



TOPSKIN

A NEW TECHNOLOGY WITH A LARGE POTENTIAL FOR SKIN APPLICATIONS
protected with the patent application PCT/IB2023/056516 (pending)

LAQV
requimte

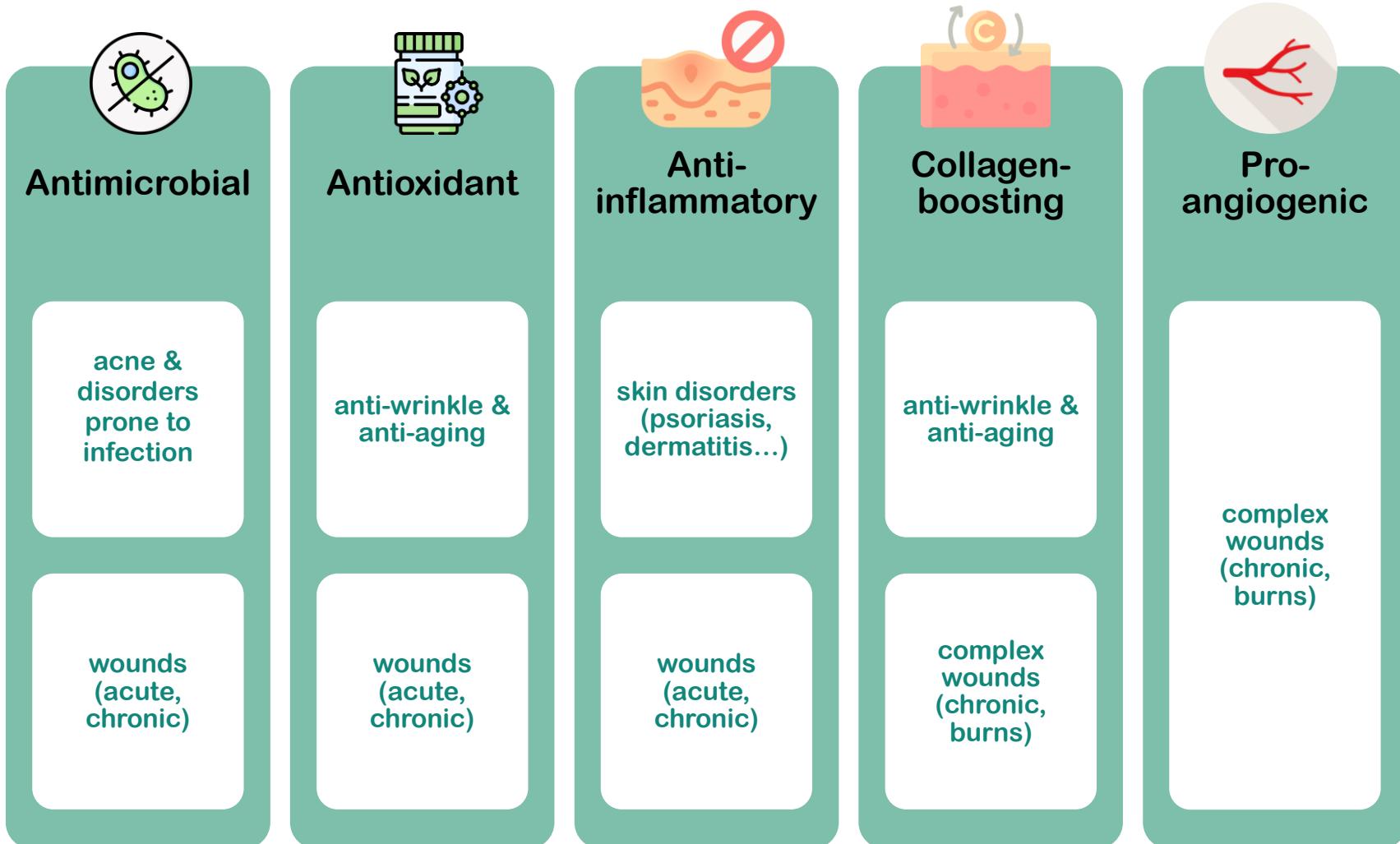
U.PORTO
FC FACULDADE DE CIÊNCIAS
UNIVERSIDADE DO PORTO

P.PORTO

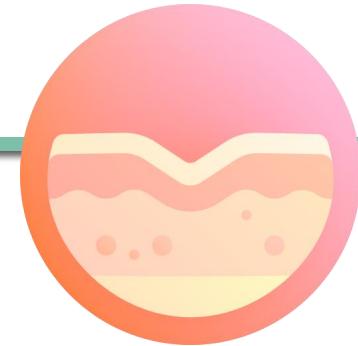
What is TOPSKIN



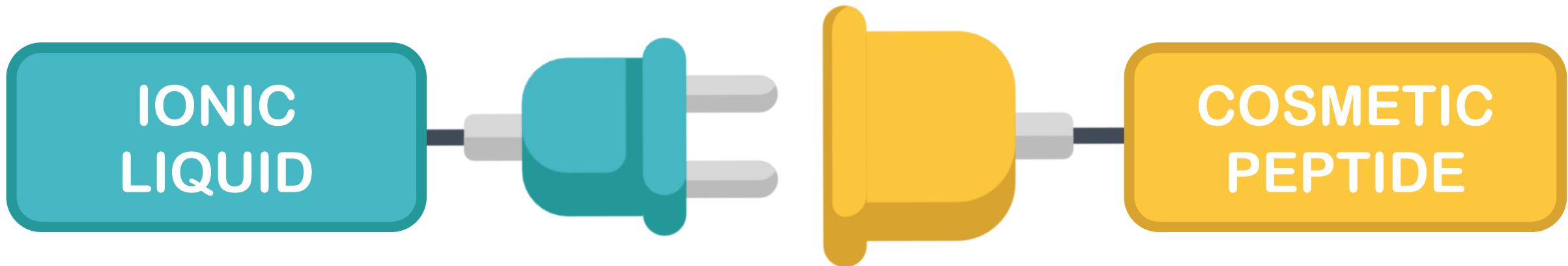
- a new technology offering collagen-boosting, antimicrobial, anti-inflammatory, antioxidant and pro-angiogenic properties in a single product



What is TOPSKIN

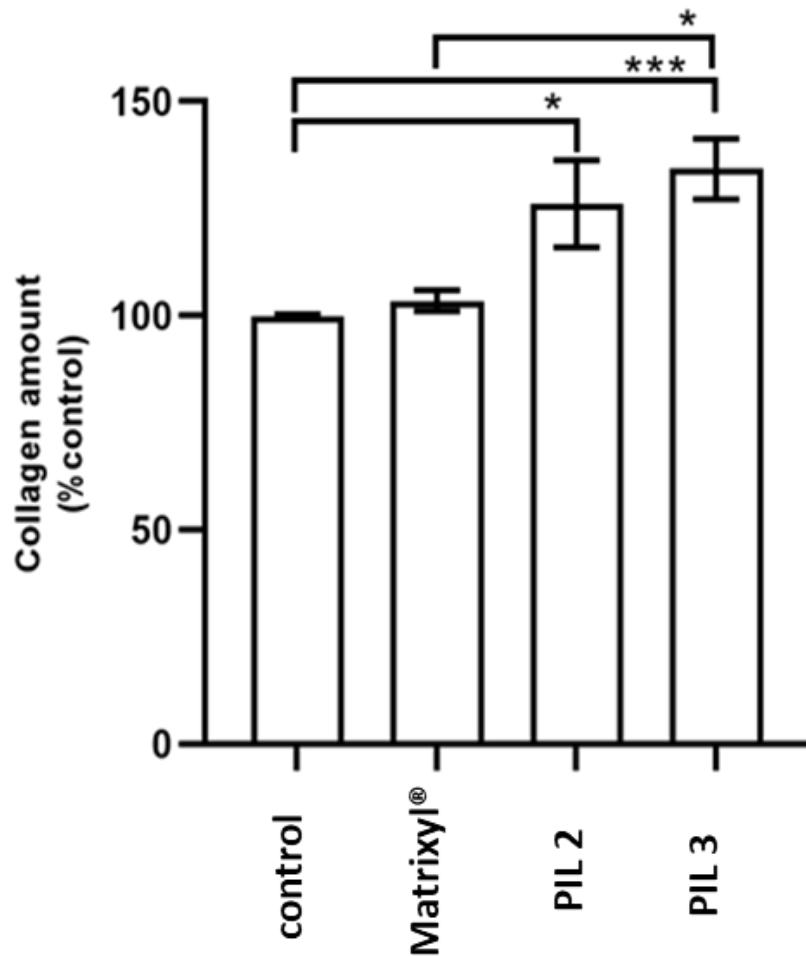
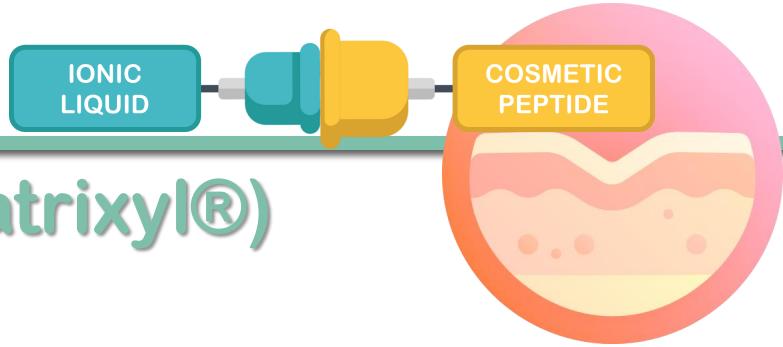


- based on a clean&simple modification of small peptides (3 to 5 amino acids) already used in high-end cosmetics, using antimicrobial ionic liquids

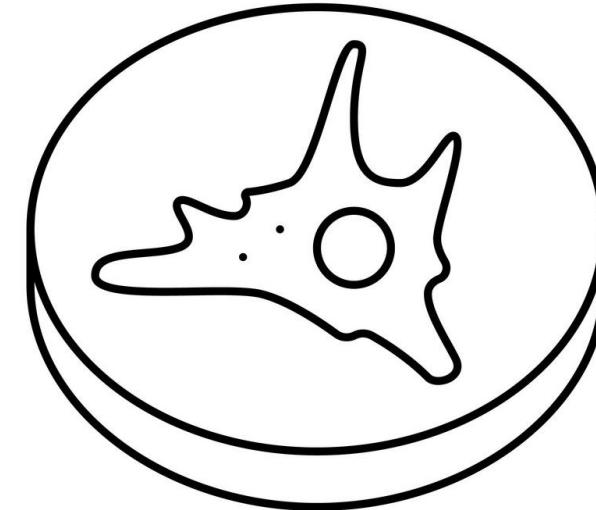


TOPSKIN's main features

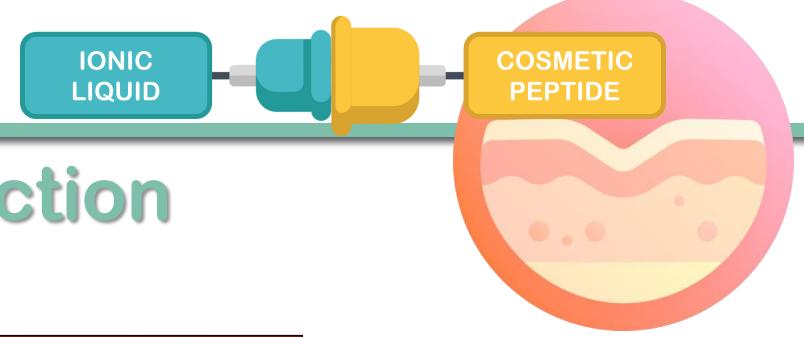
collagen-boosting action superior to PPP-4 (Matrixyl®)



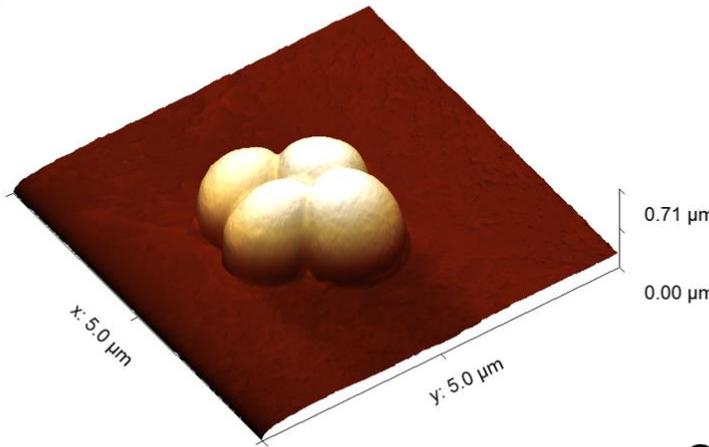
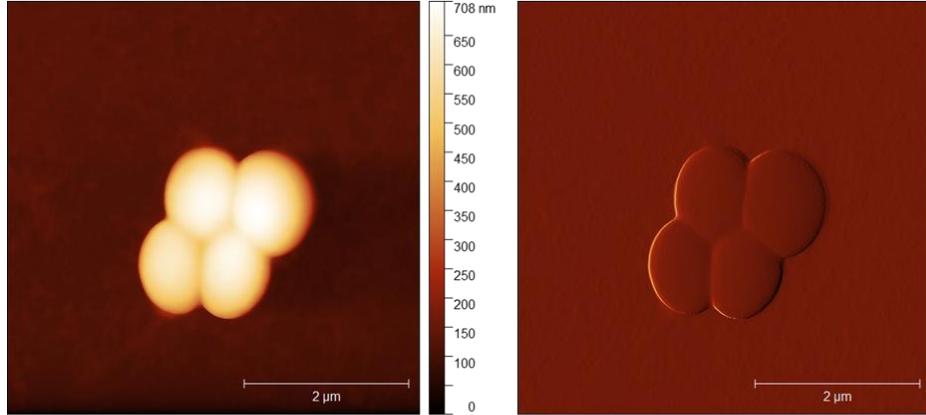
in vitro (human dermal fibroblasts)



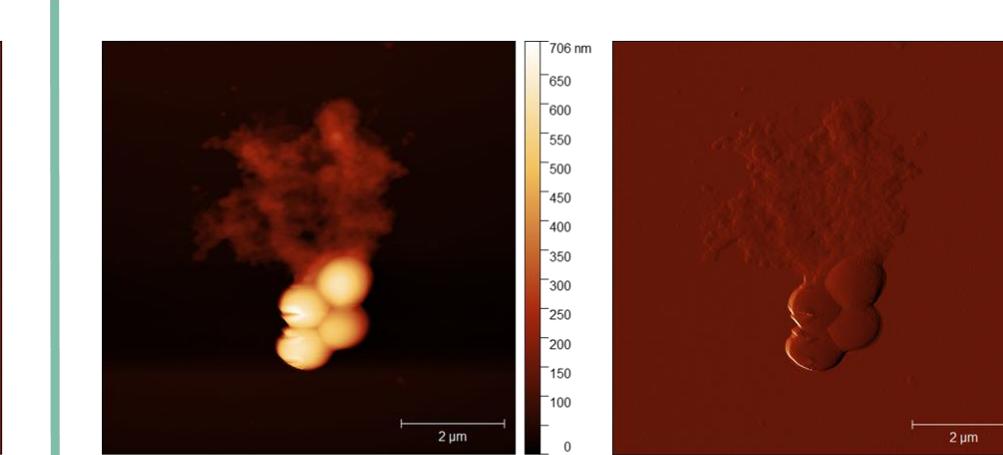
TOPSKIN's main features



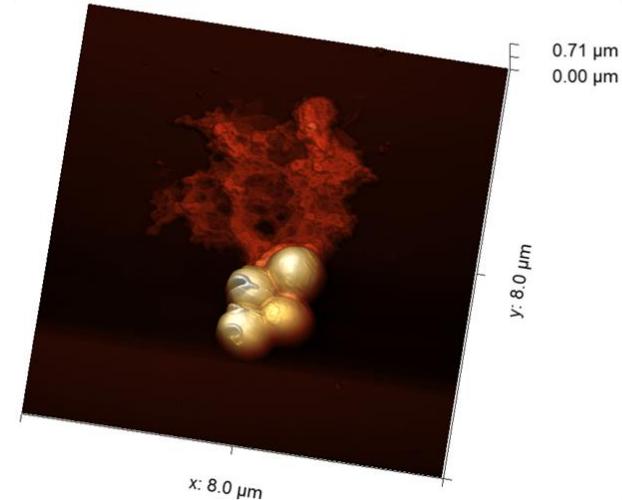
wide-spectrum “detergent-like” microbicidal action



S. aureus 29213



control
test



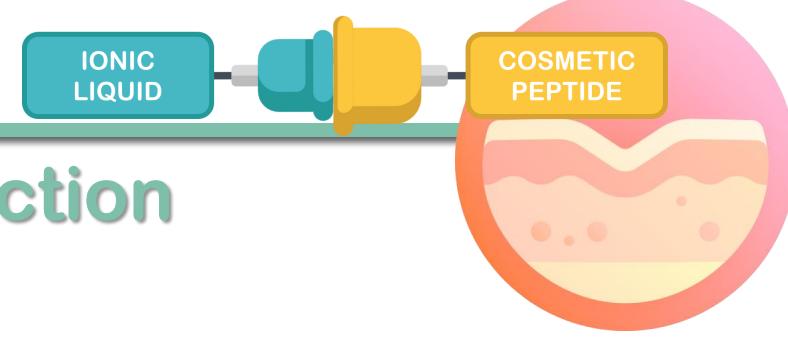
MIC = MBC/MFC (μM)

ATCC bacteria: 5-59

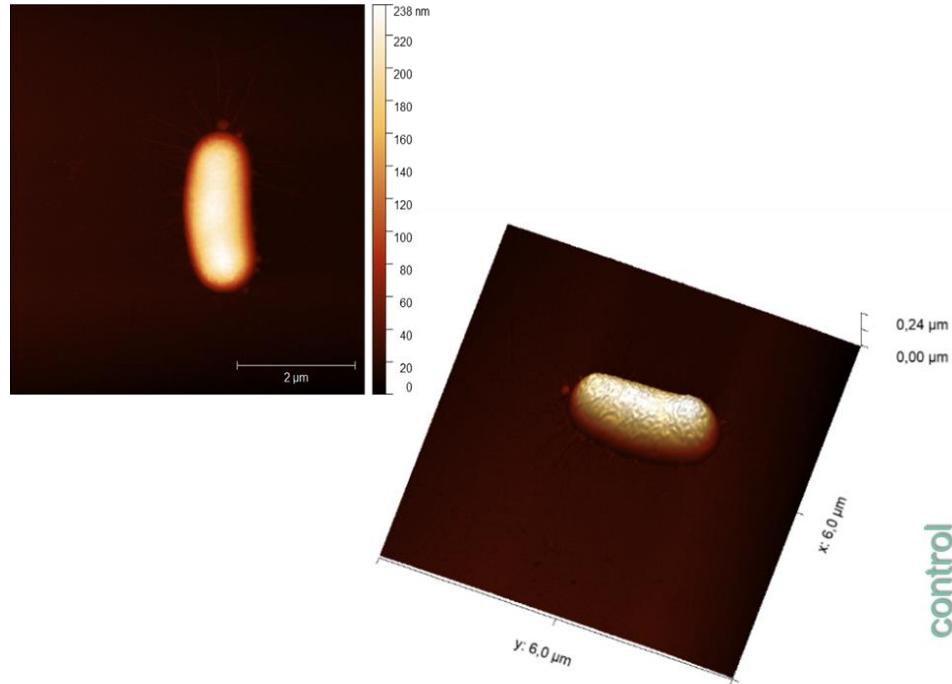
MDR bacteria: 19-38

Candida spp.: 2-5

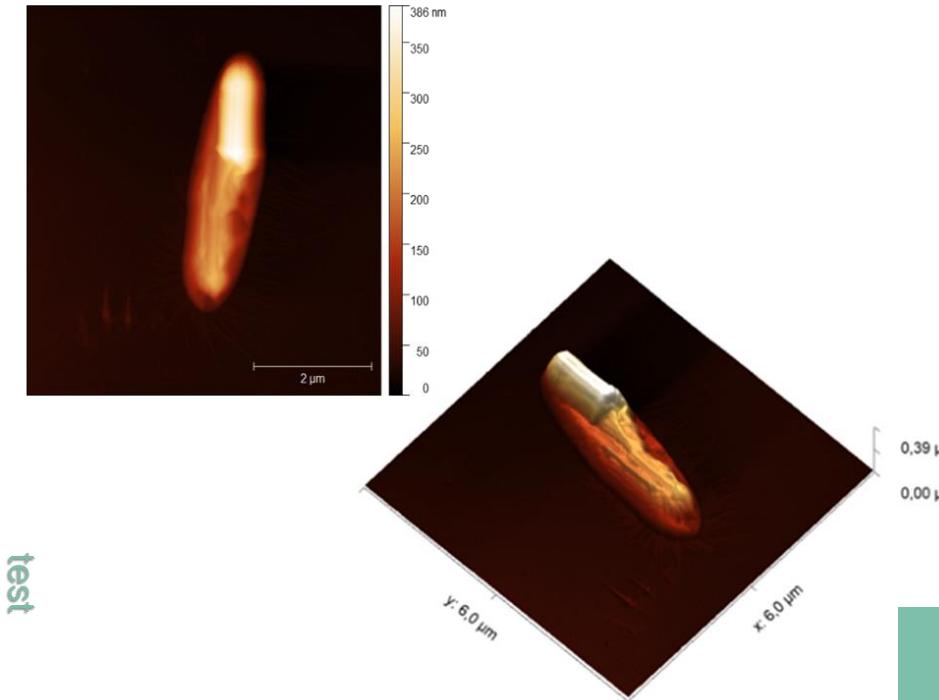
TOPSKIN's main features



wide-spectrum “detergent-like” microbicidal action



E. coli 25922



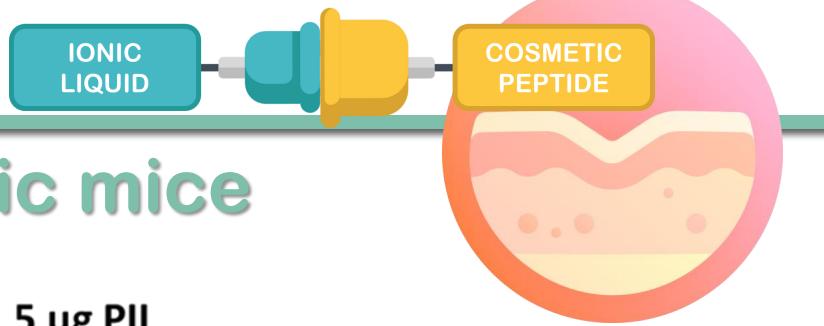
$$\text{MIC} = \text{MBC/MFC} (\mu\text{M})$$

ATCC bacteria: 5-59

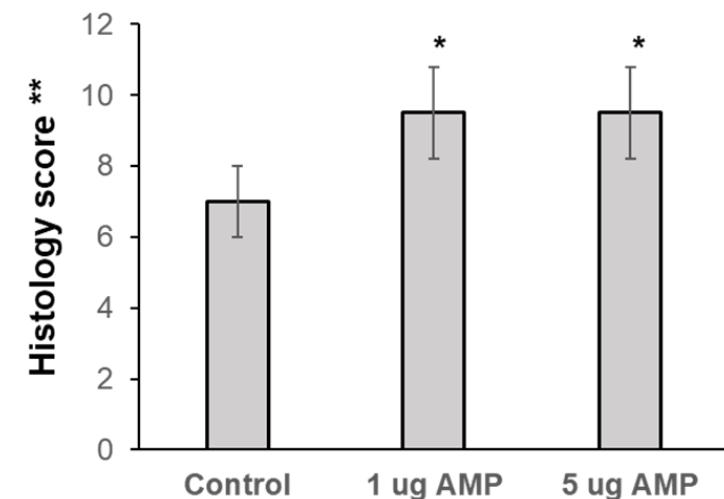
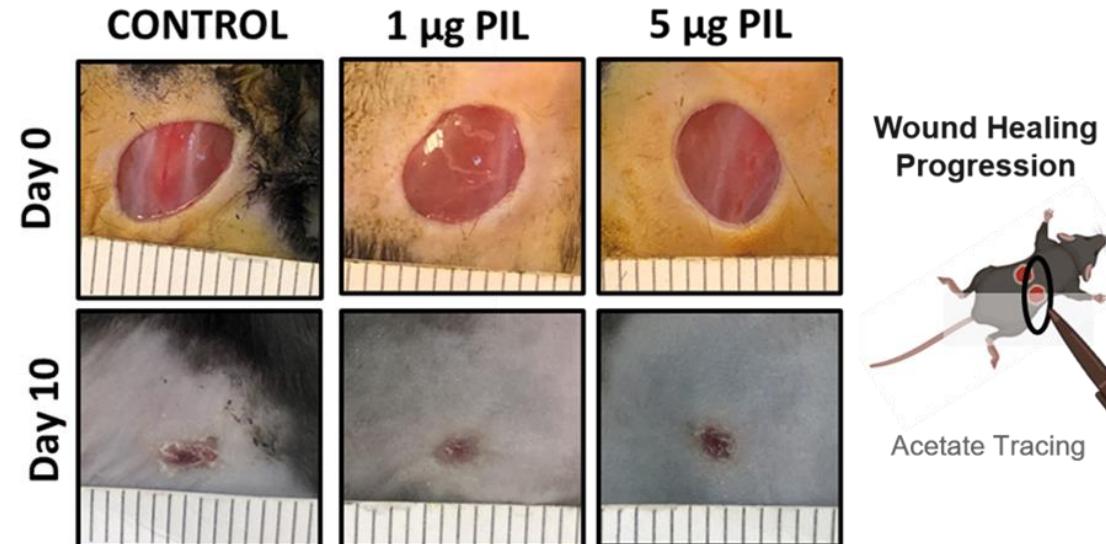
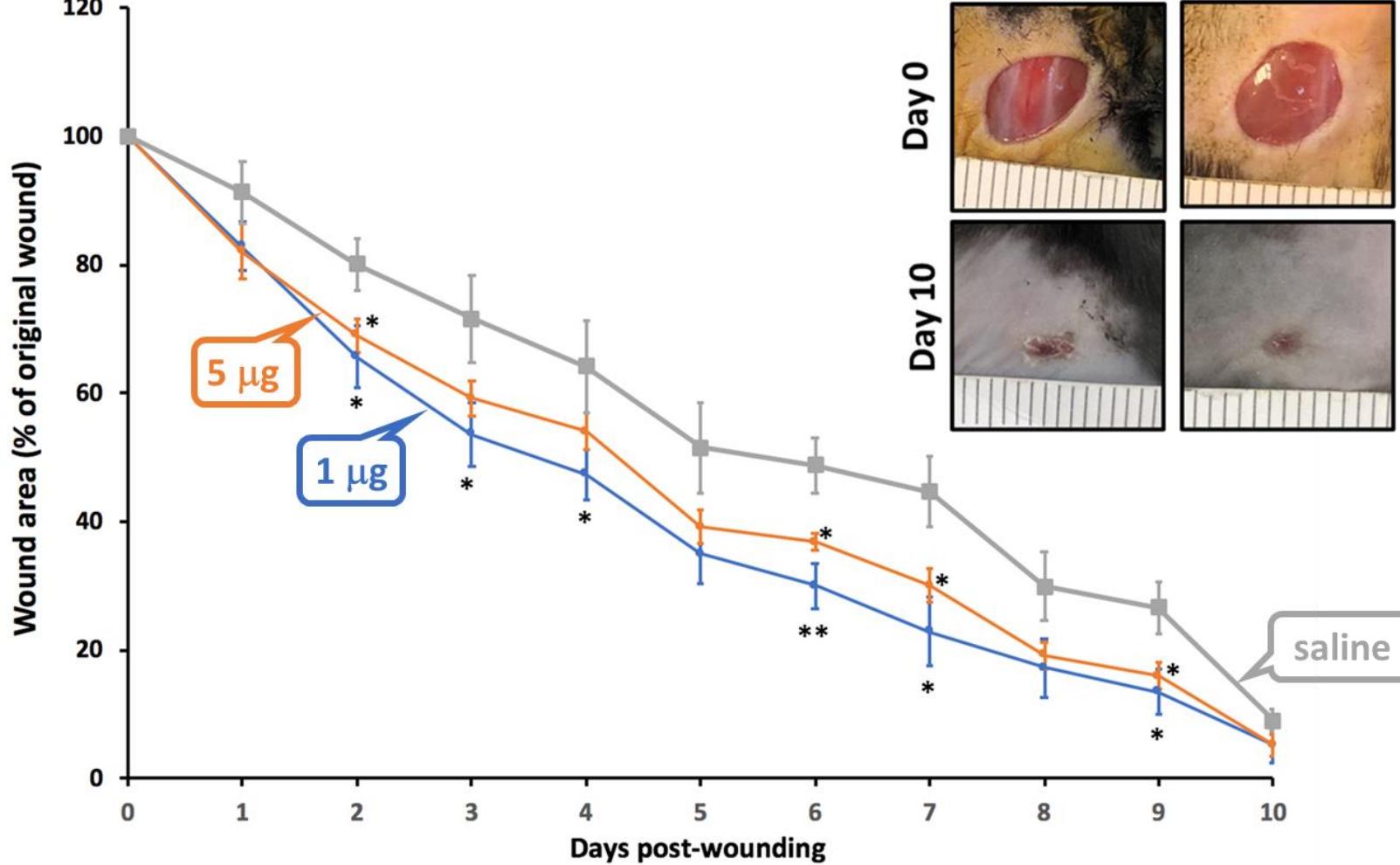
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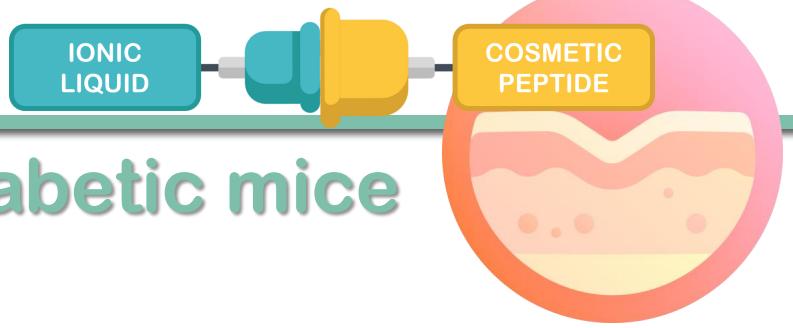
TOPSKIN's main features



faster wound maturation and healing on diabetic mice



TOPSKIN's main features



faster clearance of microbiota in wounds of diabetic mice



Bacterial counts
at regular time
points

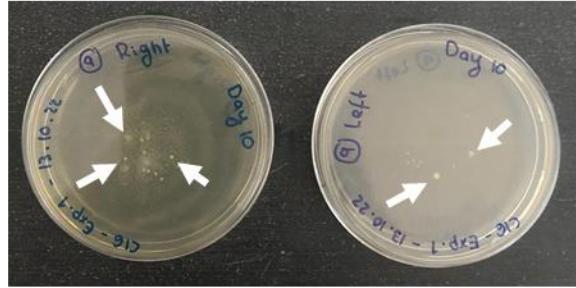
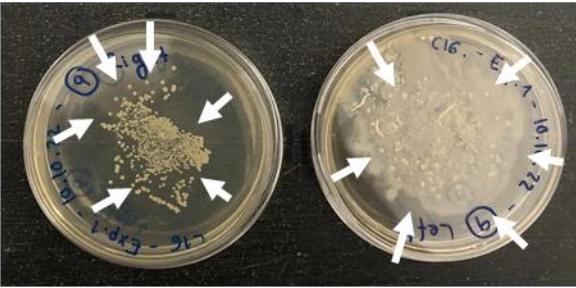
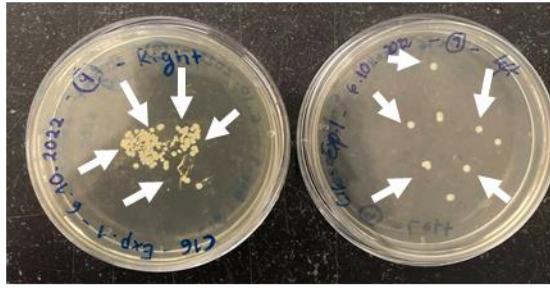
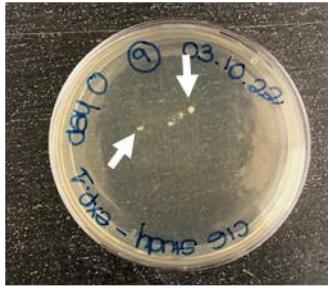
Day 0

Day 3

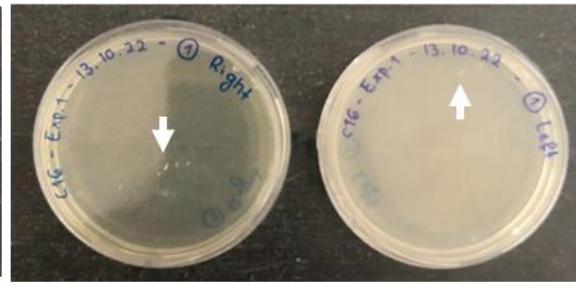
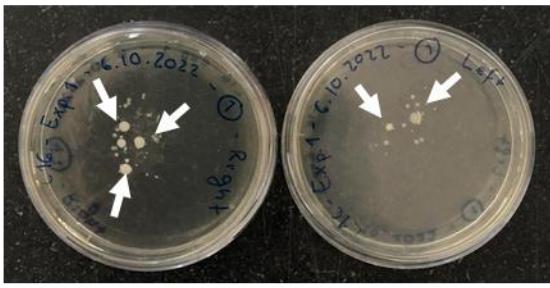
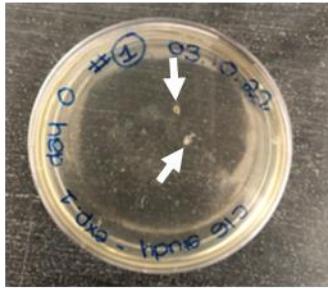
Day 7

Day 10

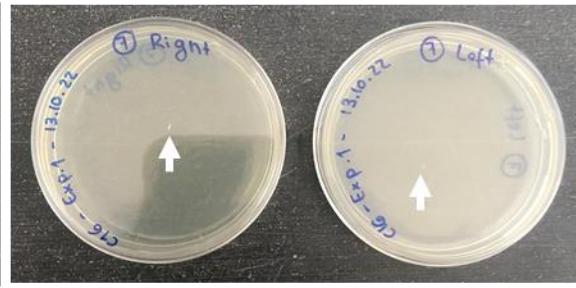
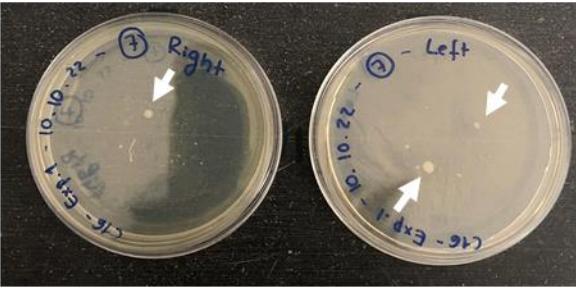
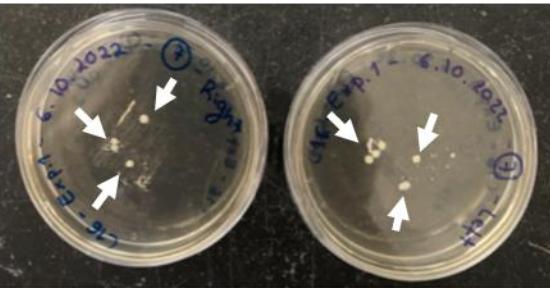
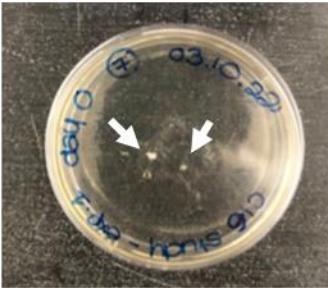
Control



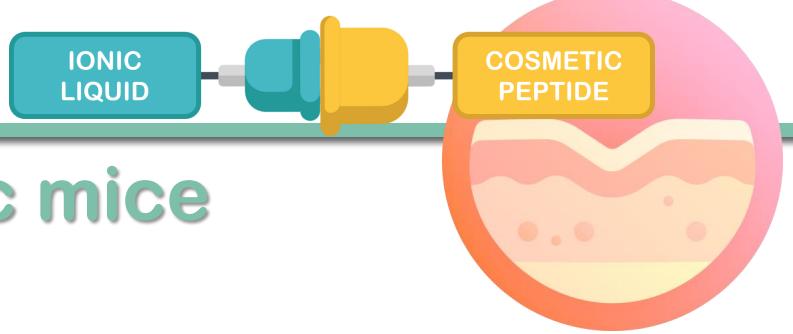
1 μ g AMP



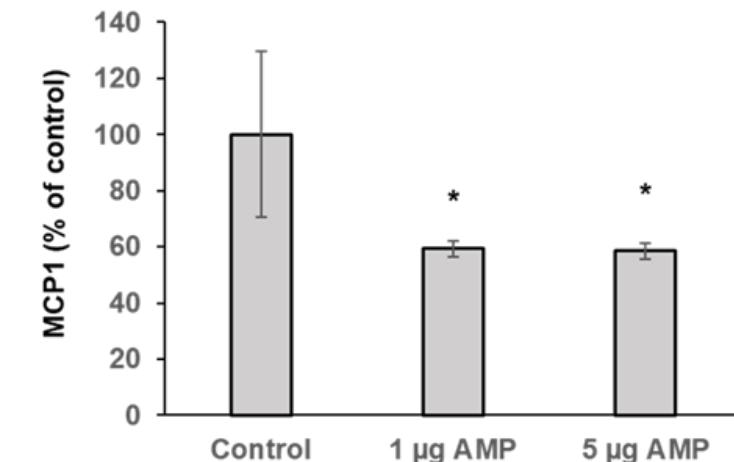
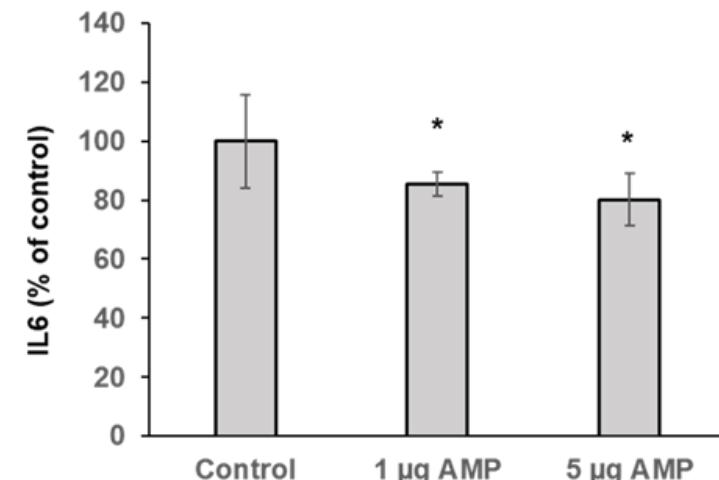
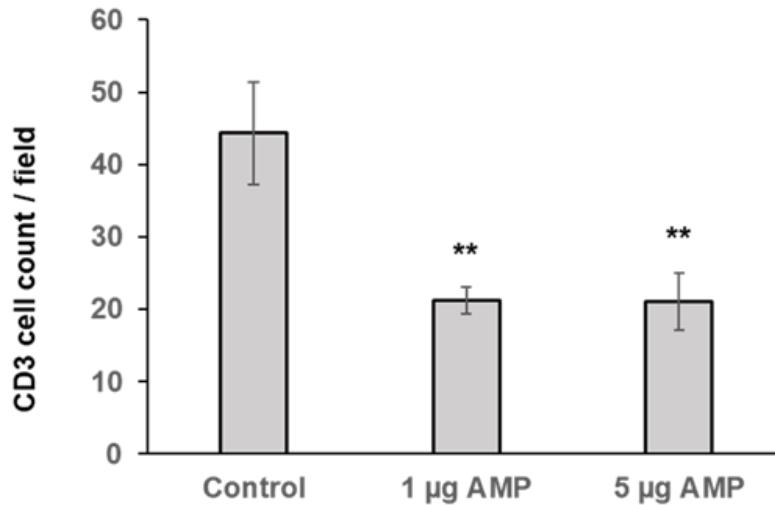
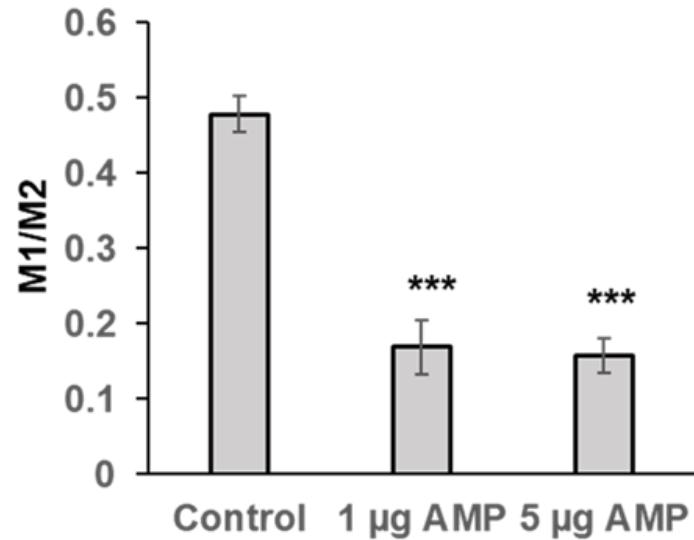
5 μ g AMP



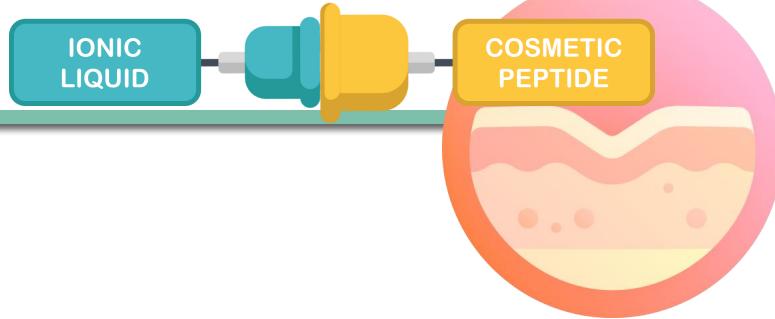
TOPSKIN's main features



anti-inflammatory effects in wounds of diabetic mice

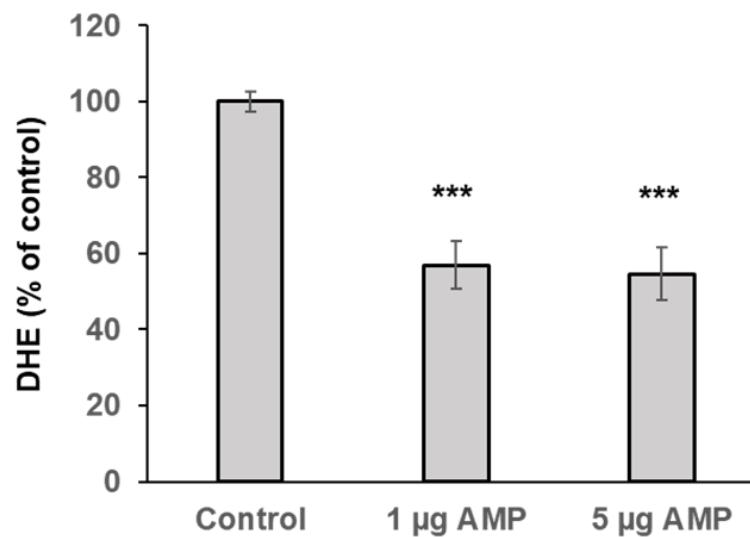


TOPSKIN's main features

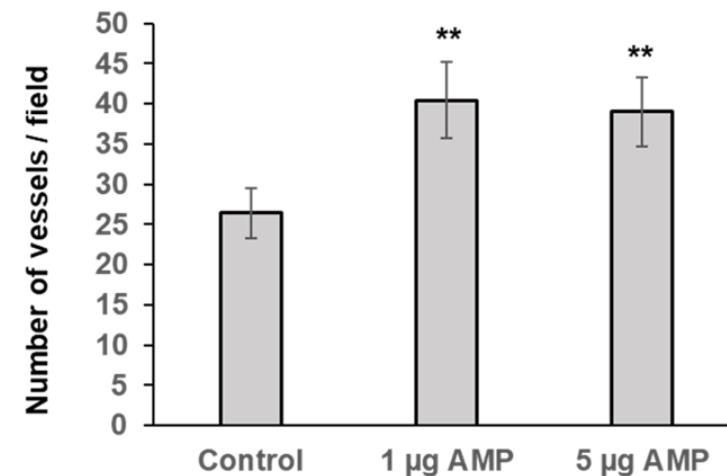


antioxidant and proangiogenic effects
in wounds of diabetic mice

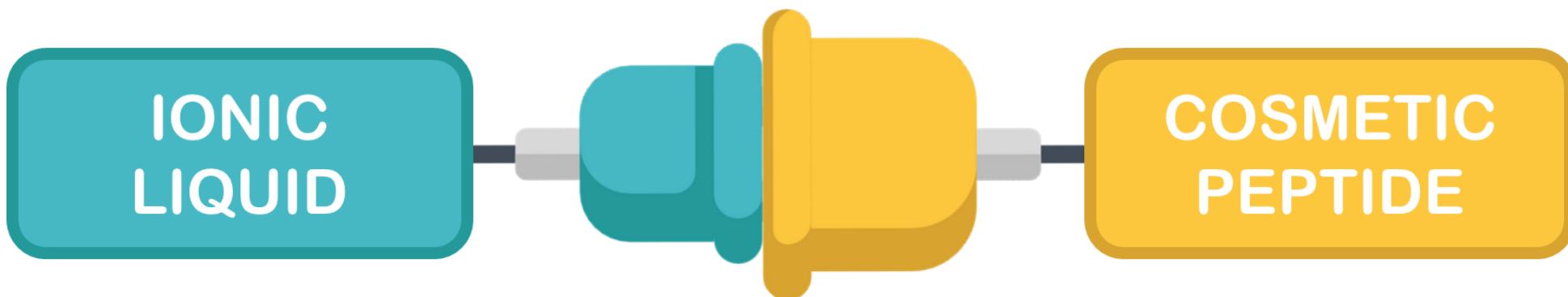
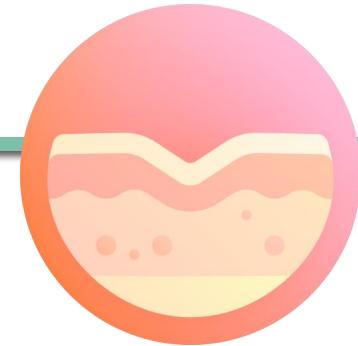
Decreased ROS levels



Improved angiogenesis



TOPSKIN's other expected features

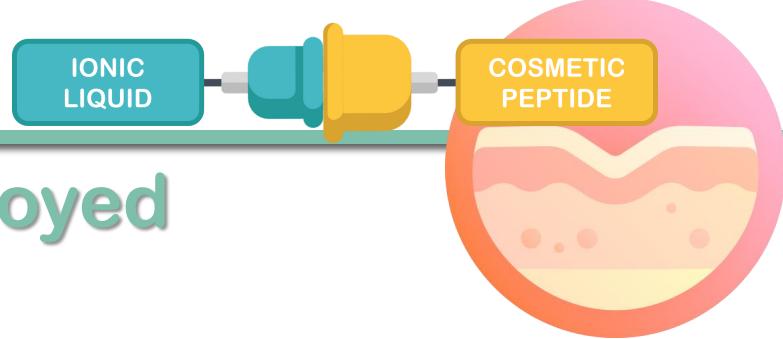


- ✓ small ecological footprint (peptide-based)
- ✓ low propensity to induce cross-resistance
- ✓ expectedly good dermal permeation with relatively low transdermal absorption



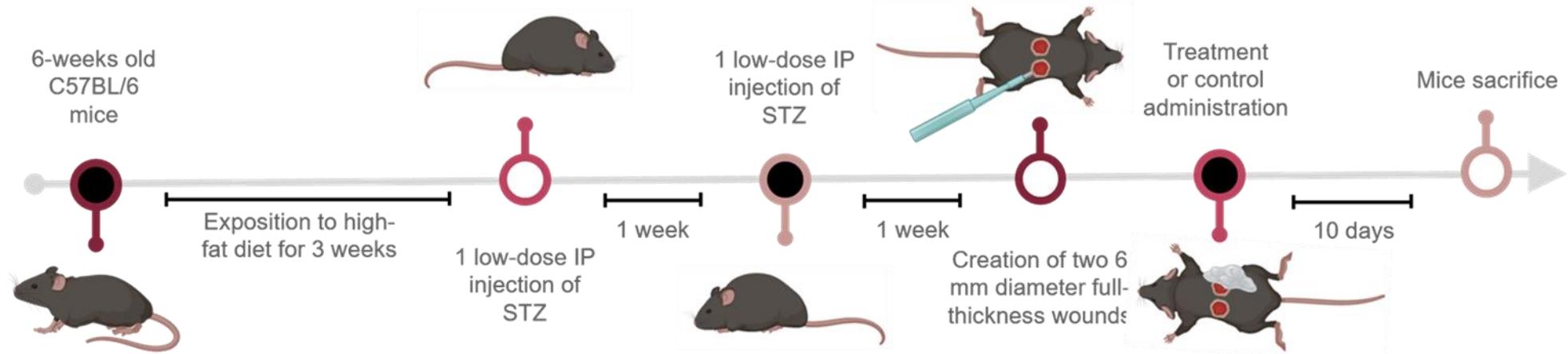
TOPSKIN is a new multifunctional product
with many prospective skin applications

TOPSKIN's *in vivo* assays



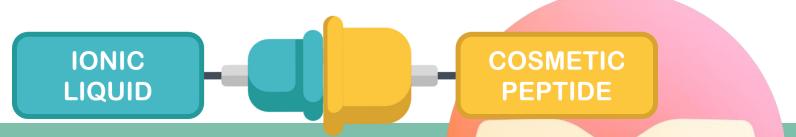
ANNEX 1: detail on the T1D mouse model employed

DIABETIC MOUSE MODEL OF WOUND HEALING



Groups	Body Weight (g)	Glycaemia (mg/dL)	n
Control	24.1±1.1	496.7 ± 74.7	3
1 µg PIL	26.4±1.1	505.5 ± 81.2	4
5 µg PIL	24.7±1.7	444 ± 59.0	4

TOPSKIN's *ex vivo* assays



ANNEX 2: histology score*

Wound healing phase/Parameter	Description	Score
Re-epithelialization	Complete 95-100% Partial >0% - <95%; None 0%	2 1 0
Epidermal thickness* <i>*ET = [average thickness of epidermis in wound area]/[average thickness of epidermis in uninjured skin]x100</i>	Normal 95–105% Hypertrophy >105% Hypoplasia <95%	2 1 0
Keratinization	<u>Yes</u> Loosely attached/lost layers or thick parakeratotic stratum corneum <u>No</u> None	2 0
Granulation tissue	Intact dermis; Dermal layer intact no granular infiltrates consistent with healing. Thick granulation tissue >100 mm Thin granulation tissue <100 mm	2 1 0
Remodeling	<u>Complete</u> All of the following parameters visible within wound area: (1) Dermal white adipose tissue; (2) Skin Appendages; (3) Panniculus carnosus regeneration. <u>Partial</u> Either of the following parameter visible within wound area: (1) Collagen deposition; (2) Dermal white adipose tissue. <u>None</u> No evidences of remodeling.	2 1 0
Scar elevation# <i>#SE = [average dermis thickness in wound area]/[average dermis thickness in uninjured skin]x100</i>	Normal 95–105% Hypertrophied >105% Hypoplasia <95%	2 1 0

* Van De Vyver et al. (2021),
Stem Cells and Development,
30(23), 1141-1152.

