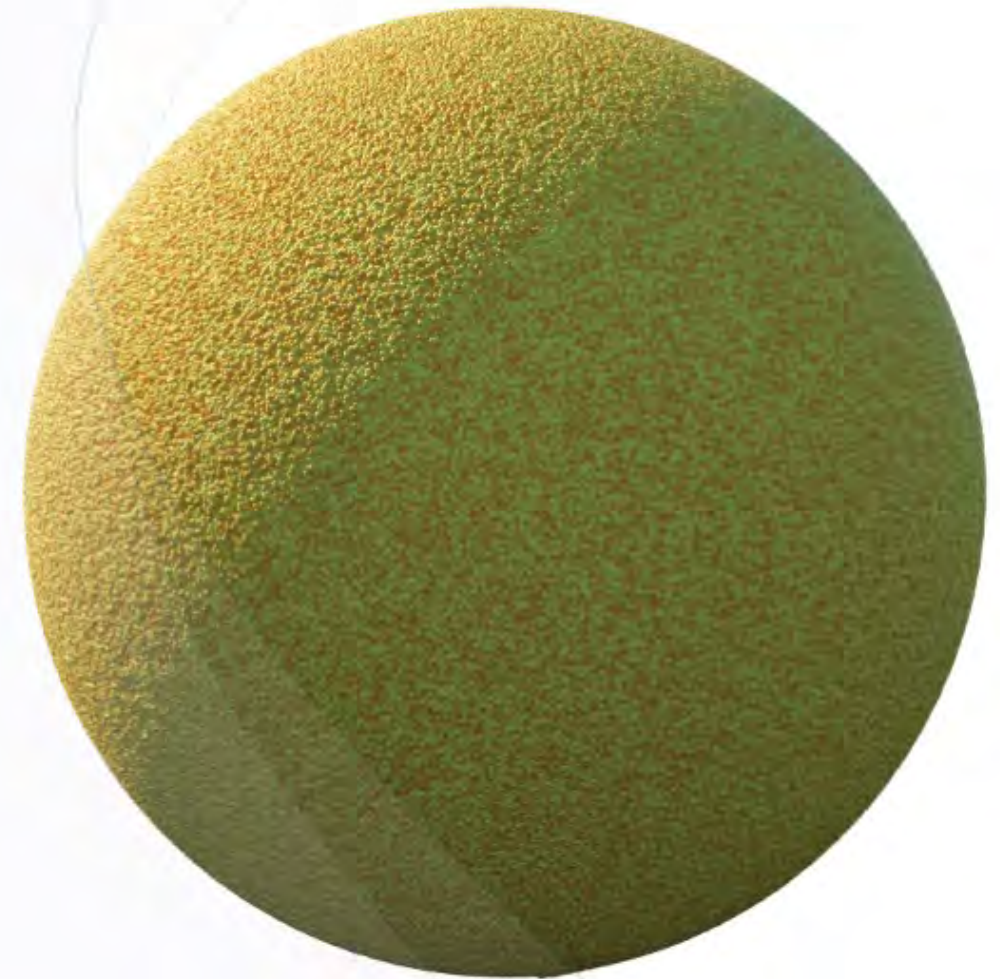






Almost 40 years later  
of the incorporation<sup>(1)</sup> of  
first encapsulation system  
in cosmetics...

## **Delivery systems have become a key element in cosmetic formulation**

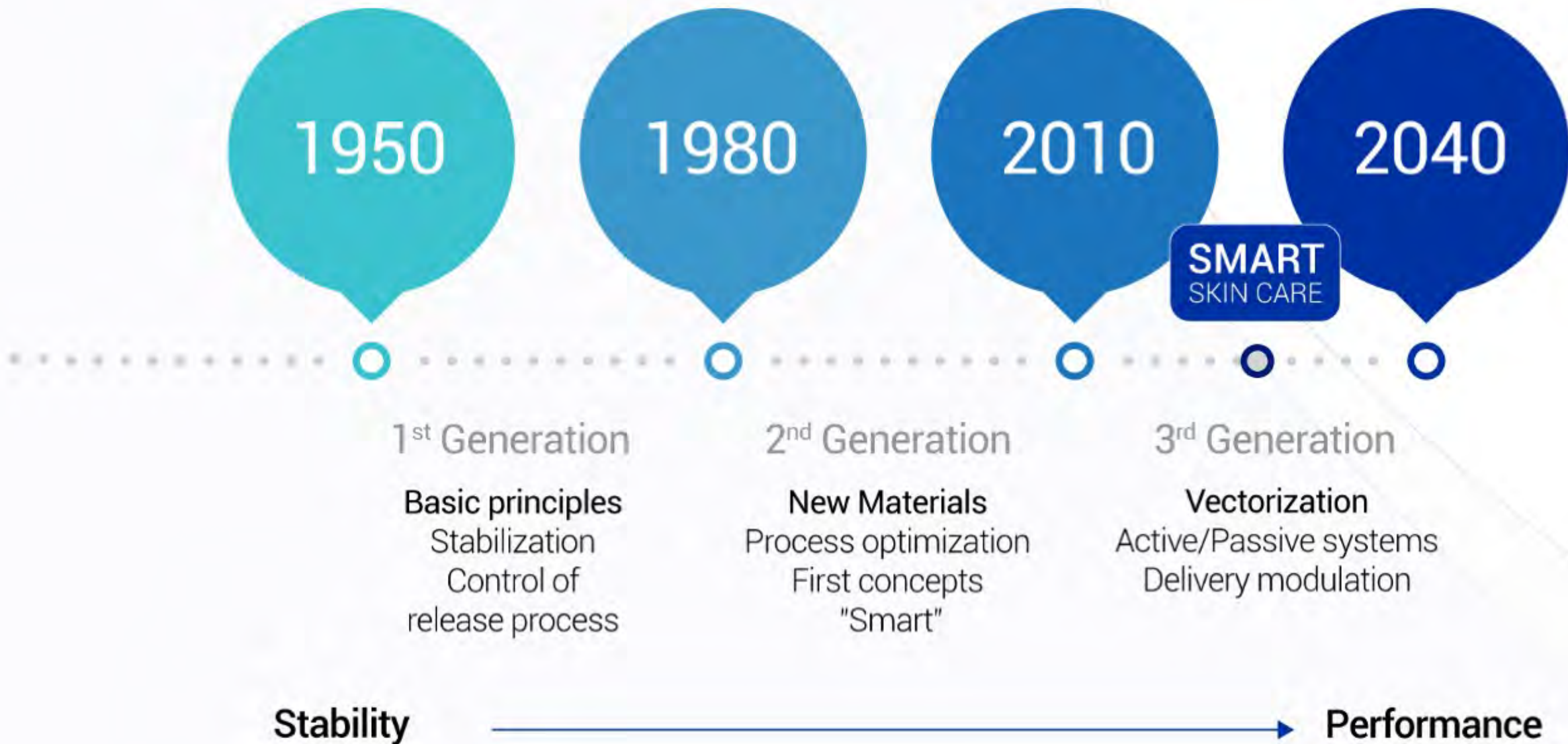


*(1) Dior Science Skin Care incorporated the use of liposomes  
in cosmetics in 1986 in its Capture line, a true revolution in anti-aging treatment.*

**SMART**  
SKIN CARE

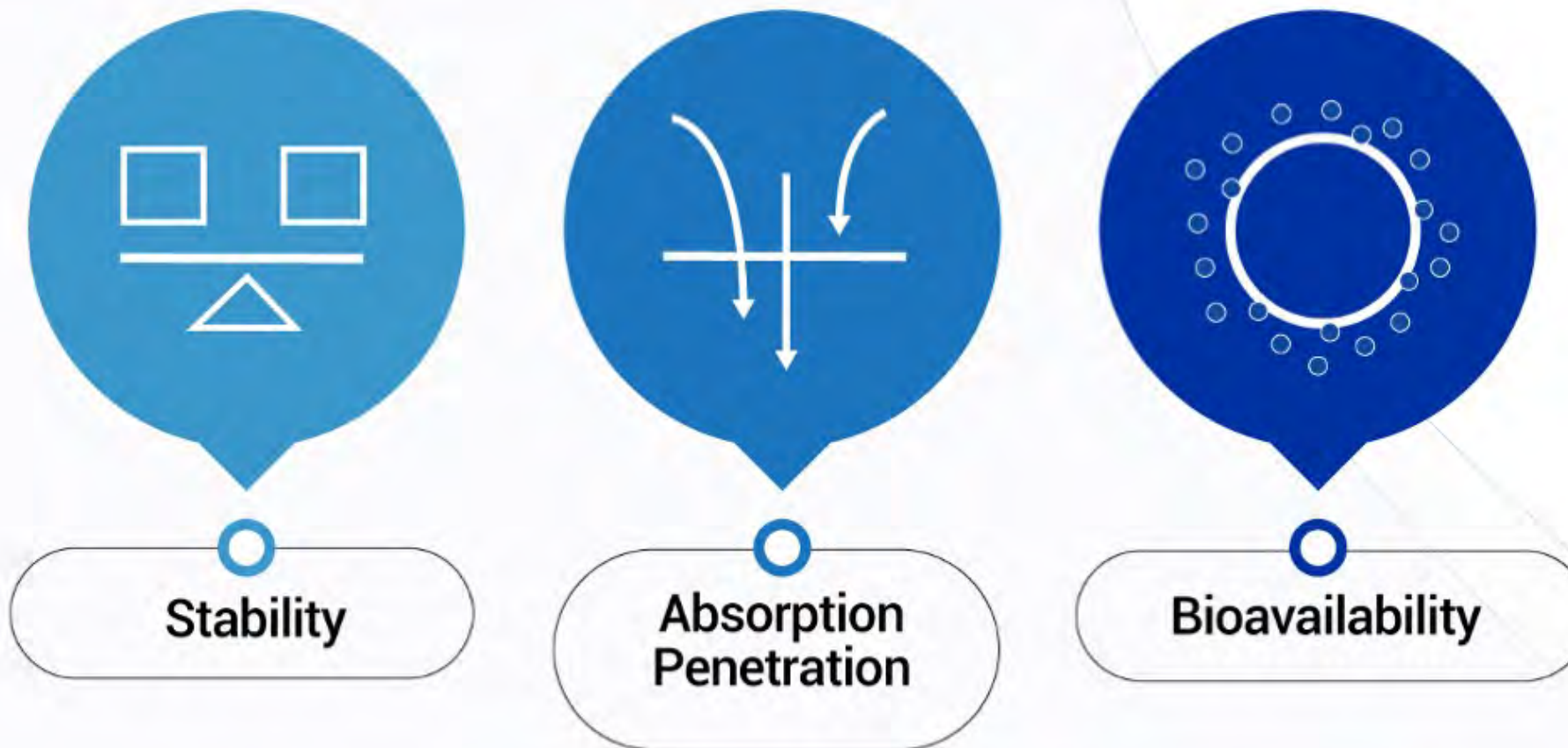
# Delivery systems: evolution

The first formula with a controlled release system (12 hours)  
It was developed in 1952 by Smith Kline & French.





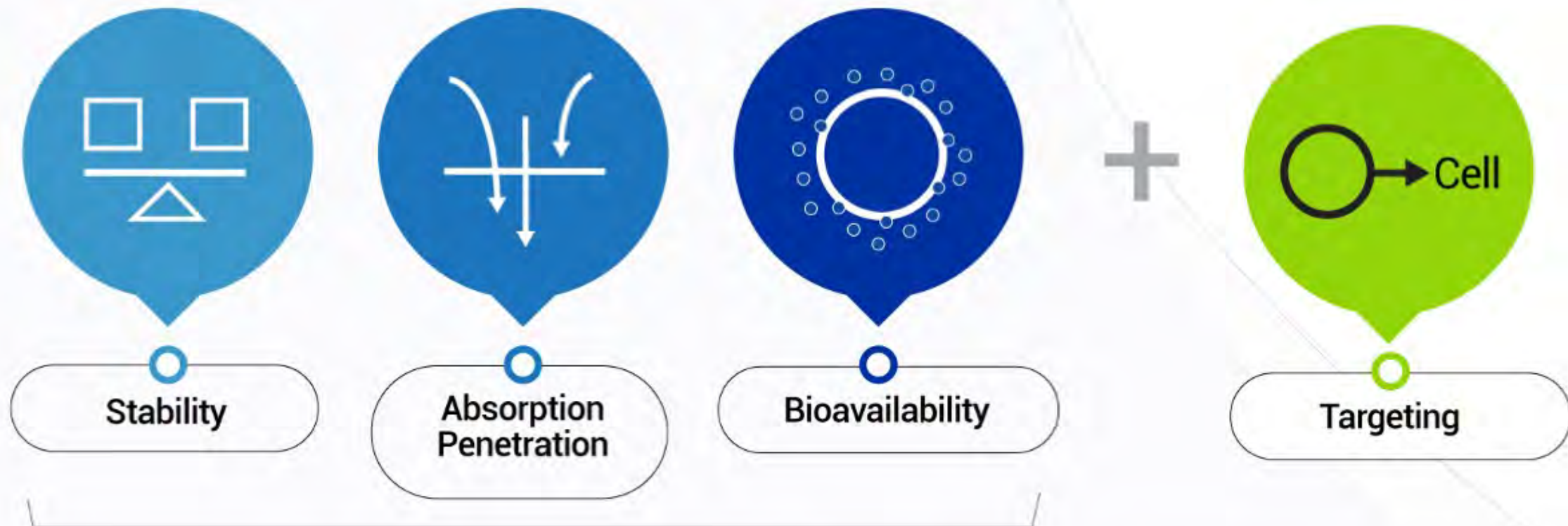
In theory and in practice,  
to design a successful product  
several issues must be considered:



The first directive of an encapsulation system  
is to solve a problem.

# The Cosmetic Drone<sup>®</sup>: innovation

The first directive of an encapsulation system is to solve a problem:  
**Bring the delivery system to the target cell.**



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**Solution:**





## The integration of a system release provides answers to different problems



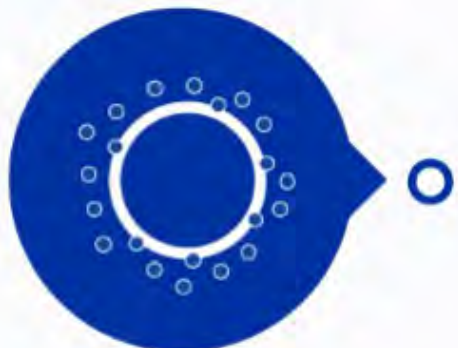
### Stability

Ensures the stability of the active ingredients  
Minimizes interaction with other ingredients in the formulation  
**Improves their incorporation into formulations**



### Absorption/Penetration

**Improves penetration** of active ingredients (solubility)  
**Prevents premature degradation of actives** (DORMANT ACTIVE INGREDIENTS)



### Bioavailability

**Increases the half-life of active ingredients**  
thanks to controlled and extended release  
It allows a **long-lasting action to provide efficacy at minimum doses of use.**

# The Cosmetic Drone<sup>®</sup>

## 12 years of research and development

Intensive study of biomaterials

> 120 candidate peptides

Precise selection of cell receptors

> 100 in vitro studies

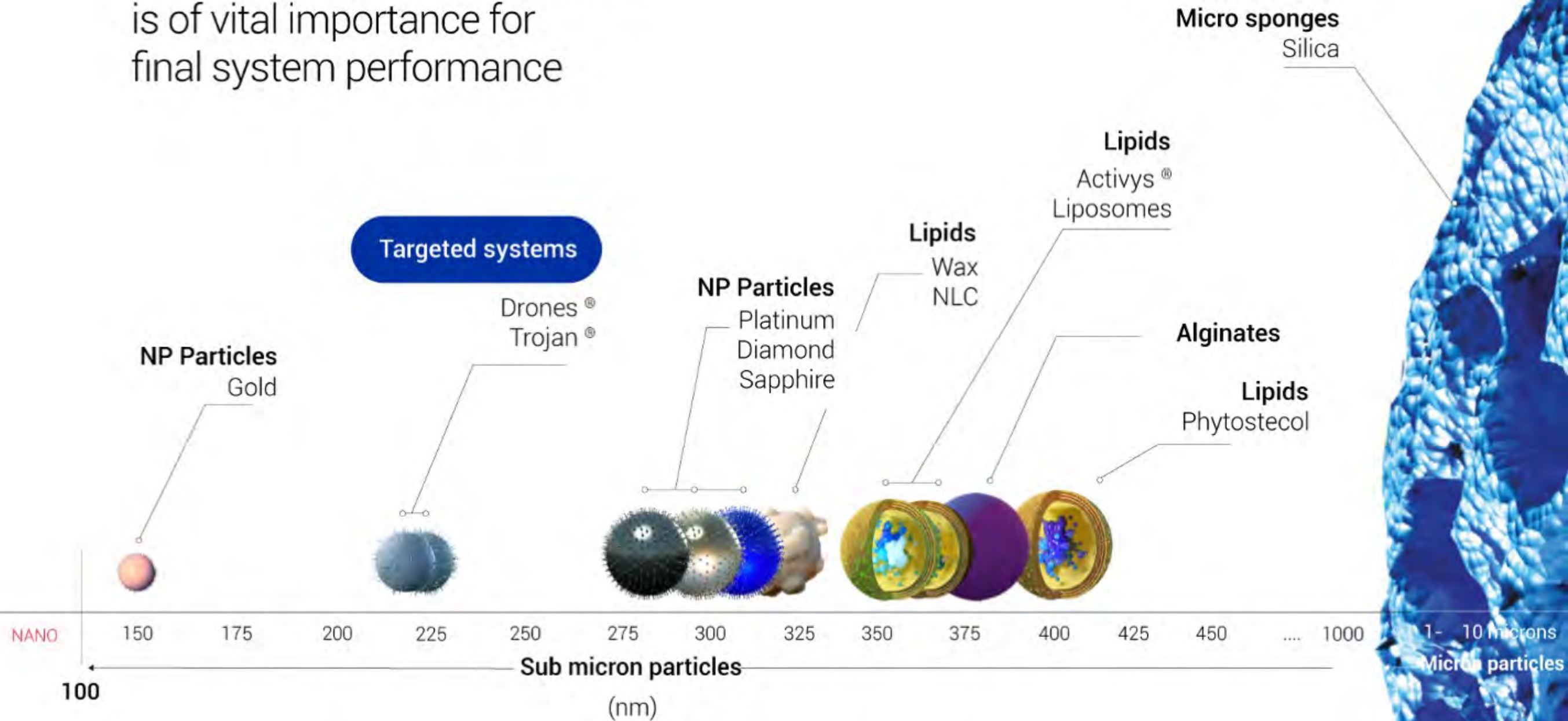
In vivo studies





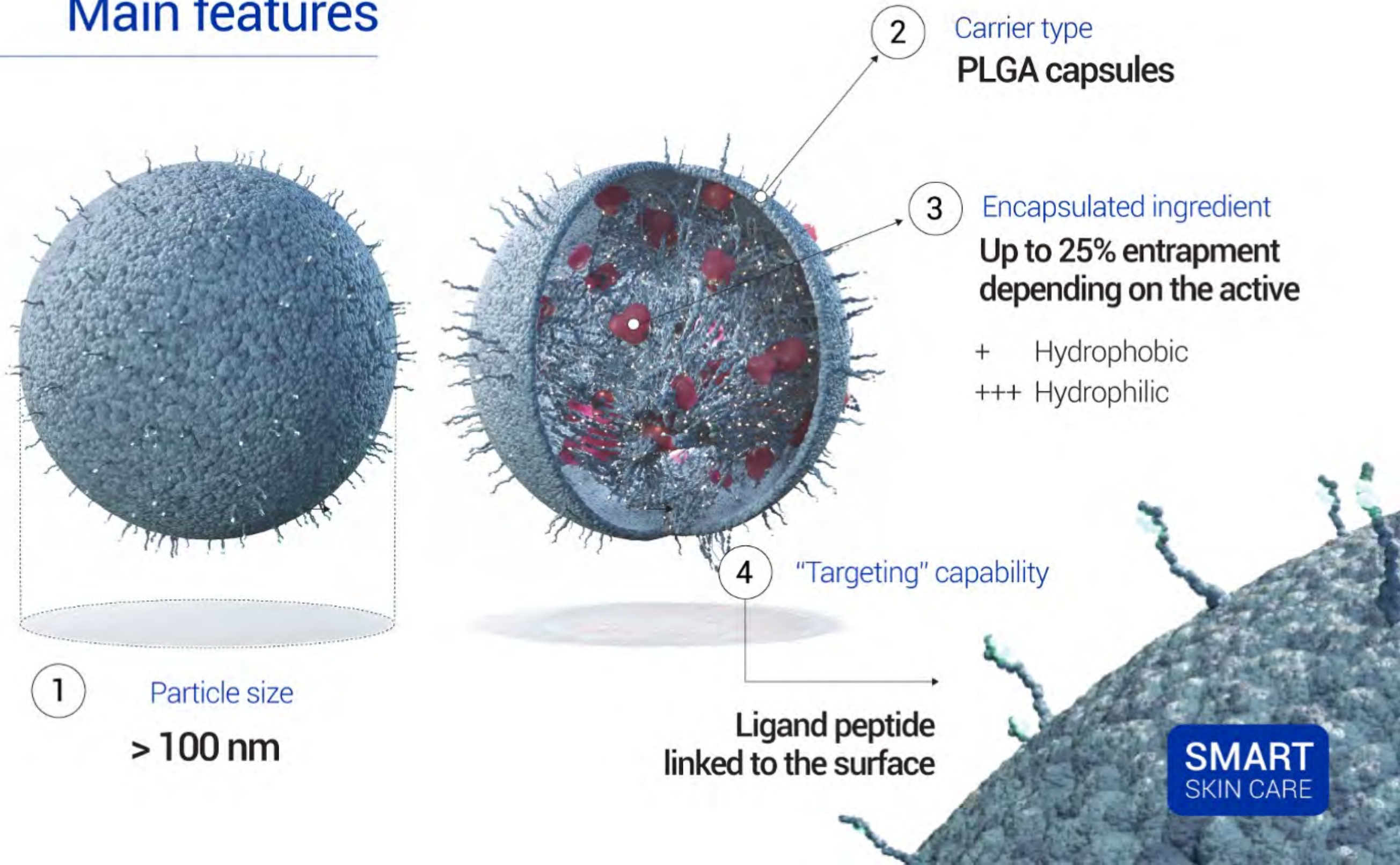
# Size and materials matter

The choice of material and size is of vital importance for final system performance





# Main features





# Delivery system (development)

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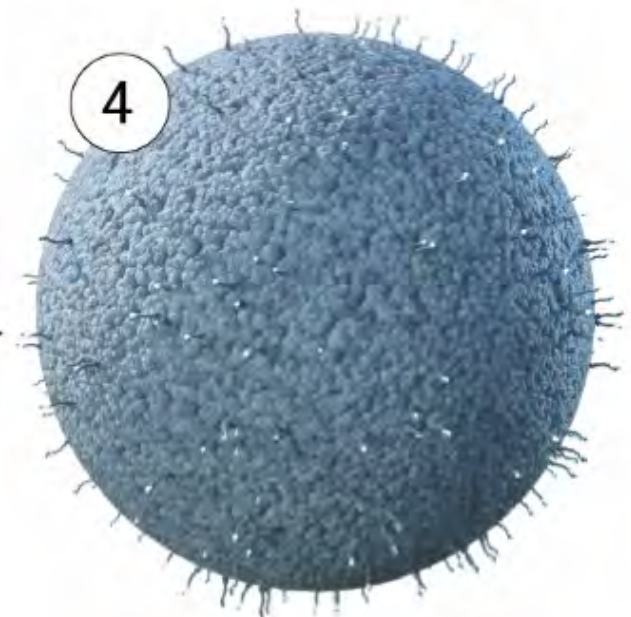
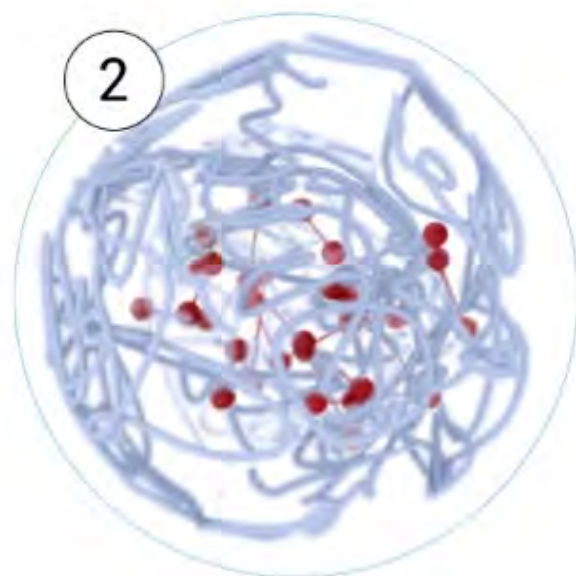
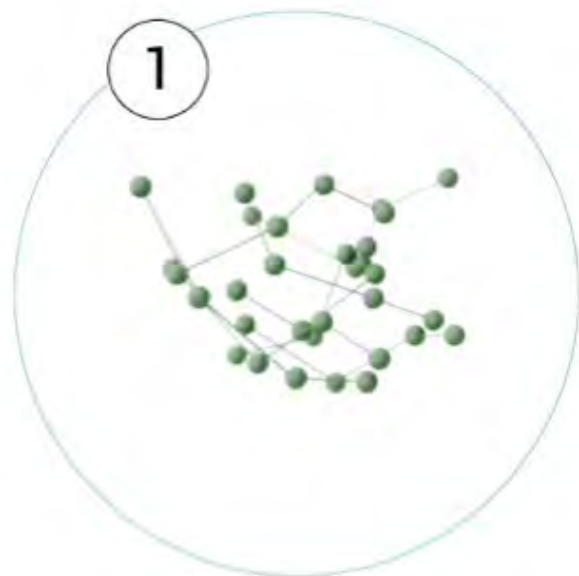


Selection of the active ingredient

Biopolymer addition

Capsules with no target

Targeting capability: Ligand peptide addition



The Cosmetic Drone®



# Mechanism of action (overview)

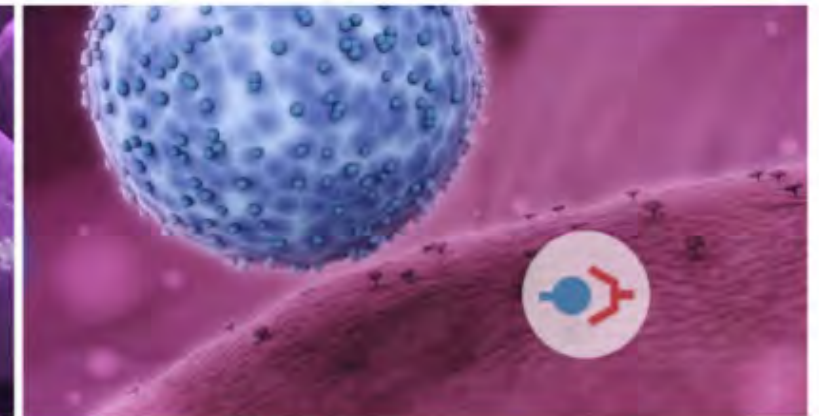
① Absorption



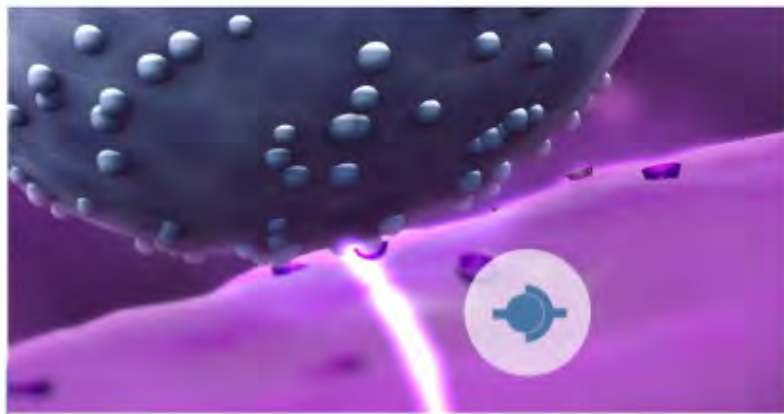
② Penetration



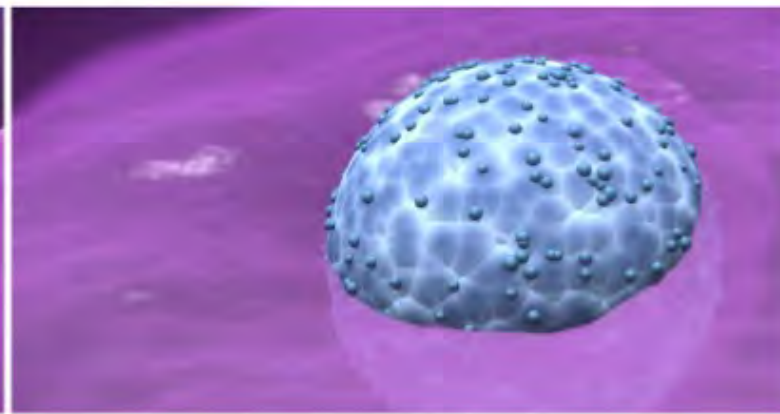
③ Selectivity



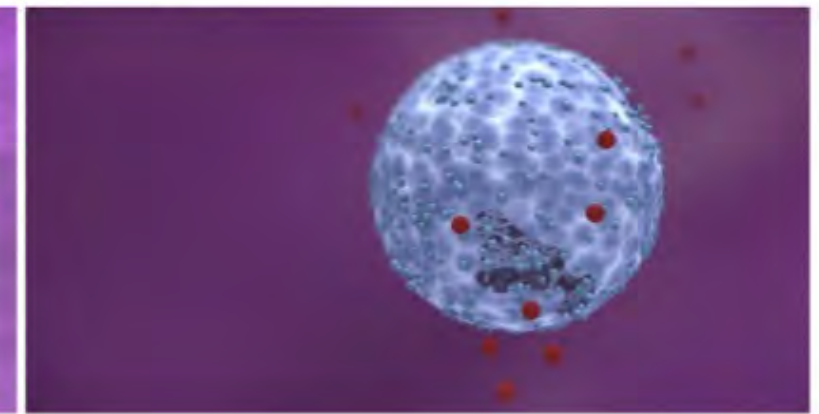
④ Receptor binding



⑤ Uptake



⑥ Release

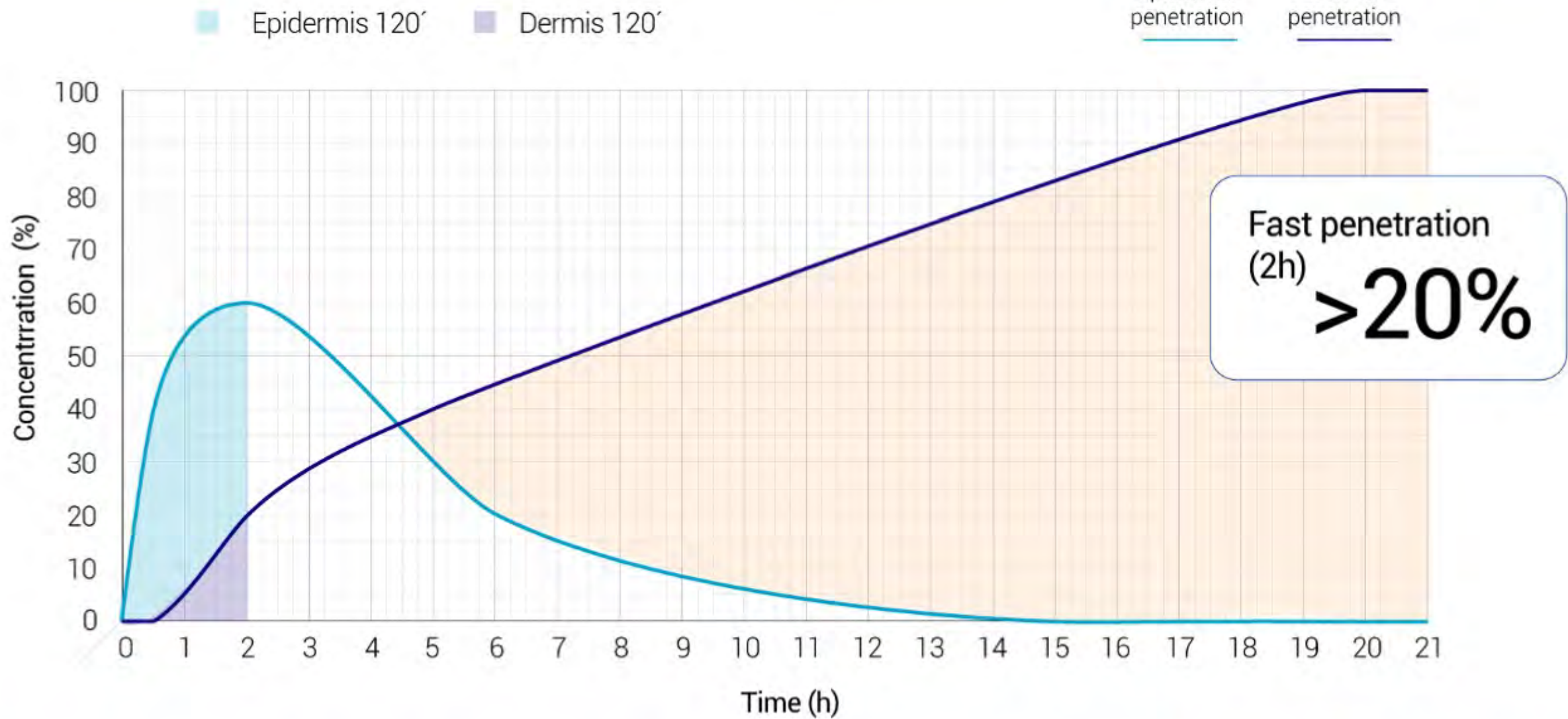


# Capsules: Absorption & Penetration



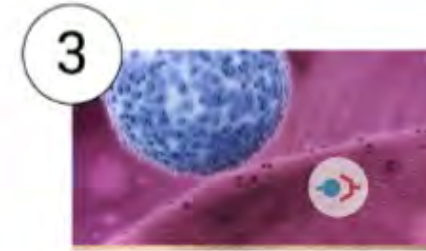
Epidermal penetration

Dermal penetration





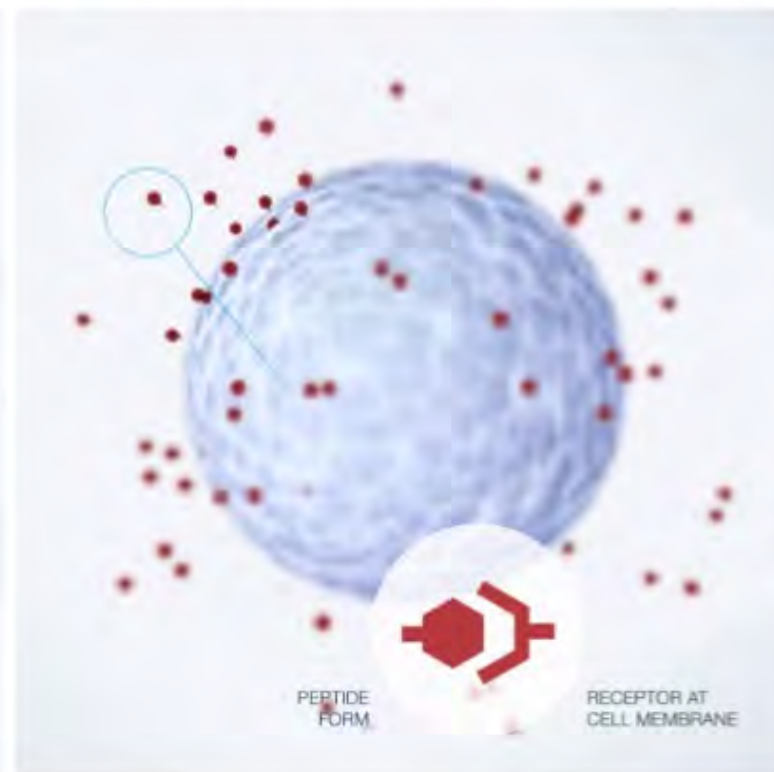
## Selectivity: Ligand activity



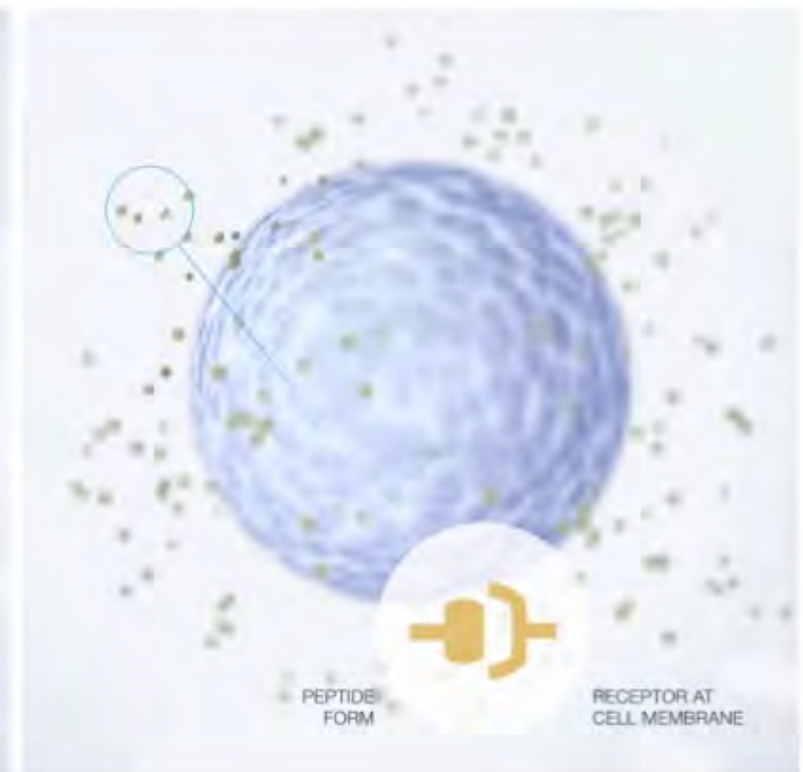
Each peptide ligand is different and is designed considering the receptor on the target cell.



Target cell: Fibroblast  
Receptor: FGFR

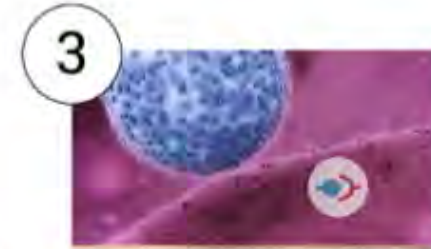


Target cell: Melanocyte  
Receptor: MC1R



Target cell: Keratinocyte  
Receptor: IntegrinR

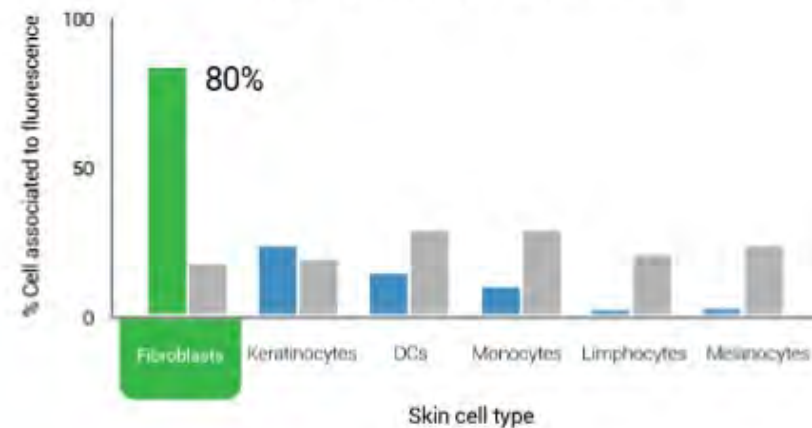
# Selectivity: Ligand activity



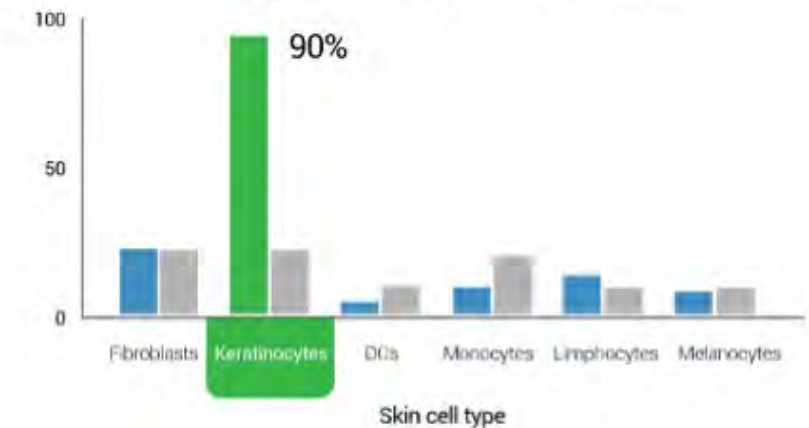
Each peptide (ligand) on the capsule surface is different and unfolds to bind to the specific receptor of the selected target cell.

- X50® Capsules without ligand
- X50® Capsules plus ligand peptide
- X50® Capsules plus ligand peptide (on target)

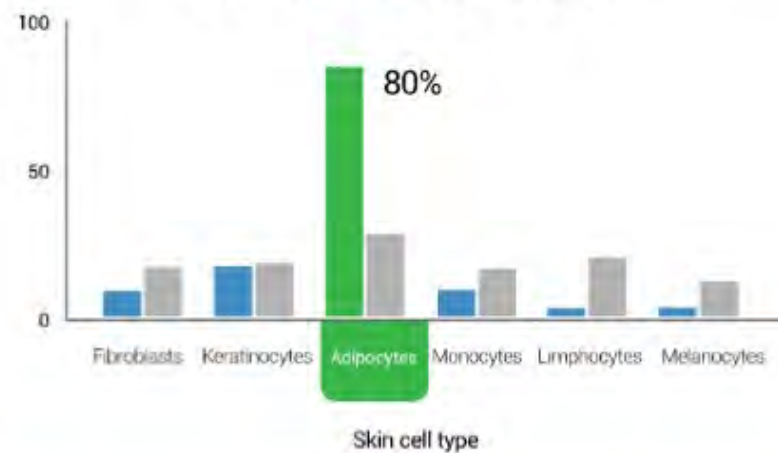
Ligand 1 - Receptor: Fibroblast



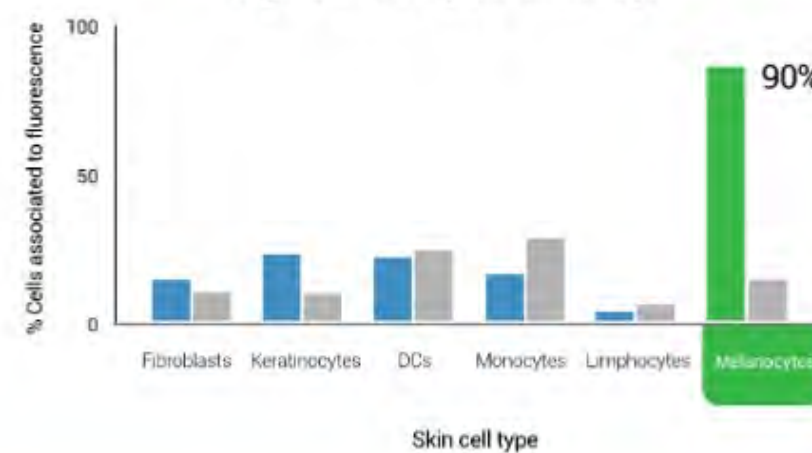
Ligand 2 - Receptor: Keratinocyte



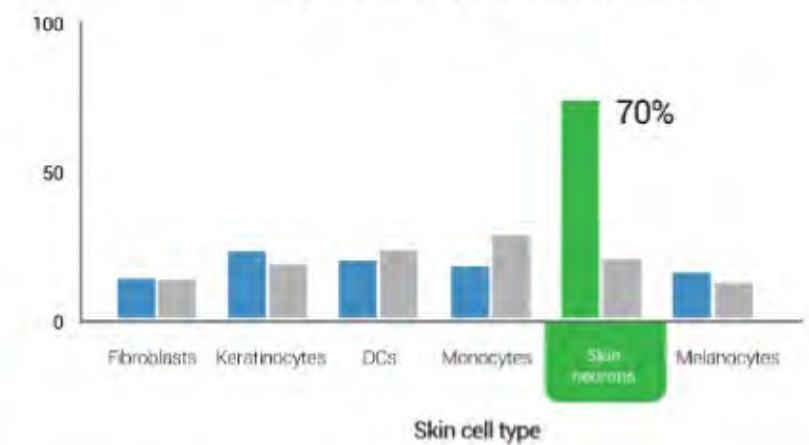
Ligand 3 - Receptor: Adipocyte



Ligand 4 - Receptor: Melanocyte



Ligand 5 - Receptor: Skin Neuron

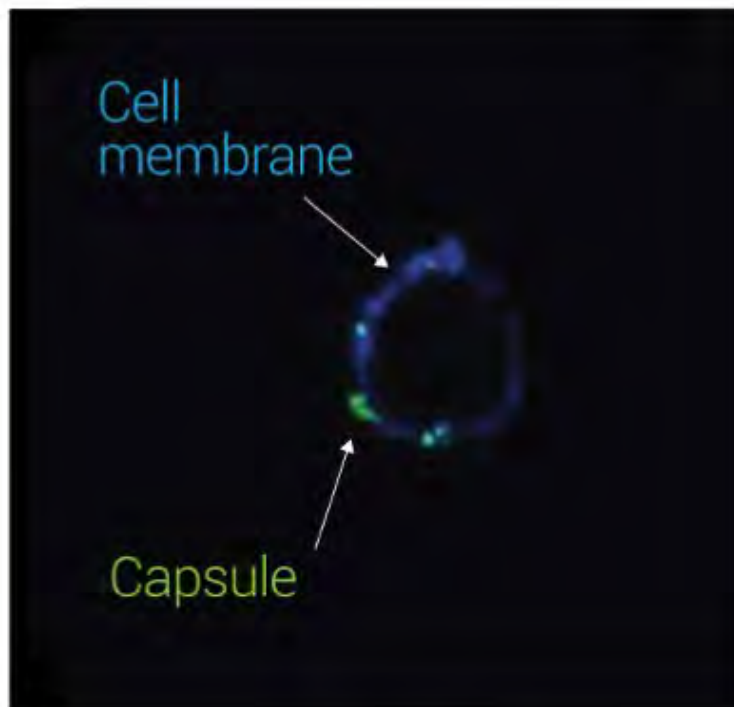




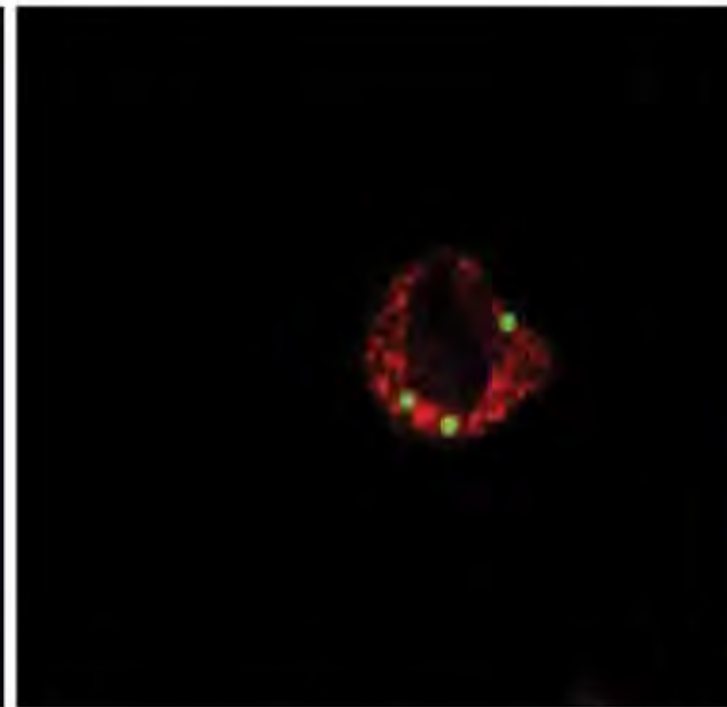
# Ligand: Receptor binding



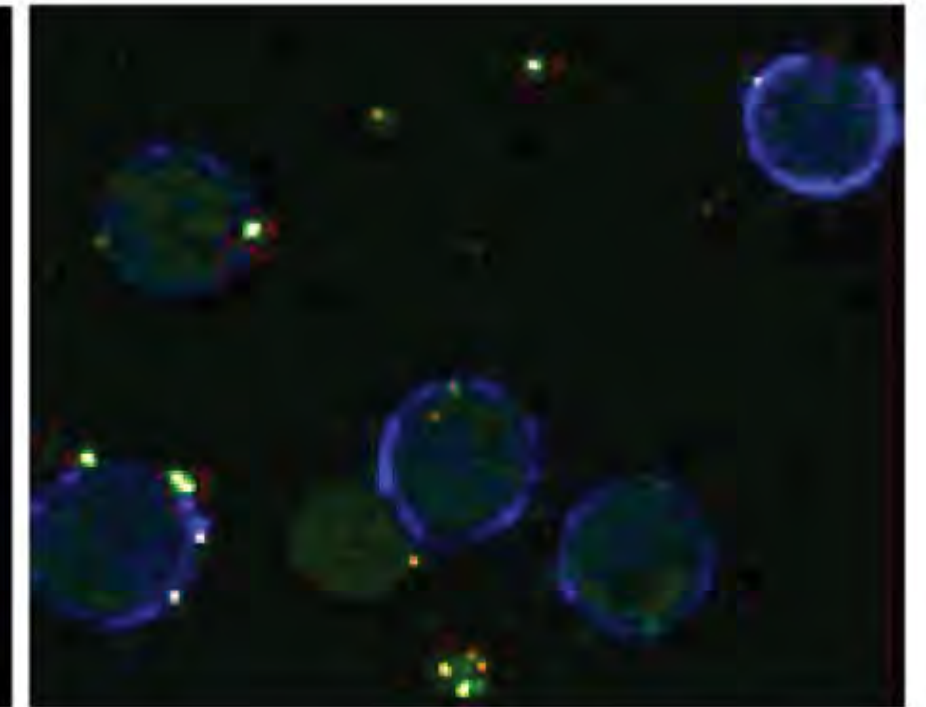
Studies of affinity / binding of the ligand to the receptor: confocal microscopy.  
Capsules loaded with FITC (fluorescence). [Examples:](#)



Fibroblasts

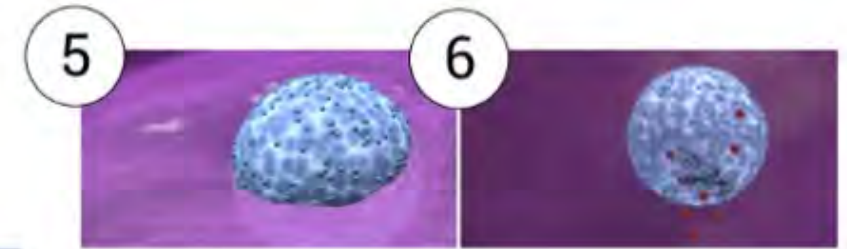


Adipocytes



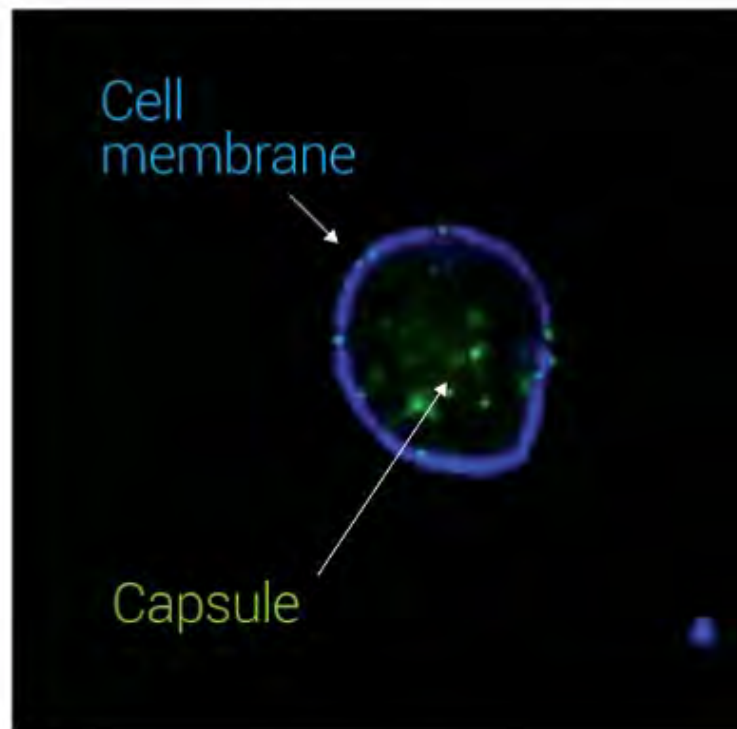
Melanocytes

# Capsule: Uptake and release

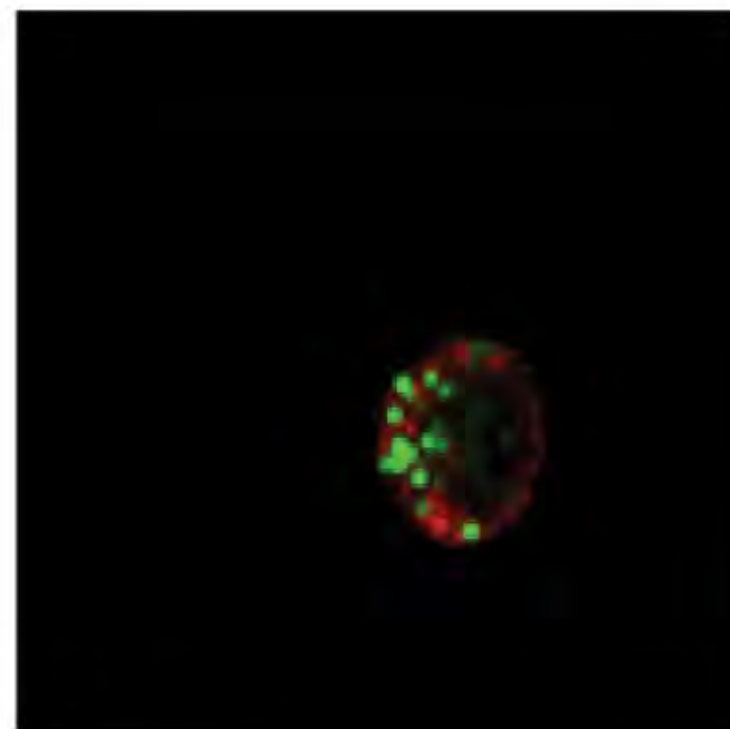


**Internalization studies:** confocal microscopy. Capsules loaded with FITC (fluorescence)

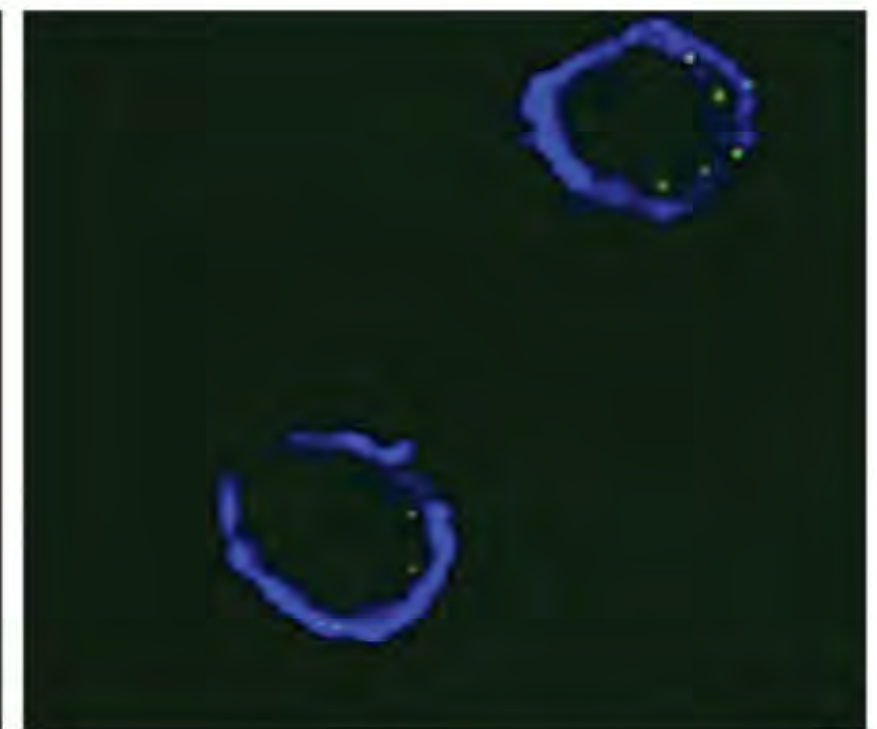
Example:



Fibroblasts



Adipocytes



Melanocytes



## The Cosmetic Drone<sup>®</sup>: concepts to remember

1 The Cosmetic Drone<sup>®</sup> is a **delivery system** with at least two active ingredients: encapsulated active and peptide ligand.

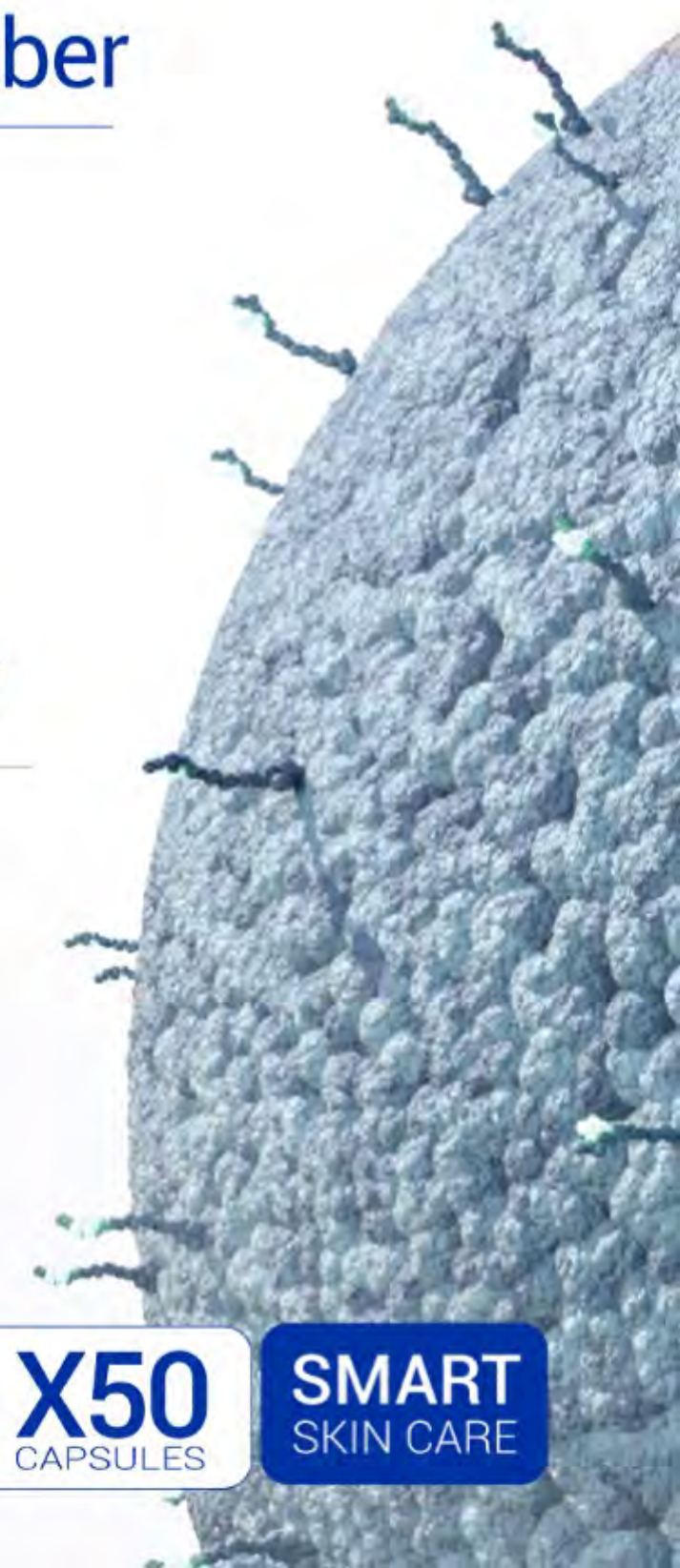
2 **Ligan peptides** do not only show affinity to receptors but they are also **functional actives with a key impact on efficacy**

3 The encapsulated active acts as a "dormant active" that it is protected while conserving all its potency.

4 **System selectivity and the activity of both active ingredients allows extremely low usage level.**

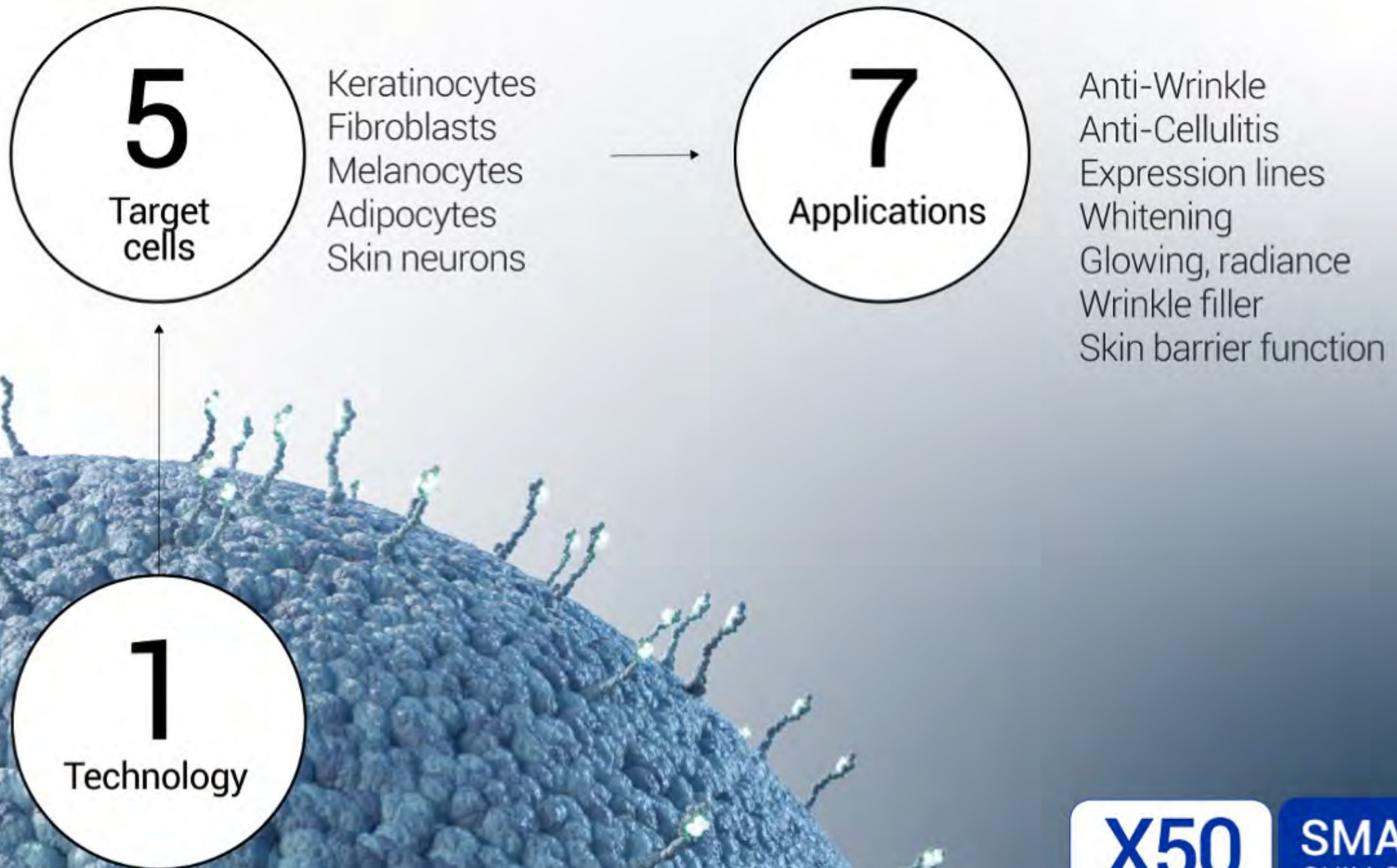
**X50**  
CAPSULES

**SMART**  
SKIN CARE





# The Cosmetic Drone<sup>®</sup>: practical use



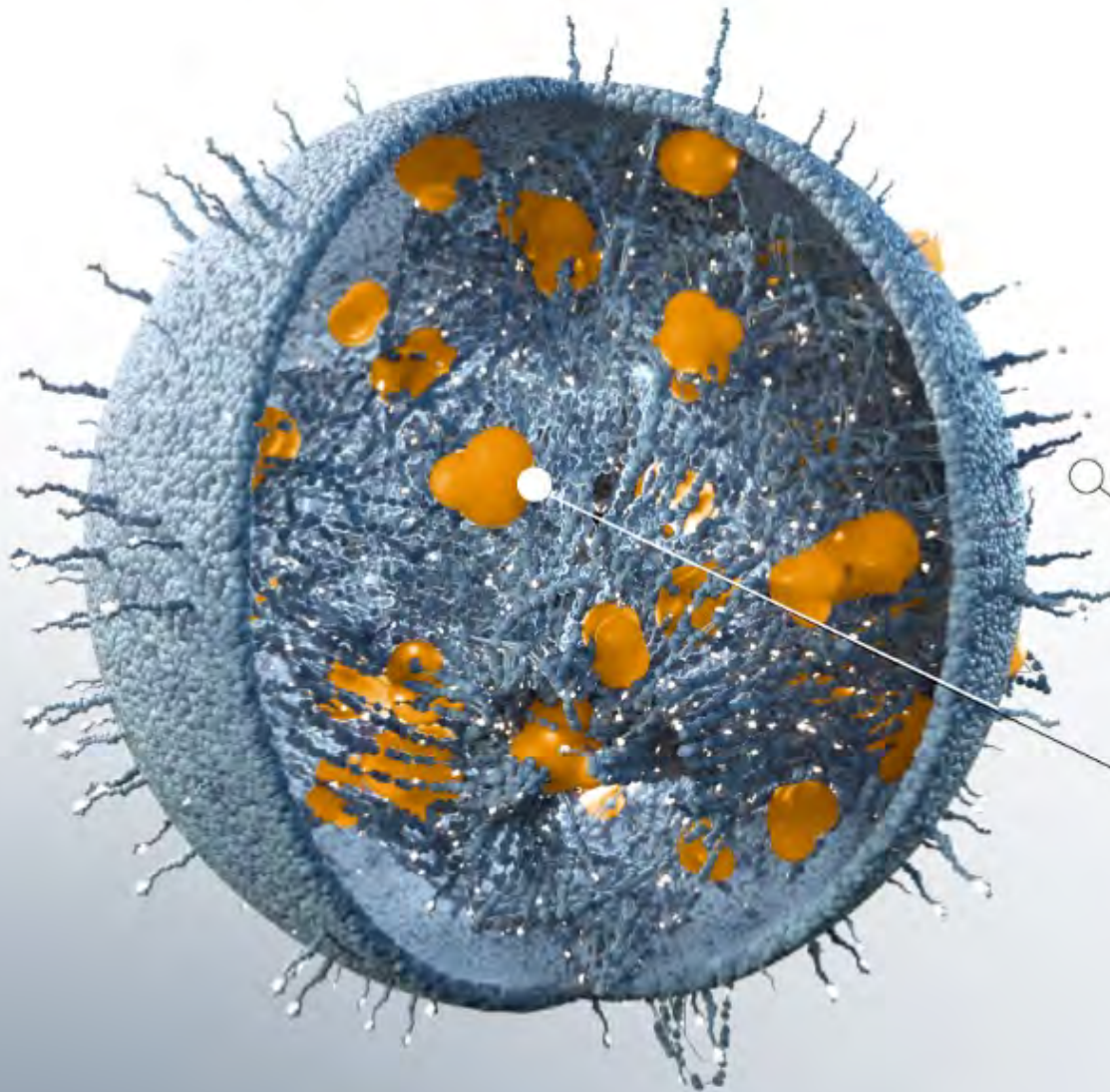


# X50<sup>®</sup> Antiaging

**A** Efficacy/Claims:  
Anti-wrinkle, antiaging

**B** Target cell:  
Fibroblast

Mechanism:  
**Collagen synthesis dual-pathway**



**C** Active principles:



**Peptide (ligand)**  
Collagen expression via FGFR

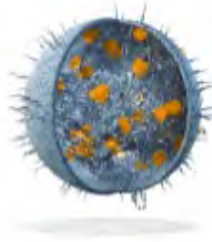


**Peptide (encapsulated active)**  
Collagen expression via cell nuclei

**X50**  
CAPSULES

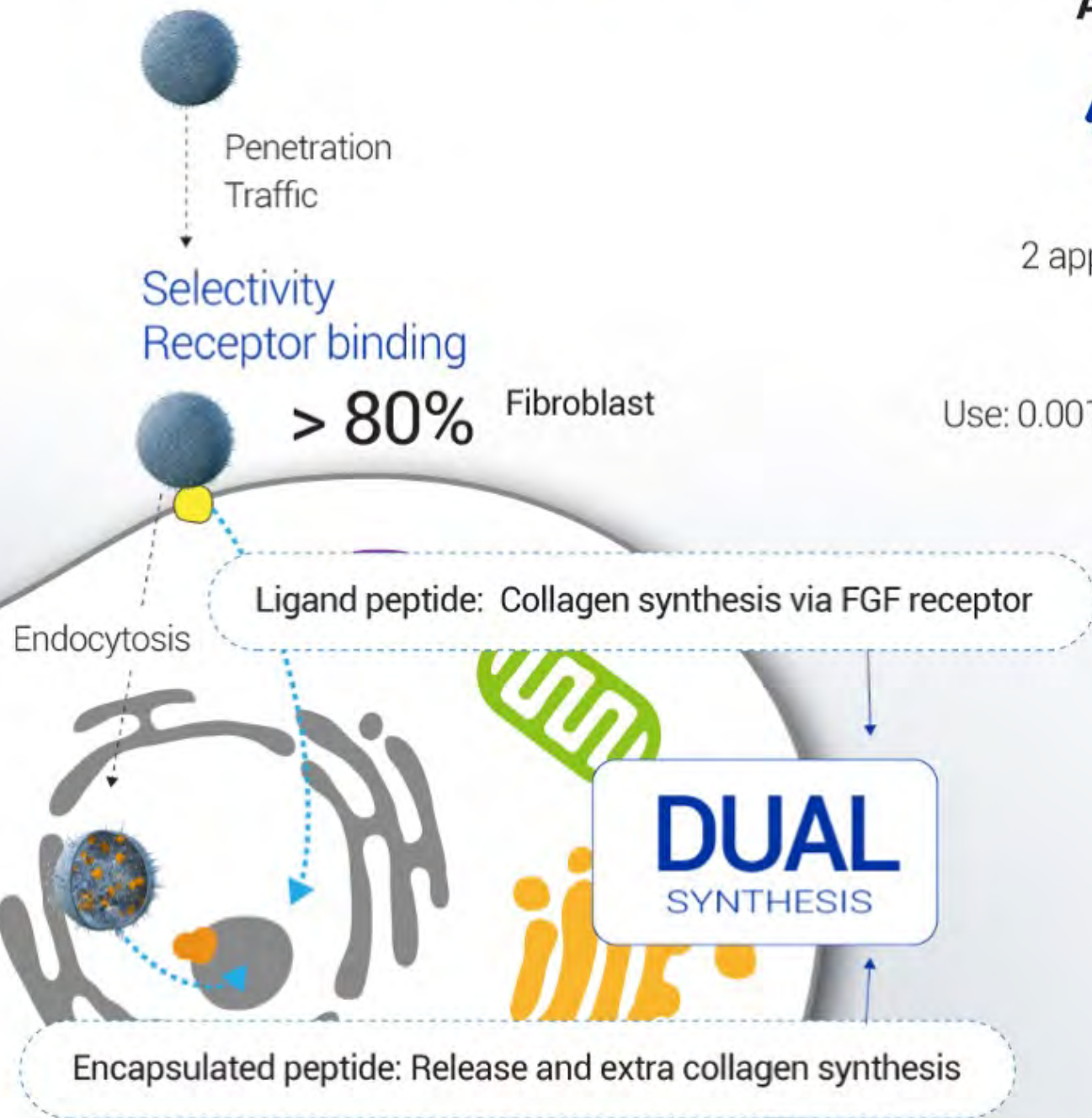
**SMART**  
SKIN CARE





# X50<sup>®</sup> Antiaging

## A Mechanism: infographic

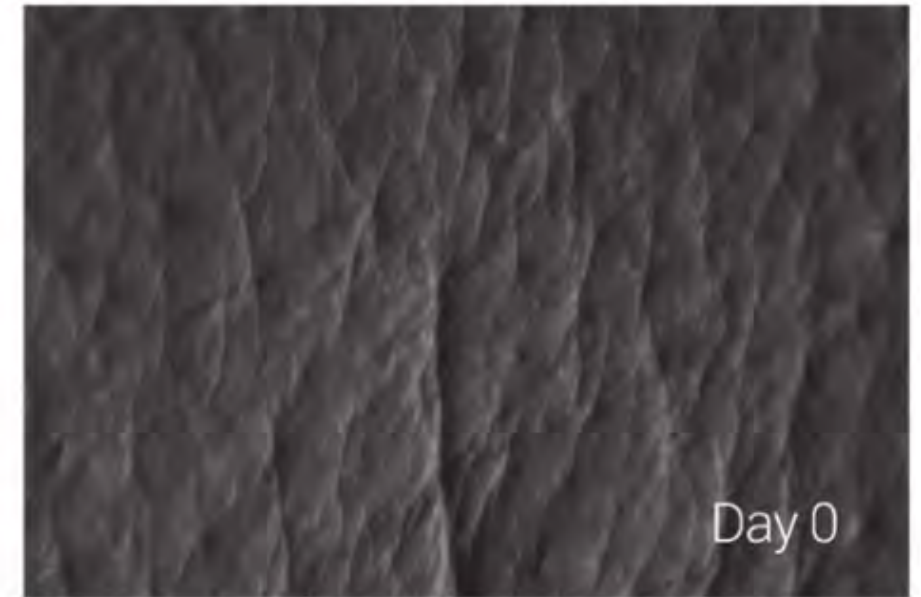


## B in vivo efficacy: Anti-wrinkle

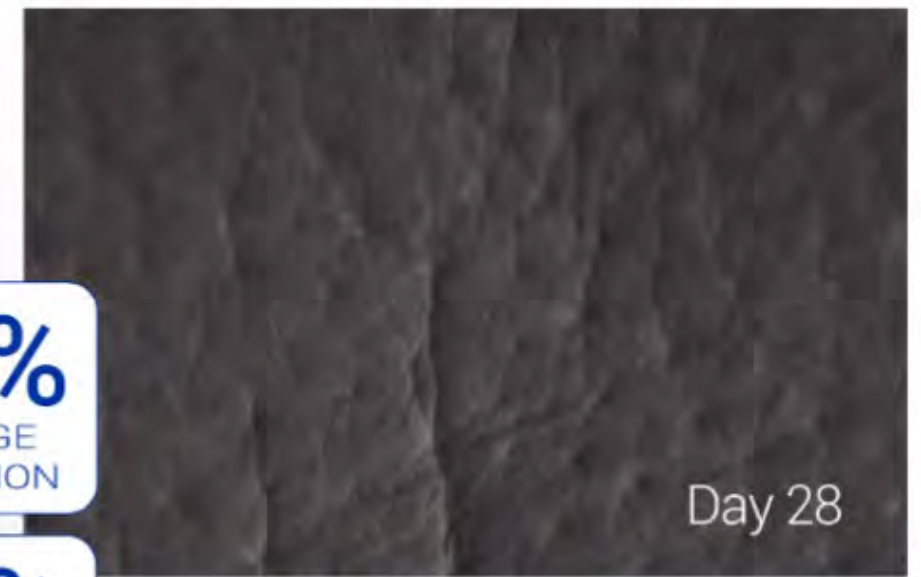
 30

4 weeks  
2 applications a day  
Eye contour  
Silicon replica

Use: 0.001% (1% of 1g/L)



Day 0



Day 28

**33%**  
AVERAGE  
REDUCTION

**67%**  
BEST  
RESPONDER

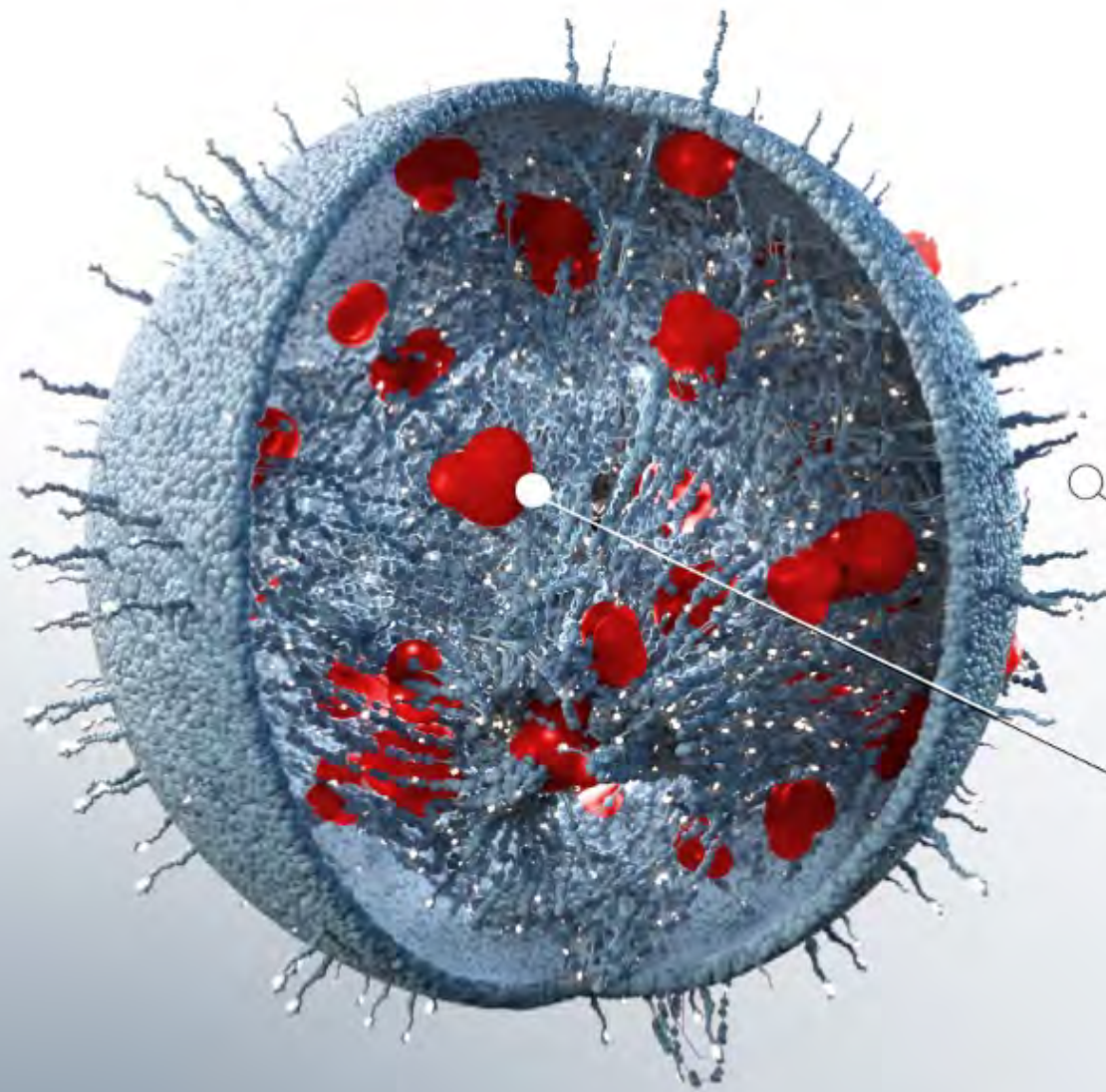
**X50**  
CAPSULES

**SMART**  
SKIN CARE



# X50<sup>®</sup> Silhouette

**A** Efficacy/Claims:  
Anti-cellulite, slimming



**B** Target cell:  
Adipocyte

Mechanism:

**Lipolytic (lipid break down)**  
**Anti-lipogenic (prevents the formation of new fat)**

**C** Active principles



**Peptide (ligand)**

Lipolytic activation pathway via MC4 receptor



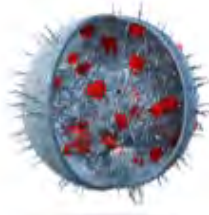
**Coccoleba Oil (encapsulated active)**

Downregulates lipogenesis process  
gene expression

**X50**  
CAPSULES

**SMART**  
SKIN CARE





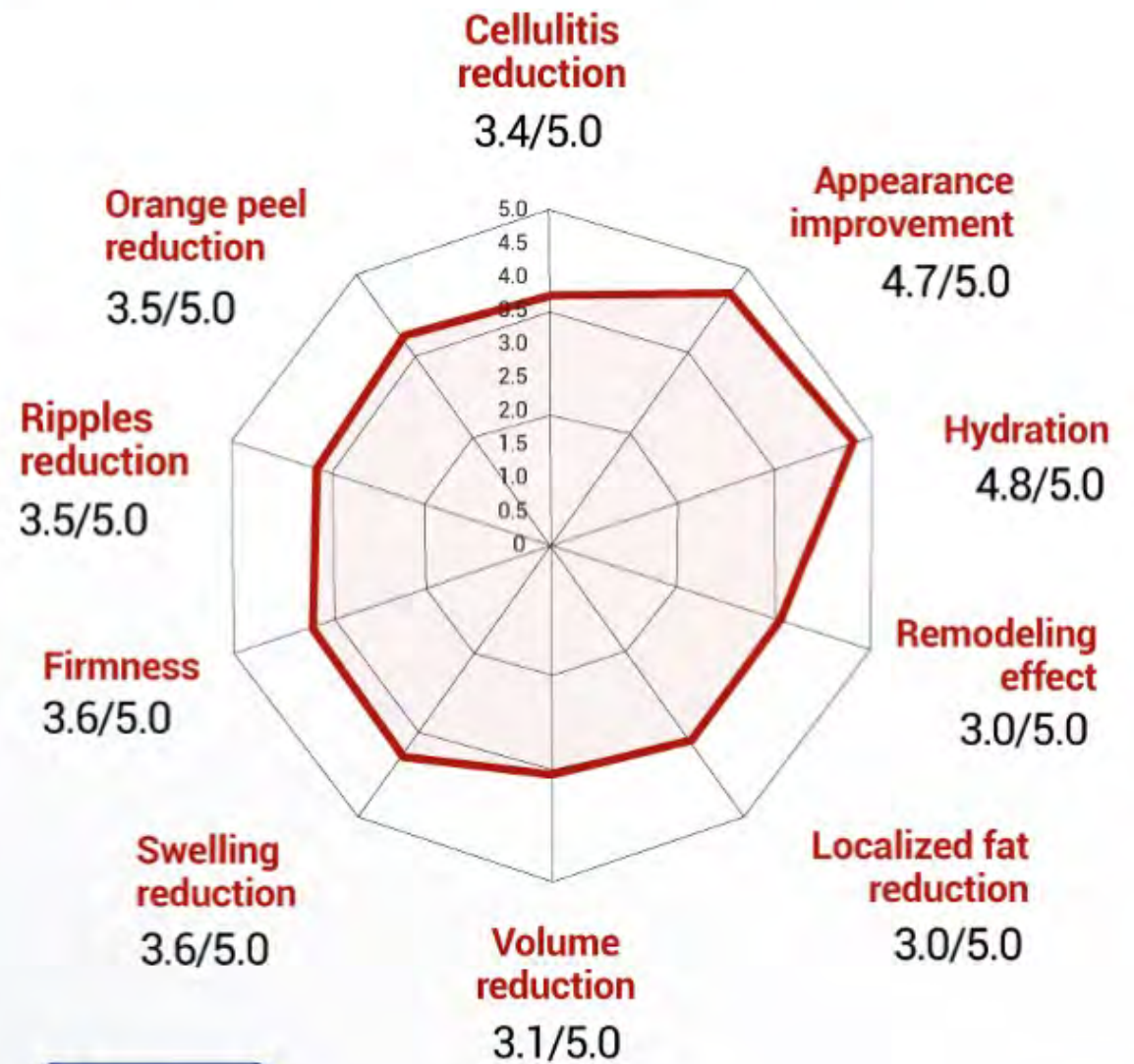
# X50<sup>®</sup> Silhouette

**A** Mechanism: infographic    **B** in vivo efficacy: **Anti-cellulitis**



**20**

8 weeks  
2 applications a day  
Buttocks and thighs  
Contour/Thermography  
Use: 0.001% (1% of 1g/L)



**2cm**  
CONTOUR  
REDUCTION

**3.1cm**  
BEST  
RESPONDER

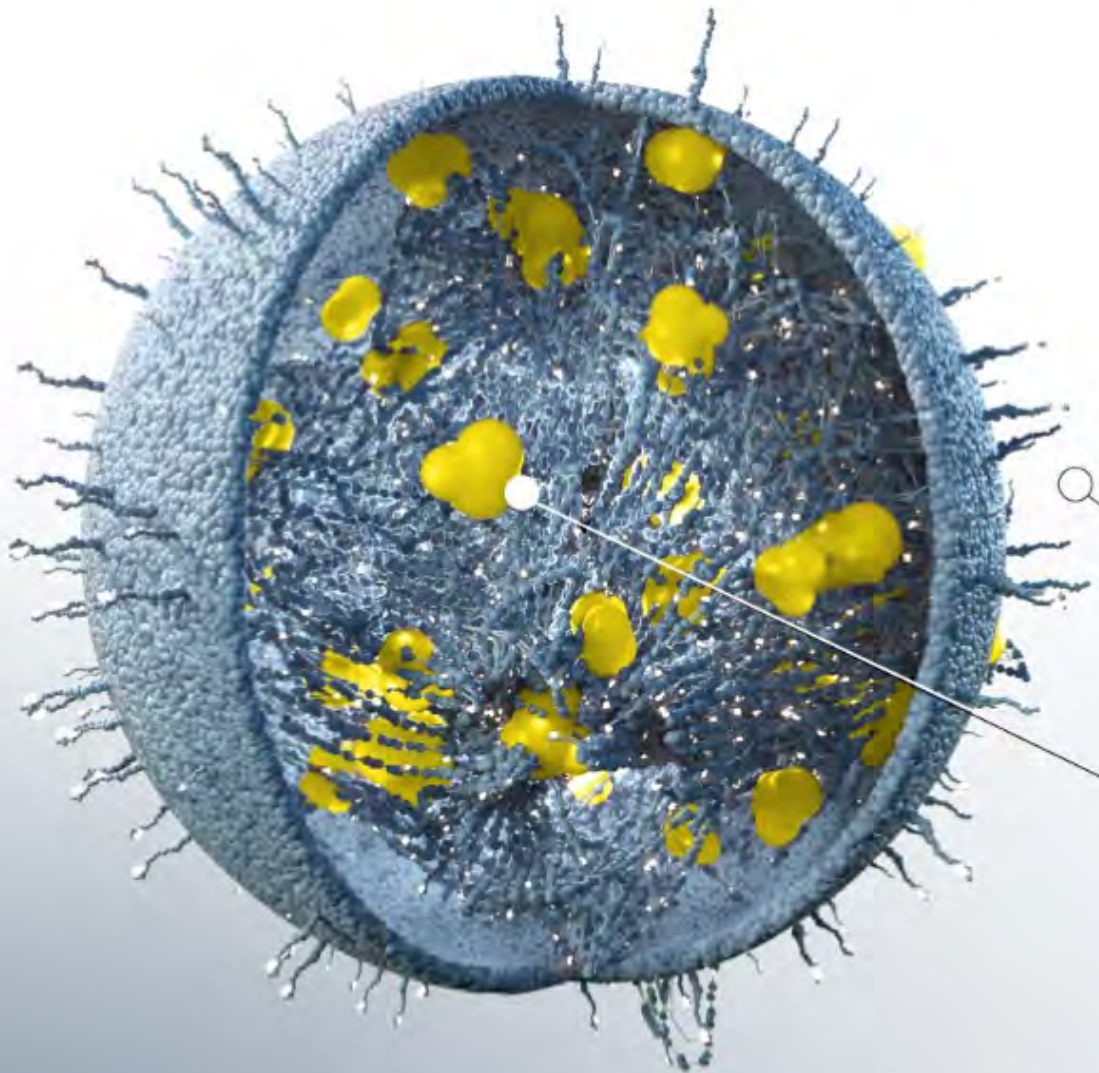
**X50**  
CAPSULES

**SMART**  
SKIN CARE



# X50<sup>®</sup> Myocept

**A** Efficacy/Claims:  
Expression lines, anti-wrinkle



**B** Target cell:  
Skin neuron

Mechanism:

**Reduces the mobilization of vesicles of acetylcholine by inhibiting  $Ca^{2+}$  entry**  
**Inhibits the release of acetylcholine**

**C** Active principles:

**Peptide (ligand)**

Inhibits calcium channels opening via opiate receptor

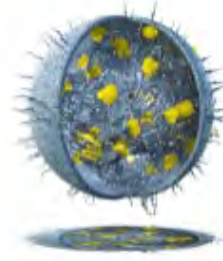
**Peptide (encapsulated active)**

Inhibits the formation of the SNARE complex responsible for acetylcholine release

**X50**  
CAPSULES

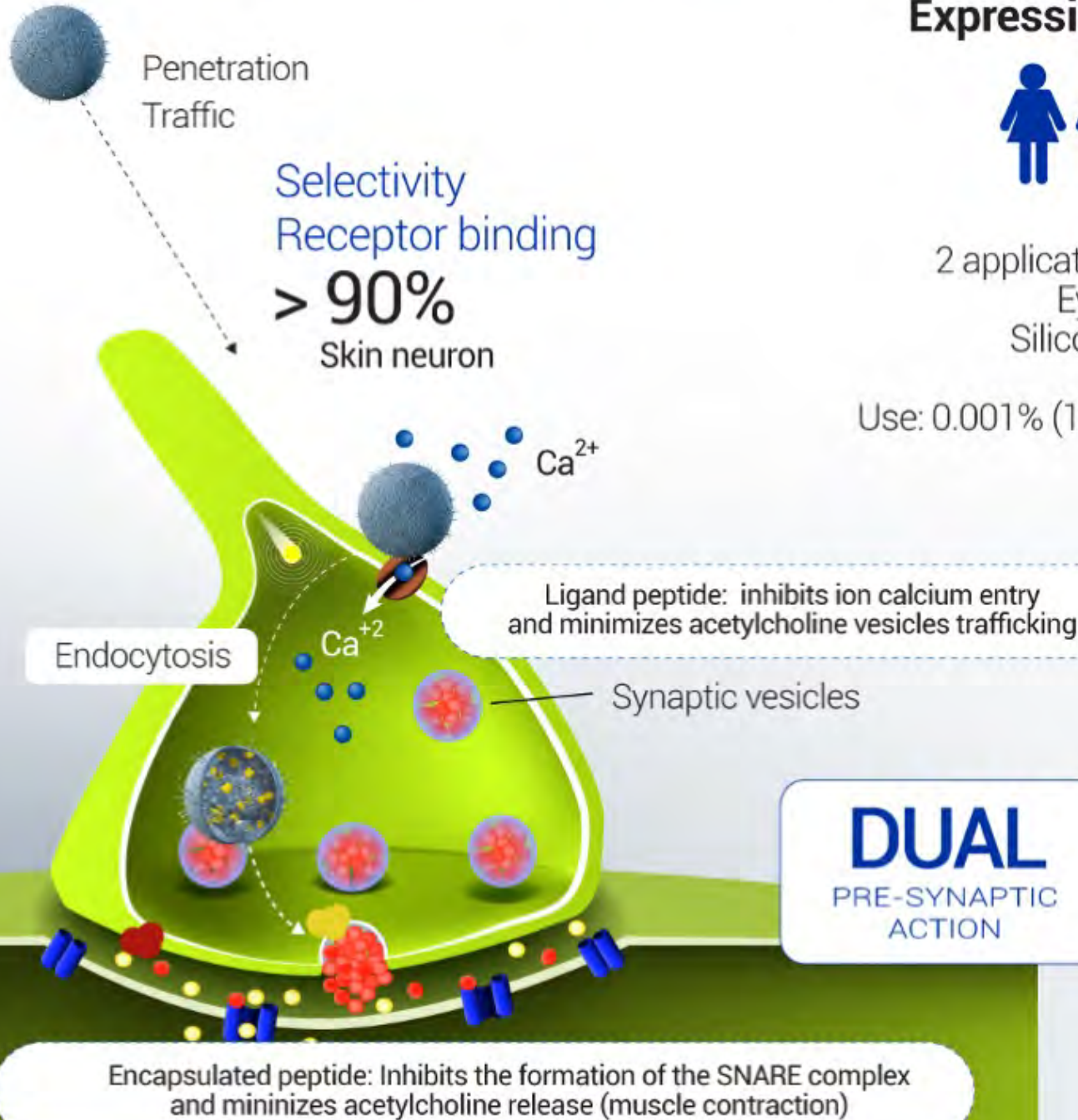
**SMART**  
SKIN CARE





# X50<sup>®</sup> Myocept

## A Mechanism: infographic



## B in vivo efficacy:

### Expression lines



4 weeks

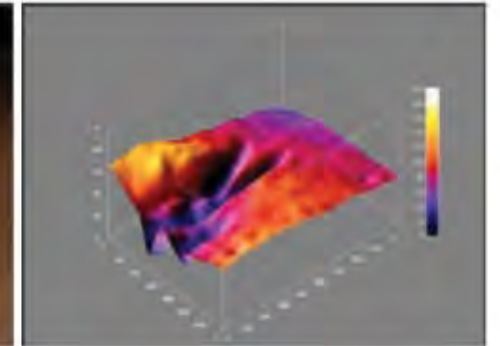
2 applications a day

Eye contour

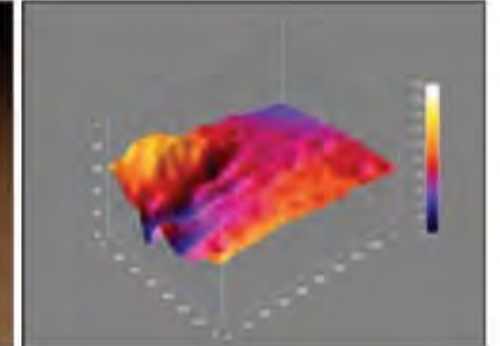
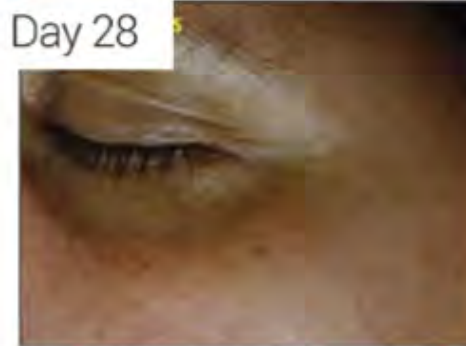
Silicone replica

Use: 0.001% (1% of 1g/L)

Day 0



Day 28



**20%**  
AVERAGE  
REDUCTION

**27%**  
BEST  
RESPONDER

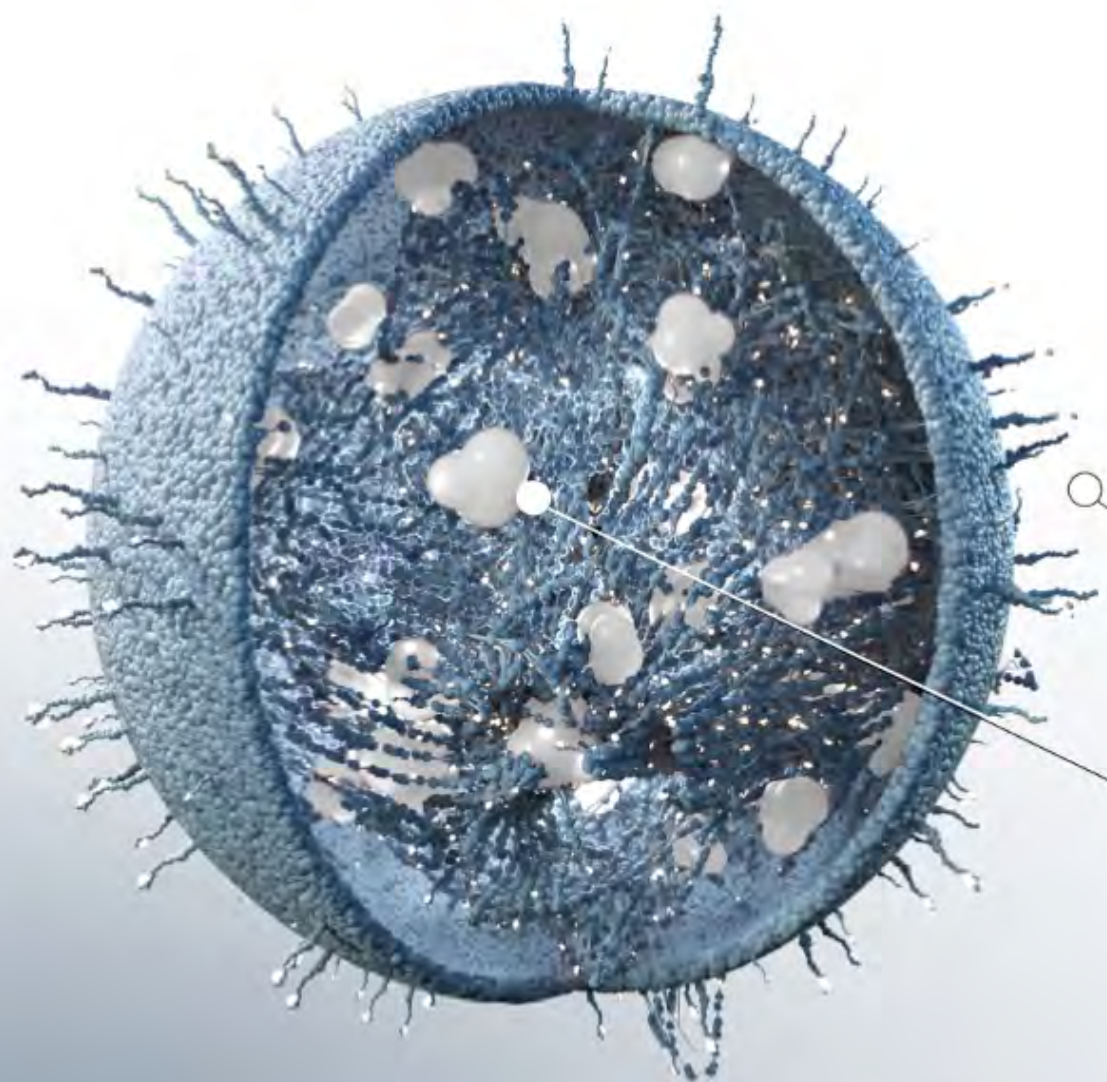
**100%**  
POSITIVE  
VOLUNTEERS

**X50**  
CAPSULES

**SMART**  
SKIN CARE



**A** Efficacy/Claims:  
Whitening



**B** Targeting cell:  
Melanocyte

Mechanism:  
**Inhibits both UV-induced and facultative pigmentation (mediated by other receptors) by reducing tyrosinase gene expression**

**C** Active principles:



**Peptide (ligand)**

$\alpha$ -MSH antagonist at MC1 receptor  
Inhibits UV-induced tyrosinase expression



**Peptide (encapsulated active)**

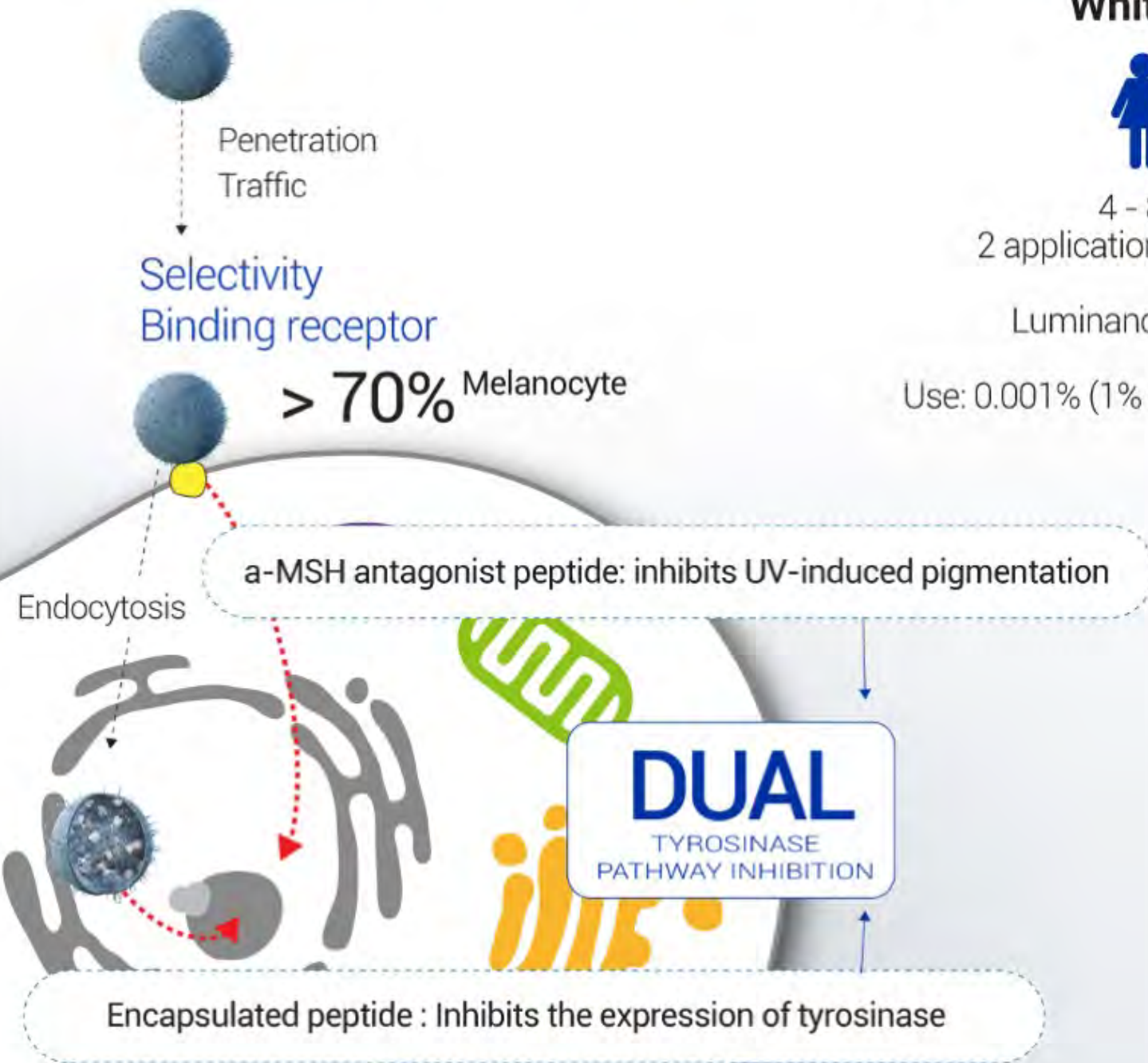
Inhibits the expression of tyrosinase





# X50<sup>®</sup> PureWhite

## A Mechanism: infographic



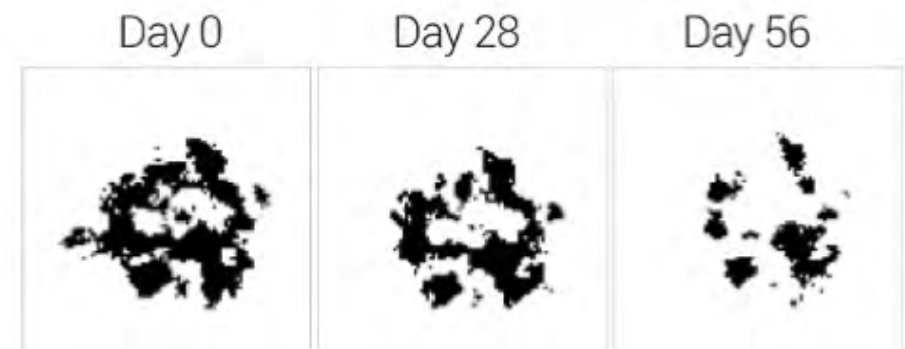
## B in vivo efficacy: Whitening

**20**

4 - 8 weeks  
2 applications a day  
Facial  
Luminance / ITA°

Use: 0.001% (1% of 1g/L)

### Sport fading (ITA°)



**x13**  
SKIN TONE  
LIGHTENING

**x6.3**  
SPOT  
FADING

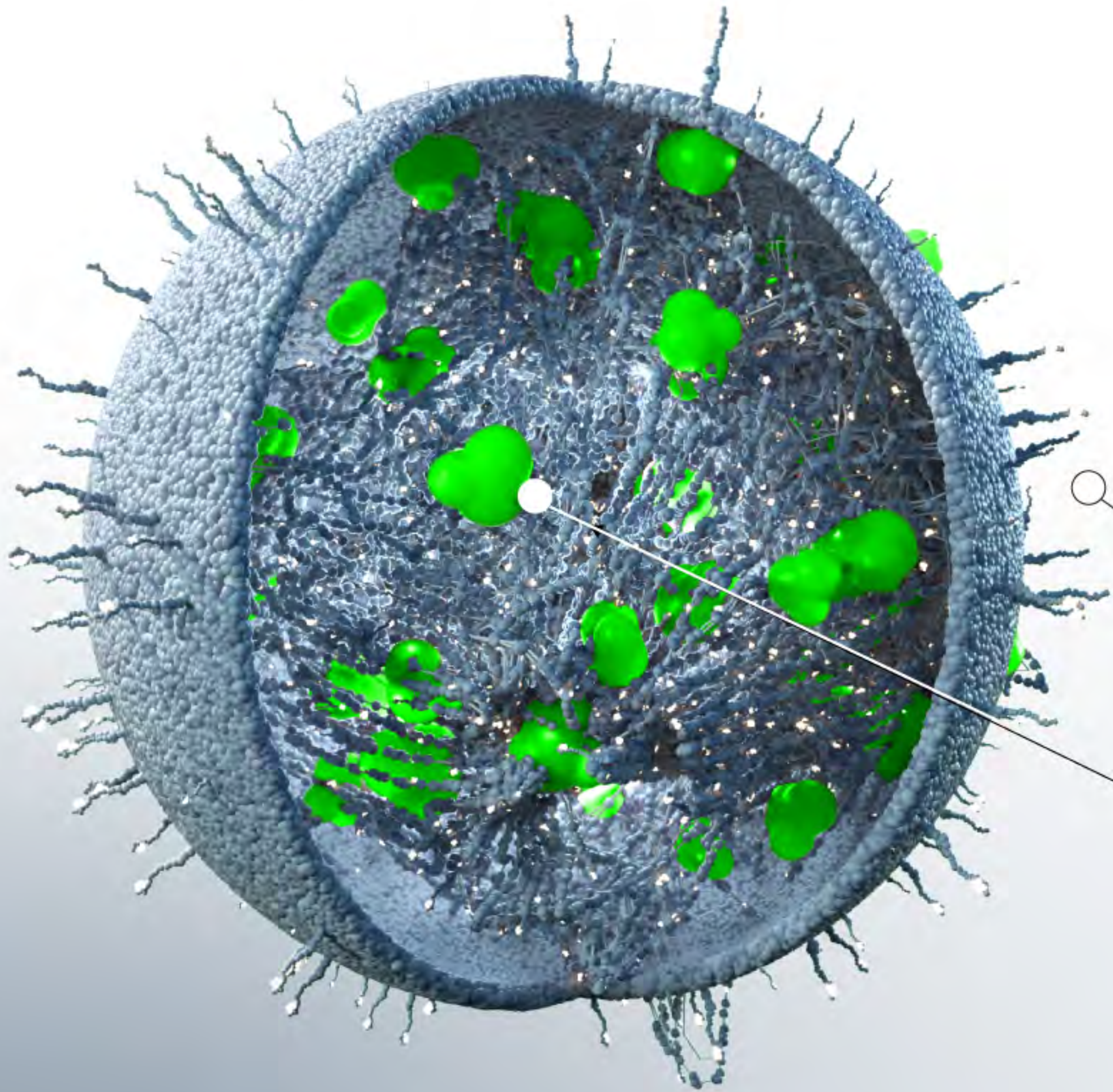
**X50**  
CAPSULES

**SMART**  
SKIN CARE



# X50<sup>®</sup> PhotoGlow

**A** Efficacy/Claims:  
Glowing, even tone.



**B** Target cell:  
Fibroblast

Mechanism:  
**Stimulates collagen synthesis and increases skin thickness to decrease light absorption on the skin and increase its reflection**

**C** Active principles:



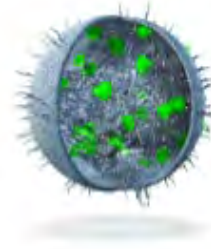
**Peptide (ligand)**  
Collagen expression via FGF receptor



**Chlorella extract (encapsulated active)**  
ATP synthesis increase  
Skin turnover stimulation

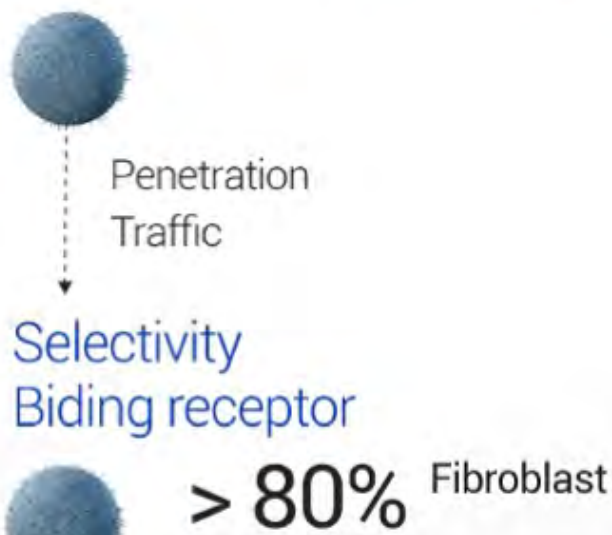






# X50<sup>®</sup> PhotoGlow

## A Mechanism: infography



Ligand peptide: Collagen synthesis via FGF receptor

**DUAL**  
REGENERATING  
ACTIVITY

Encapsulated extract: stimulates ATP synthesis and cell turnover

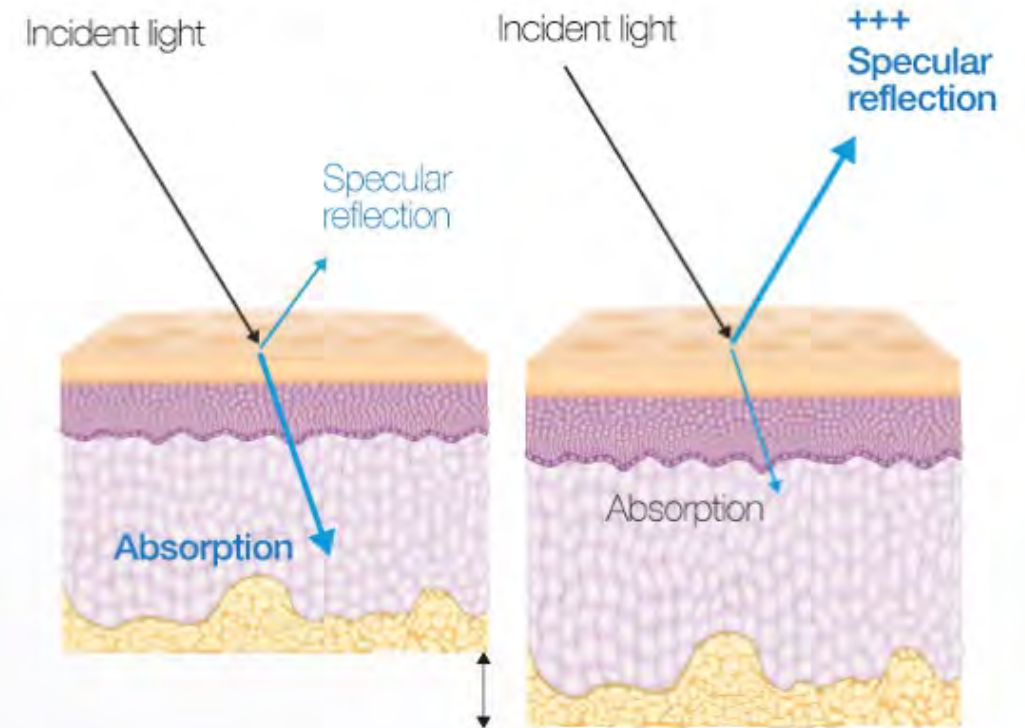
## B in vivo efficacy: Glow, even tone



2-4 weeks  
2 application a day  
Facial  
Chromammetry

Use: 0.001% (1% of 1g/L)

## Skin-light interaction



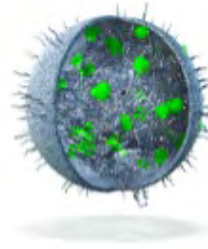
X50 PhotoGlow

The increased thickness of the skin due to increased activity is seen as greater reflection of the incident light

**X50**  
CAPSULES

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# X50<sup>®</sup> PhotoGlow

B in vivo efficacy: visible light



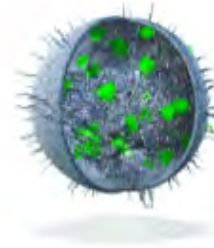
Day 0

Day 14

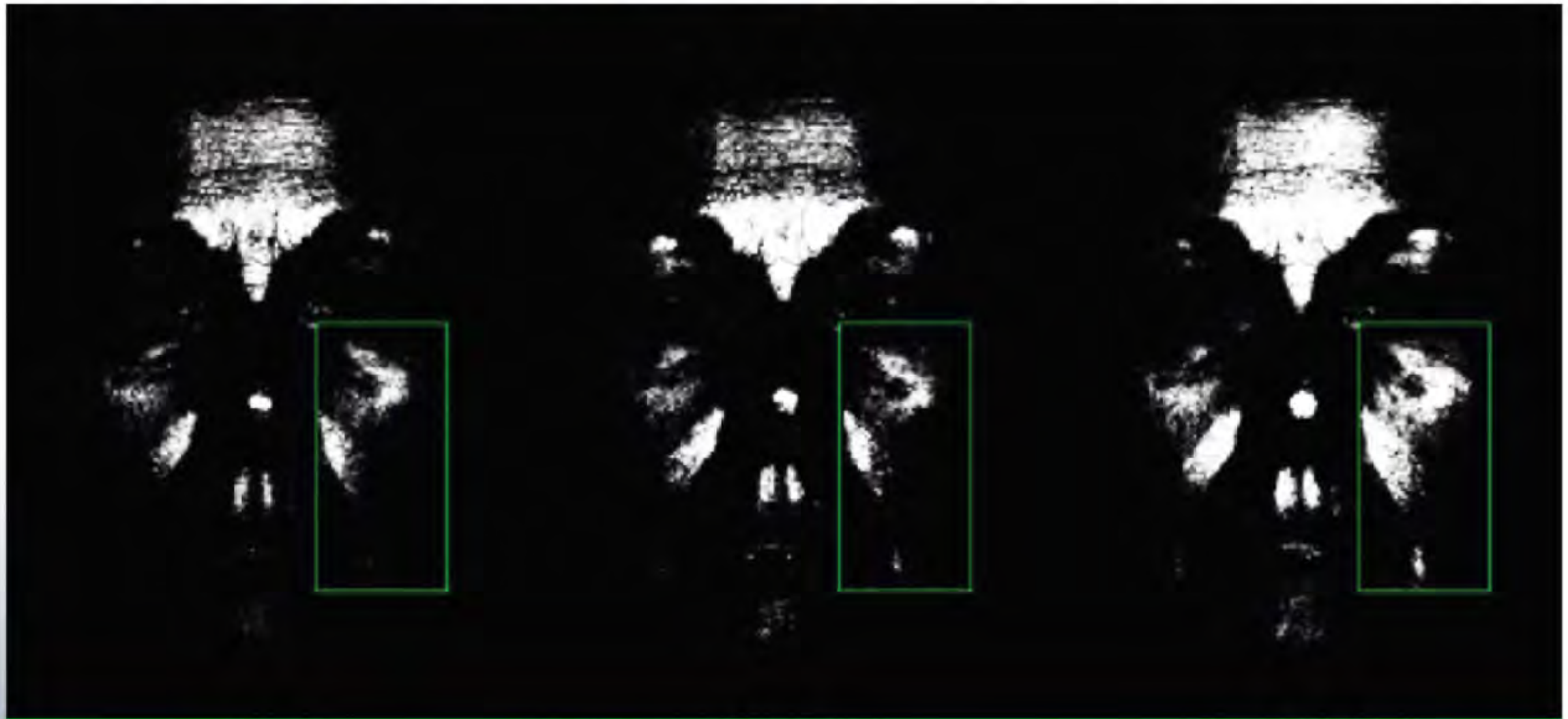
Day 28







**B** in vivo efficacy: reflected light (pixel intensity)



Day 0

Day 14

Day 28

**X50**  
CAPSULES

**SMART**  
SKIN CARE

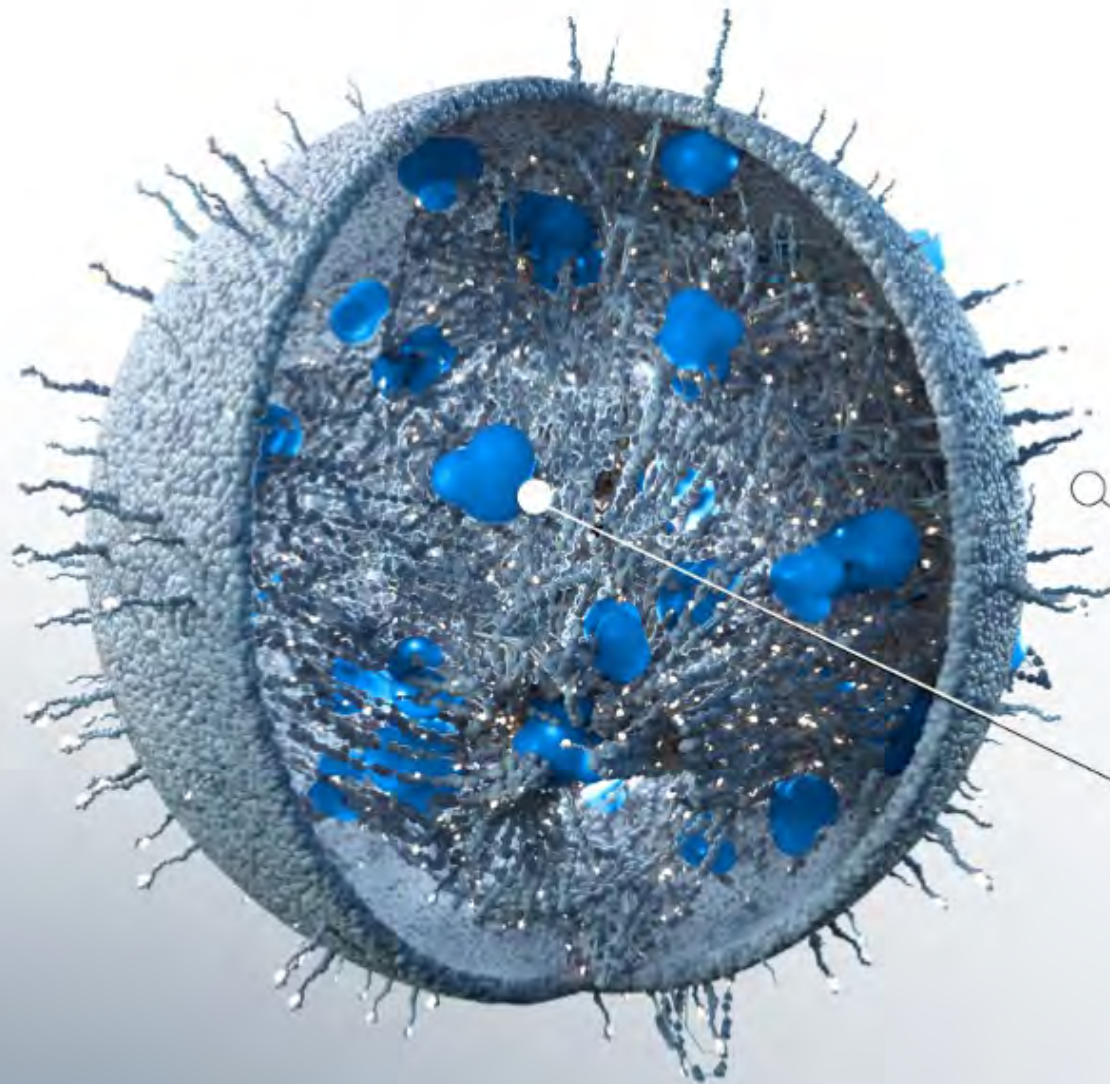
**+33%**  
EVEN TONE  
AVERAGE

**+55%**  
GLOWING  
AVERAGE



# X50<sup>®</sup> Hyalufiller

**A** Efficacy/Claims:  
Wrinkle filler effect



**B** Target cell:  
Fibroblast

Mechanism:  
**Stimulates collagen and hyaluronic acid (HA) synthesis to help fill in wrinkles and fine lines for a young-looking appearance**

**C** Active principles:



**Peptide (ligand)**  
Collagen expression via FGF receptor



**Peptide (encapsulated active)**  
Stimulates non-active fibroblast into HA synthesis and multiplies its synthesis

**X50**  
CAPSULES

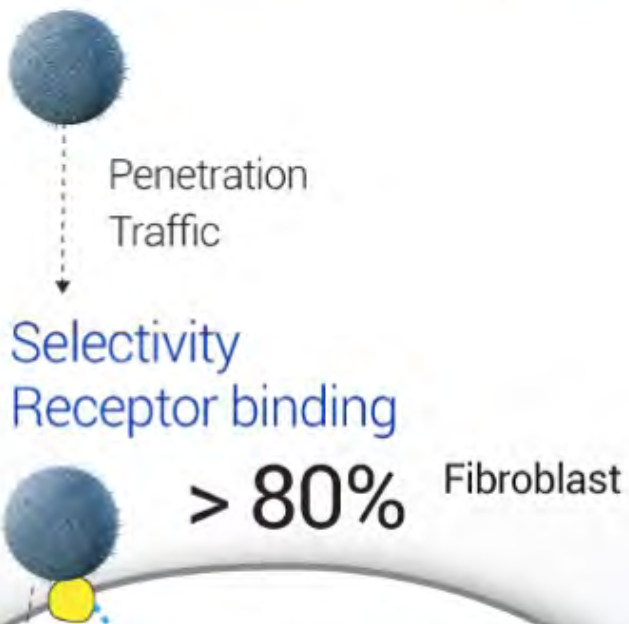
**SMART**  
SKIN CARE





# X50<sup>®</sup> Hyalufiller

## A Mechanism: infographic



Ligand peptide: Collagen synthesis via FGF receptor

Endocytosis



Encapsulated peptide : Hyaluronic acid synthesis

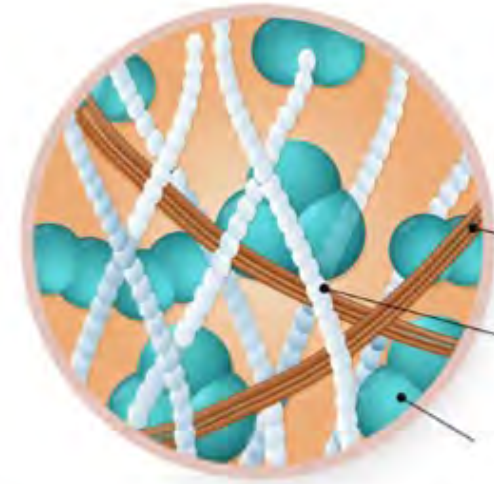
## B in vivo efficacy

**Wrinkle filler**



2 -4 weeks  
2 applications a day  
Nasogenial folds  
PhotoGrammetrix<sup>®</sup>

Use: 0.001% (1% of 1g/L)



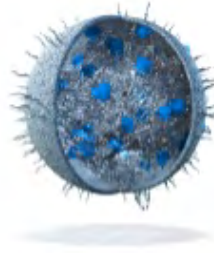
Collagen  
Hyaluronic acid

Hyaluronic acid and collagen are vital to maintain layers and the structure of the skin. Collagen provides firmness and hyaluronic acid is what nourishes and hydrates collagen as a lubricant would.

**X50**  
CAPSULES

**SMART**  
SKIN CARE





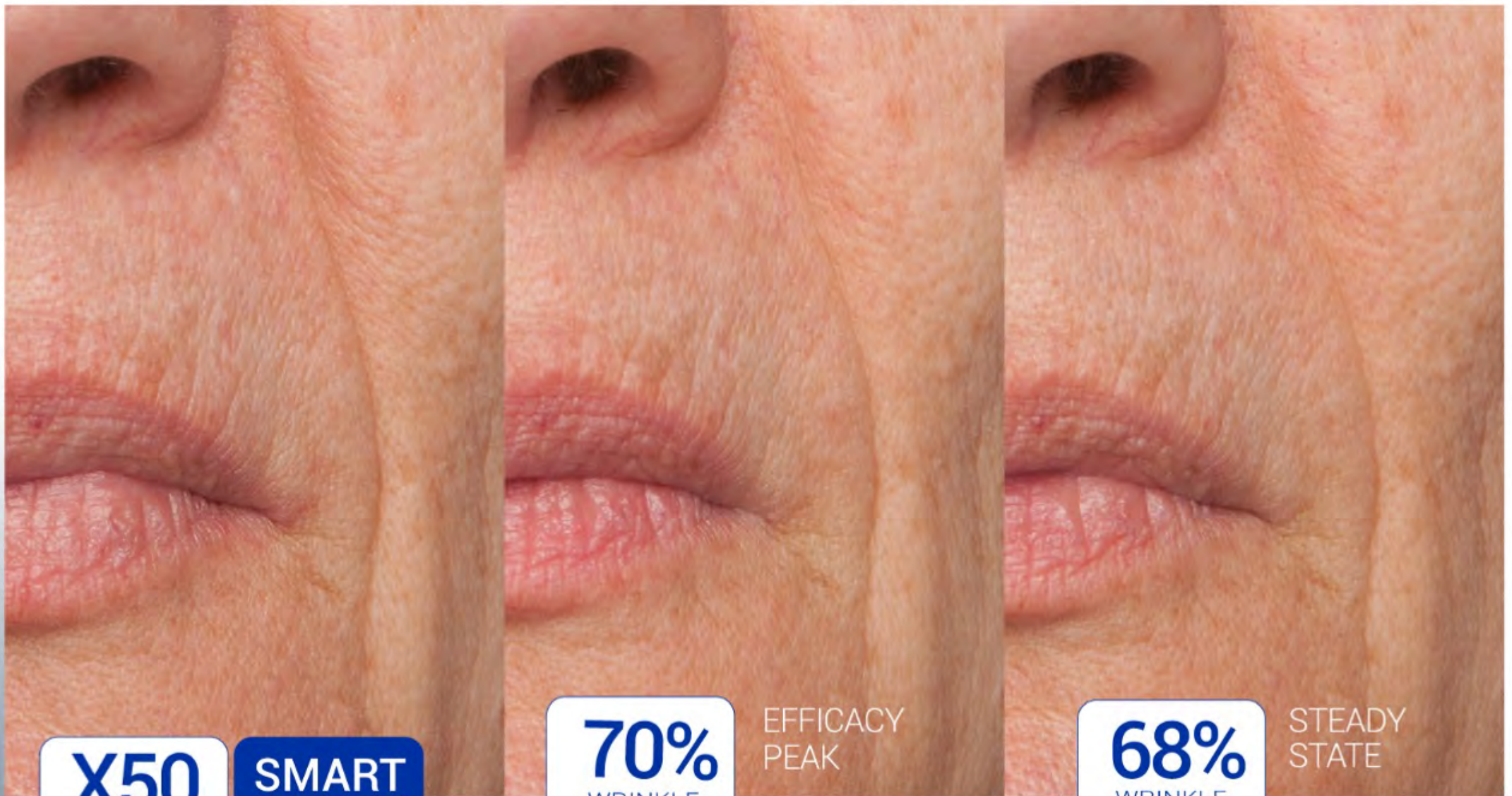
# X50<sup>®</sup> Hyalufiller

## B In vivo efficacy: wrinkle-filling effect

Day 0

Day14

Day 28



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**70%**  
WRINKLE  
REDUCTION

EFFICACY  
PEAK

**68%**  
WRINKLE  
REDUCTION

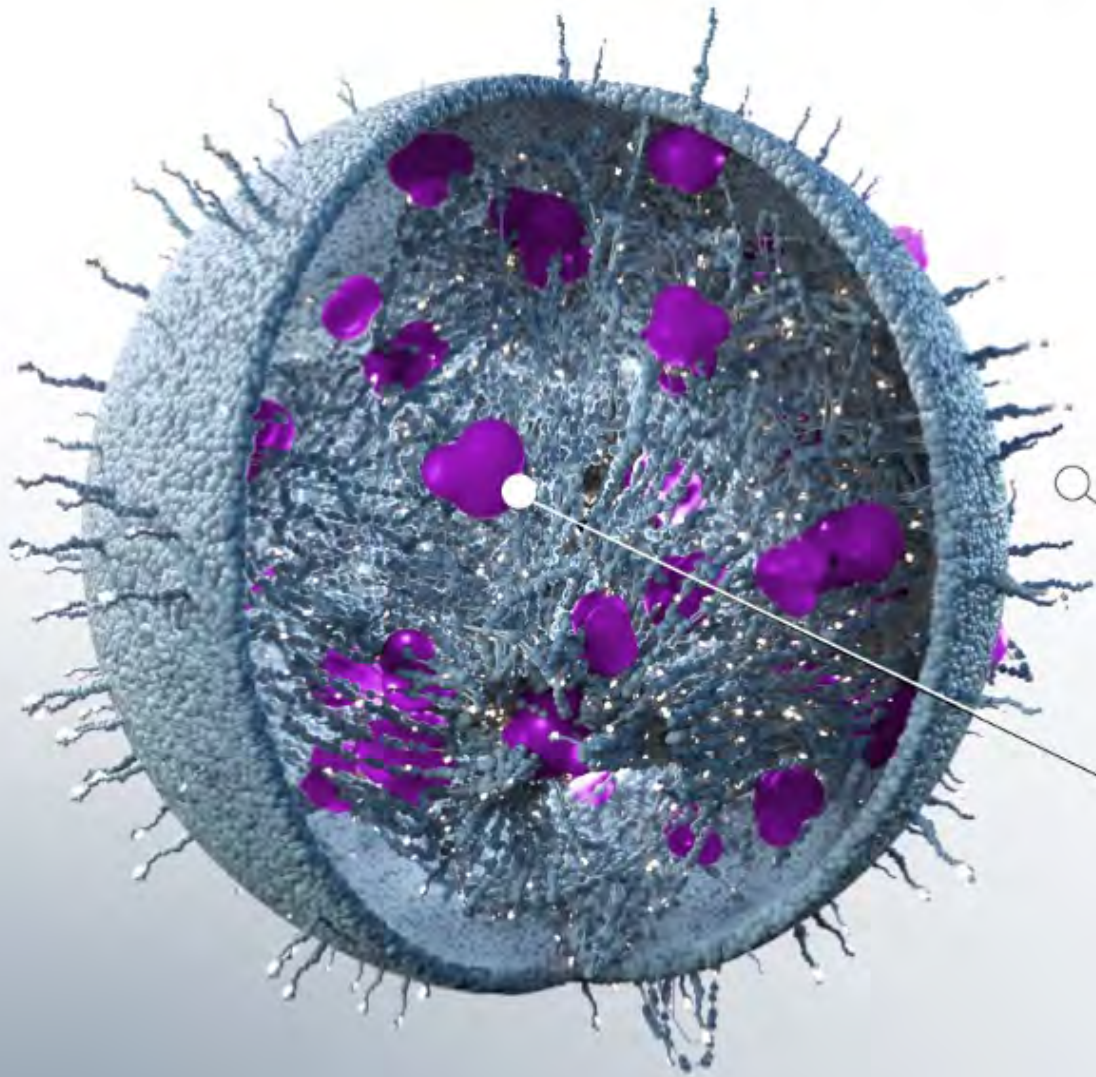
STEADY  
STATE



# X50<sup>®</sup> SkinBarrier

- A** Efficacy/Claims:  
Skin barrier function, protection

- B** Target cell:  
Keratinocyte
- Mechanism:  
**Stimulates the synthesis of four (4) keratins, filaggrin and loricrin to improve renewal and integrity of the epidermis**



- C** Active principles:
- Peptide (ligand)**  
Ligand activity only (Integrins receptor)
  - 2** **Two peptides (encapsulated actives)**  
They stimulate protein synthesis (keratins, filaggrin and loricrin)

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# X50<sup>®</sup> SkinBarrier

**A** Mechanism: infography    **B** in vivo efficacy:



**Skin barrier function**



4 weeks  
2 applications a day  
Facial  
Ultrasonography

Use: 0.001% (1% of 1g/L)



Echogenic density scale

Black/green  
Lower density



Red/White  
Higher density

Improvement in barrier function  
results in less dehydration

**2ml**  
TEWL  
REDUCTION

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Ligand peptide: Activity as ligand only

**6** PROTEIN  
SYNTHESIS

Encapsulates peptides: Epidermal turnover improvement



## The Cosmetic Drone<sup>®</sup>: Benefits



- **Innovative and patented platform**
- **A single technology, different applications**
- **Domant actives concept:**  
protection of the active principle to the target
- **Penetration without compromising barrier function**
- **Safety**
- **Customizable technology**

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## The Cosmetic Drone<sup>®</sup>: Benefits

Lab

- Integration (stability, penetration, availability) in a unique, single system
- Ingredients dispersed in water
- Minimum dose of use: 0.001% active (1% of 1g / L)
- Does not alter the appearance of the formula
- Easy incorporation (<40°C)

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## The Cosmetic Drone<sup>®</sup>: Benefits



- Transferable and recognizable innovation by the consumer. The Cosmetic Drone<sup>®</sup>
- Powerful message in the product line: single technology, multiple applications
- Line expansion possibilities from skin care to color cosmetics
- Product and corporate positioning as an innovative company

**X50**  
CAPSULES

**SMART**  
SKIN CARE





# What's next: Trojan<sup>®</sup> Technology When the target is inside cells...

Dual peptide -targeting system

**Peptide 1:** Cell receptor targeting

**Peptide 2:** Mitochondria membrane targeting

2020 Ingredient

TROJAN  
Q10



X50  
CAPSULES

SMART  
SKIN CARE

Free webinar @ <https://bit.ly/2VJxxCj>





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TECHNICAL ART OF SCIENCE