

Special populations

Marwa A. Sallam

CRS 2022 Annual Meeting & Expo

July 11 – 15, 2022 | Montreal Congress Center, Montreal Canada

Advanced Delivery Science



Lactoferrin Nanoconjugates For Topical Attenuation of Psoriasis

Marwa A. Sallam, PhD

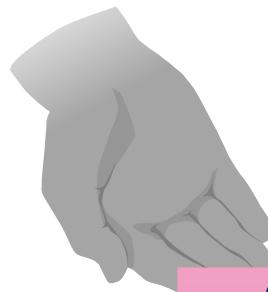
Ass. Prof of pharmaceutical technology, Faculty of pharmacy,
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Psoriasis



Unsatisfactory
clinical
outcomes



Systemic treatment
immunosuppressives &
anti-inflammatory

Marketed topical treatments
as creams, gels..etc,

- limited amount reaching skin
- Off target side effects due to distribution in body organs
- Poor skin penetration (frequent application)
- Local side effects :dryness, skin thinning, delayed wound healing, fungal infections hypopigmentation.
- Inconsistent patient adherence & discontinuation of successful treatment

1-3% of adults populations
Public health concern!



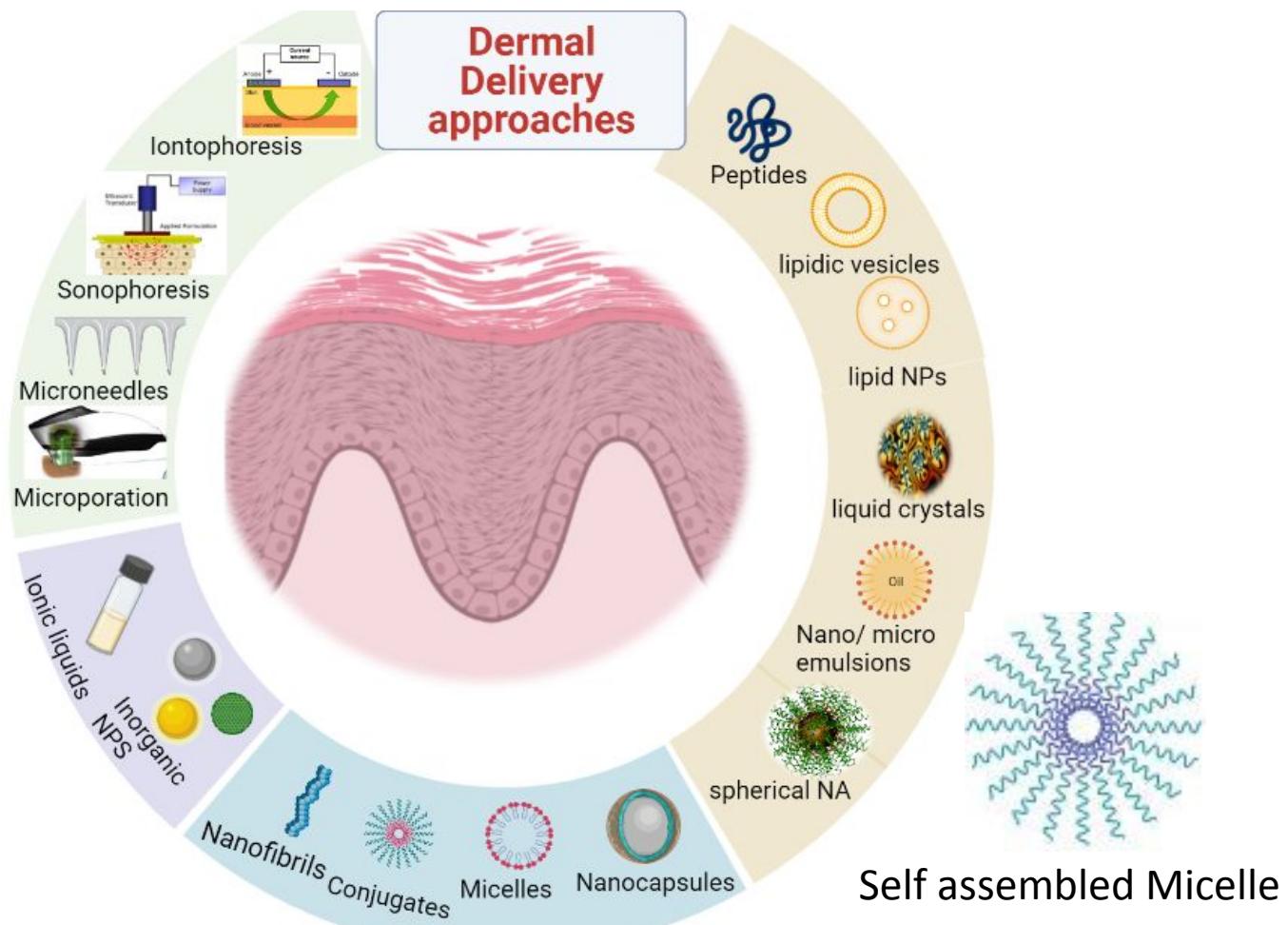
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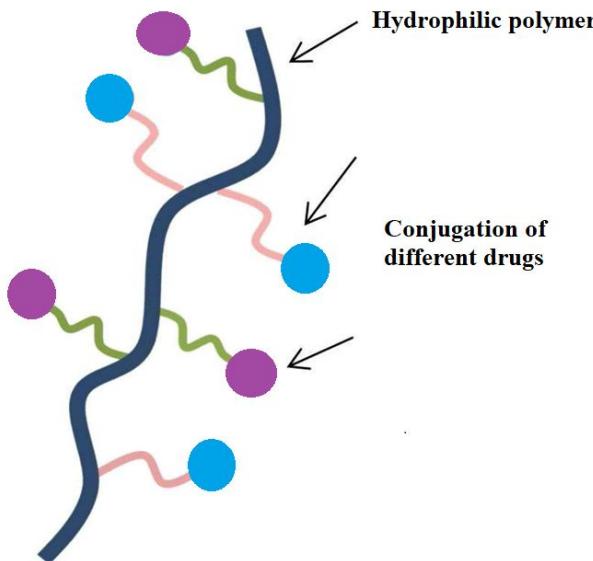
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Nanomedicines overcoming challenges for dermal delivery



Polymer Drug conjugate



We aim to prepare rationally designed polymer conjugates using natural bioactive ingredients that possess immunomodulatory activity.



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Dietary products for PDC

Lactoferrin



Mucosal epithelial cells
Biological fluids

functional groups allow
its chemical conjugation

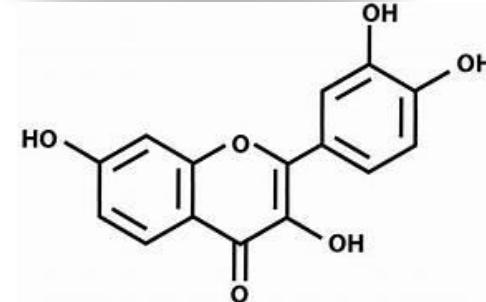
Immunomodulatory
anti-inflammatory, anticancer
Skin disease
Acne, Psoriasis



Methotrexate

Synergistic anti-inflammatory
activity, improve its skin delivery

Fisetin



Polyphenolic flavonoid (pigmented fruits)
Anti-inflammatory, antioxidant & anti-cancer effects

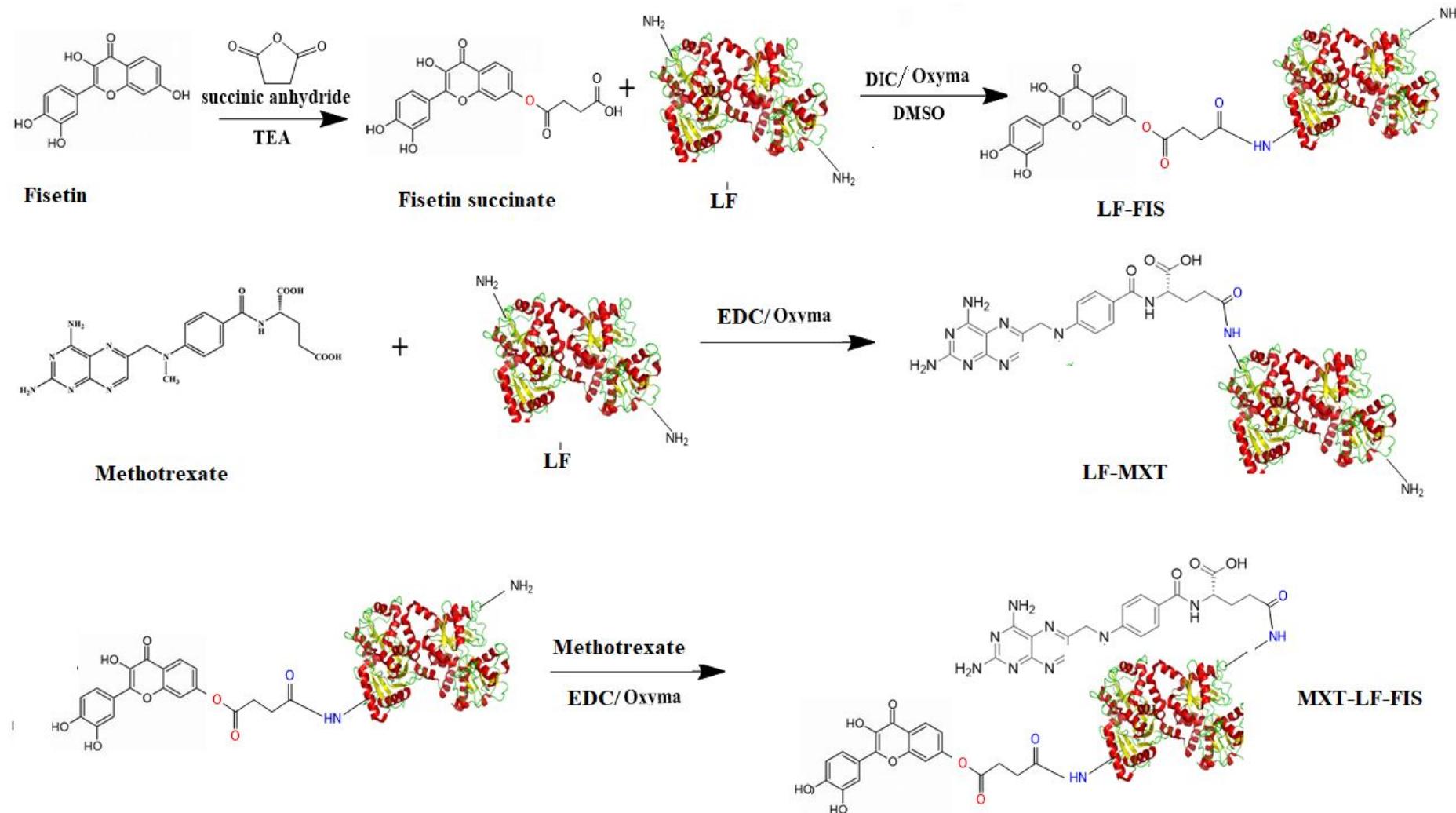
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Synthesis & characterization of MXT-LF-FIS conjugates



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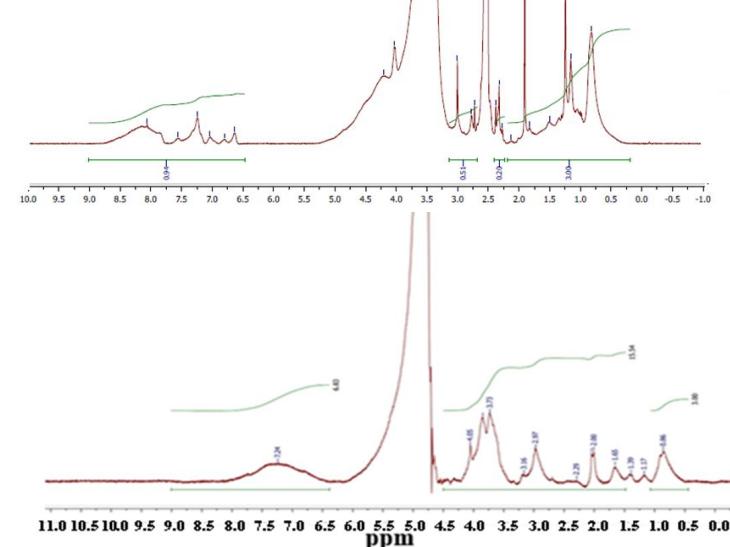
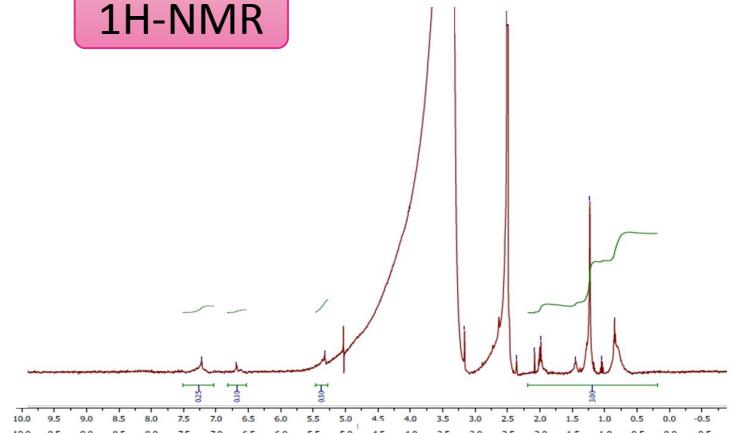
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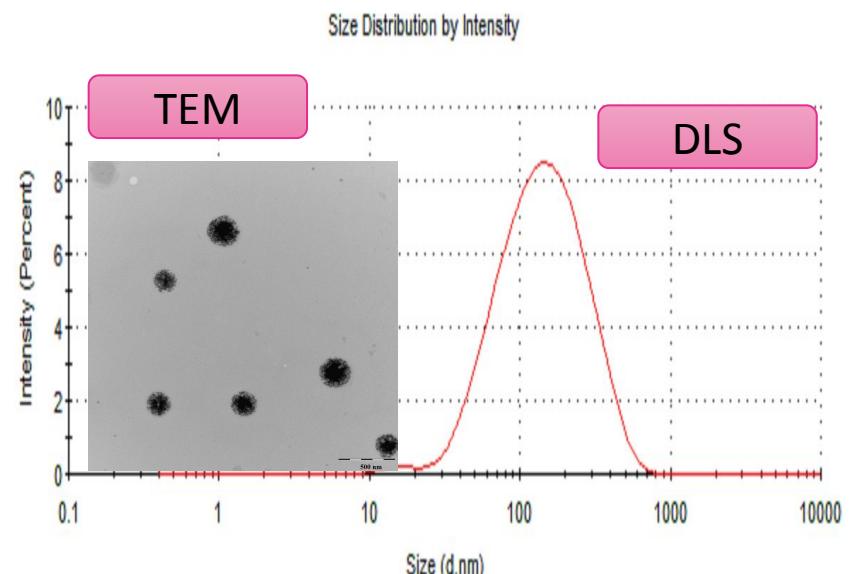
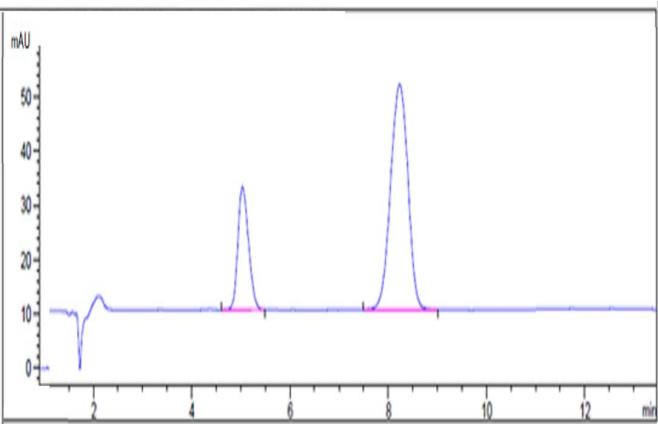
Conjugates characterization

1H-NMR

Conjugate	Drug Content (w/w)	Particle size (nm)	Zeta potential
LF-FIS	5.83%	126.2 ± 2.3	$+16.3 \pm 2.1$
LF-MXT	5.03%	130.2 ± 5.7	$+19.4 \pm 3.2$
MXT-LF-FIS	4.75% MXT, 5.56% FIS	164.3 ± 3.1	$+13.5 \pm 1.5$



HPLC



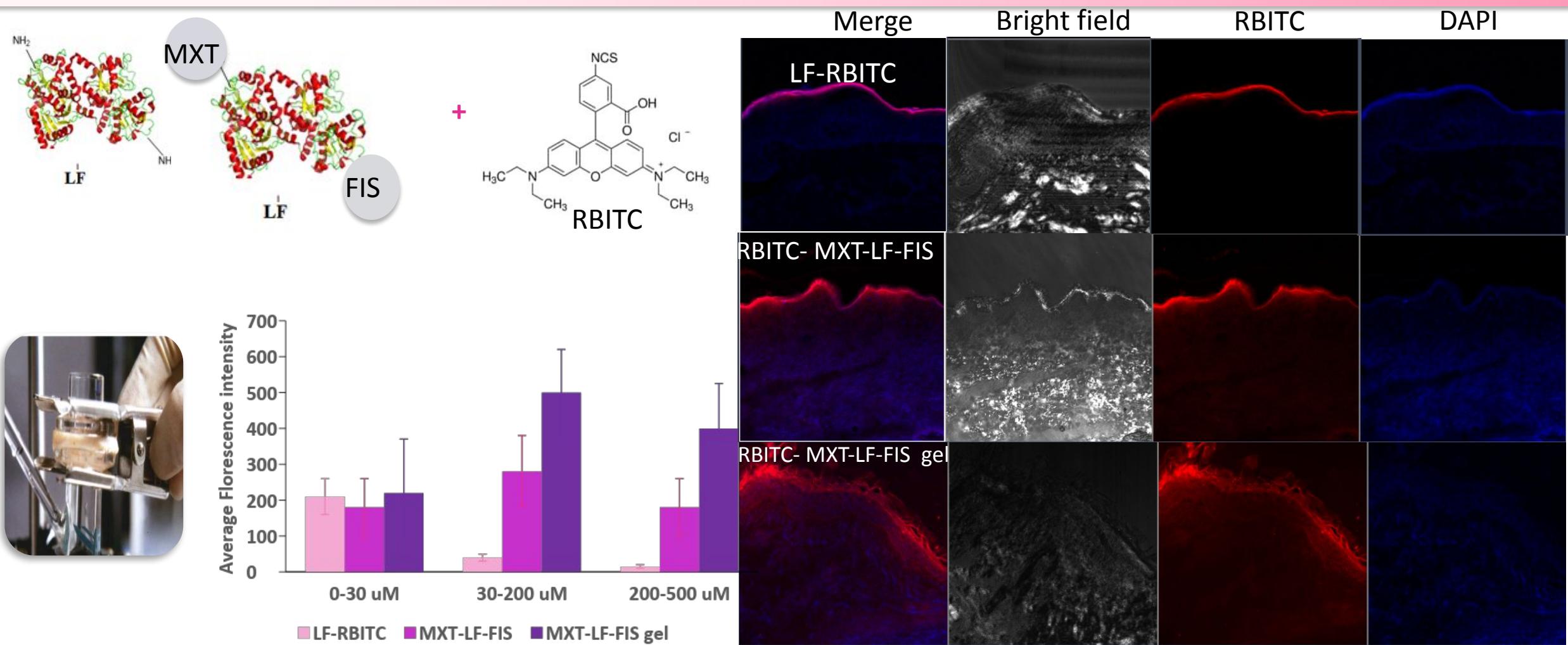
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Synthesis of fluorescent MXT-LF-FIS conjugates and Ex-vivo human skin permeation



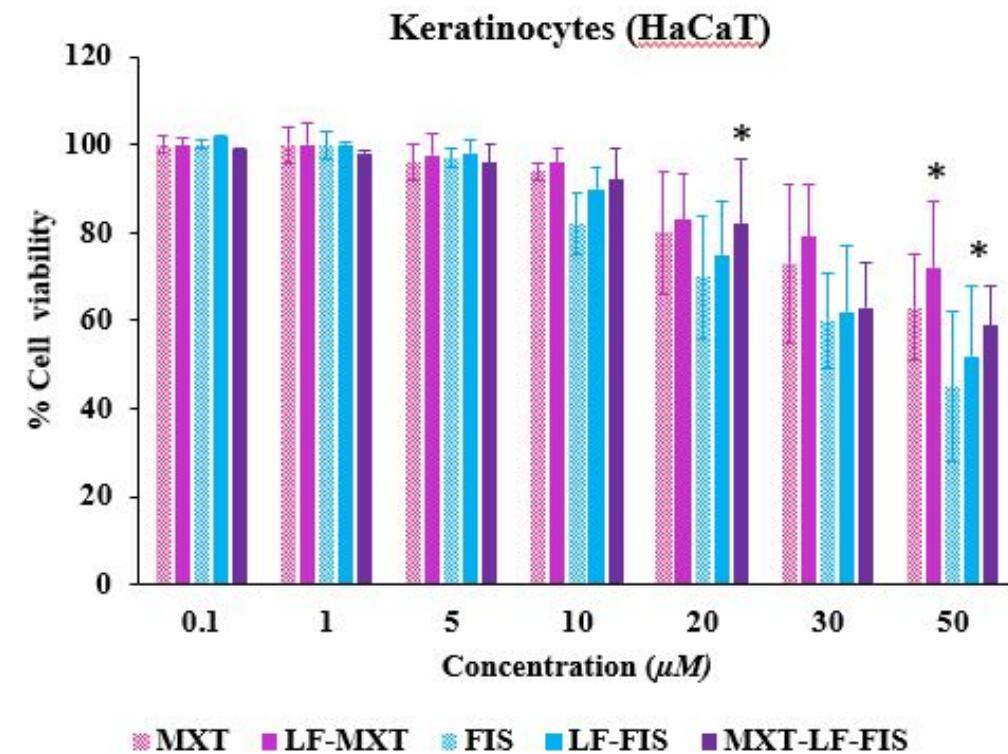
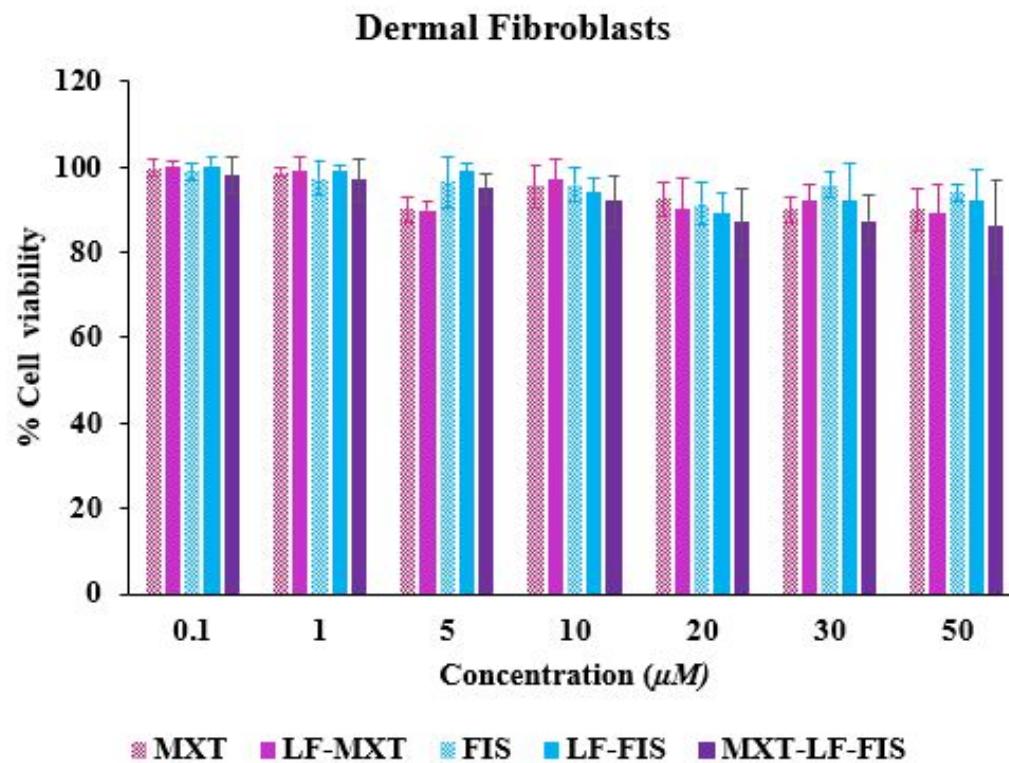
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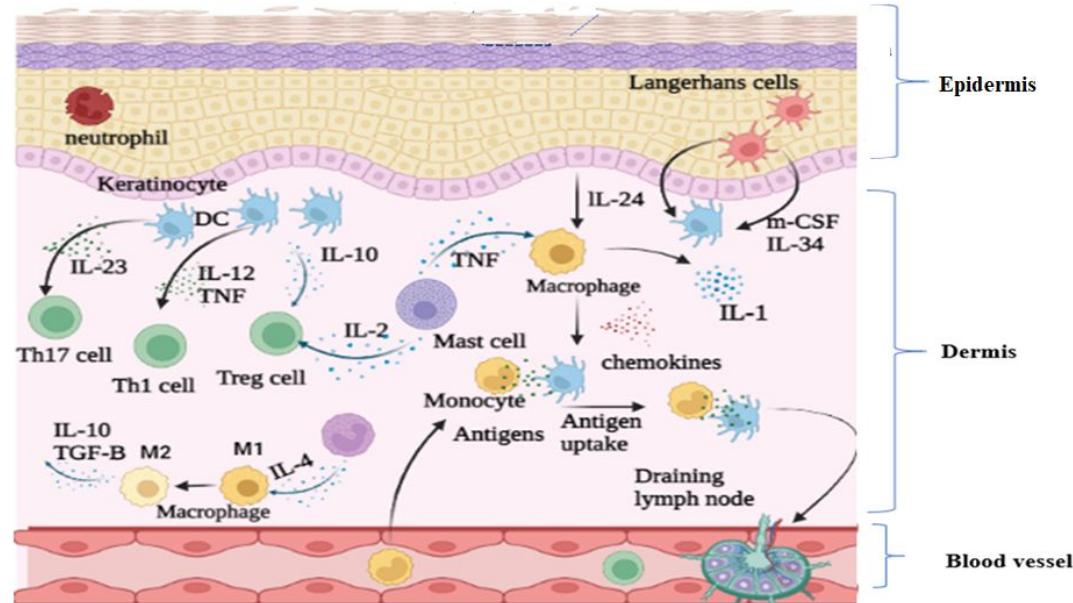
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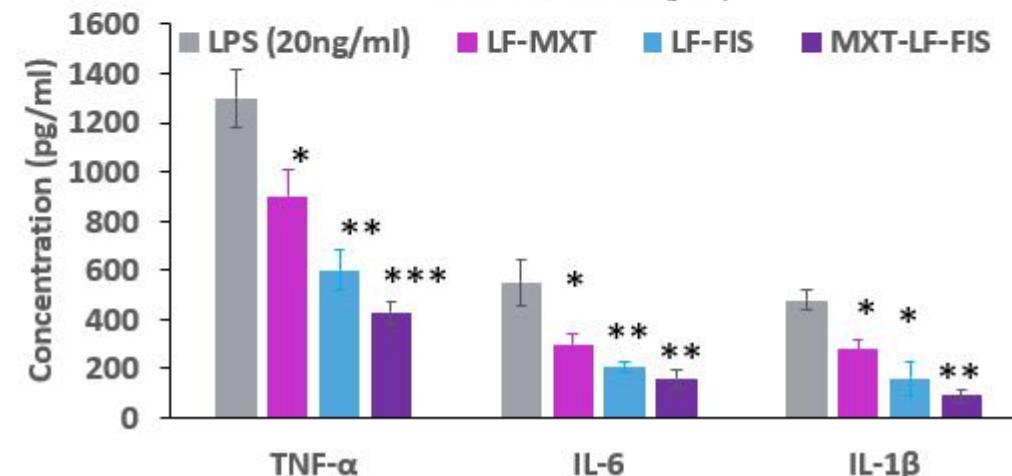
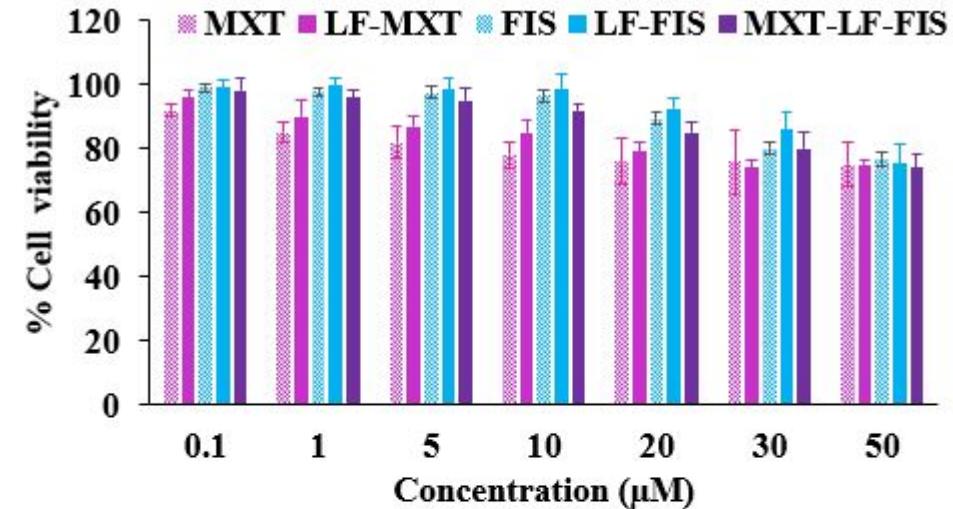
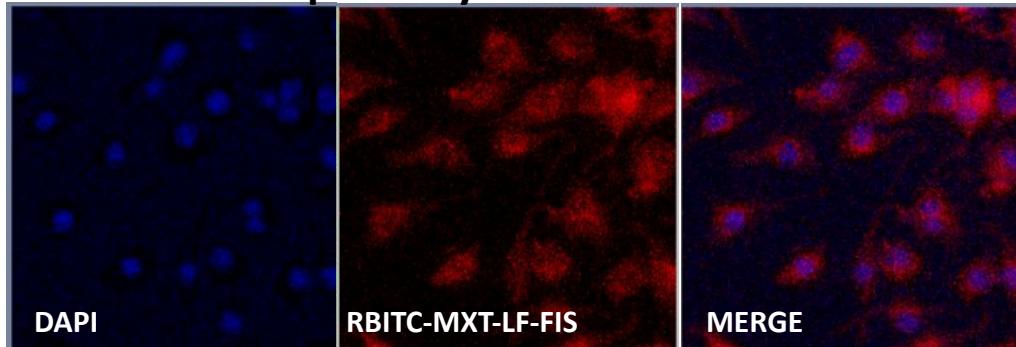
Effect on the viability of Dermal fibroblasts & keratinocytes (HaCaT)



Effect on the macrophage viability and production of inflammatory cytokines



Uptake by RAW 247.1

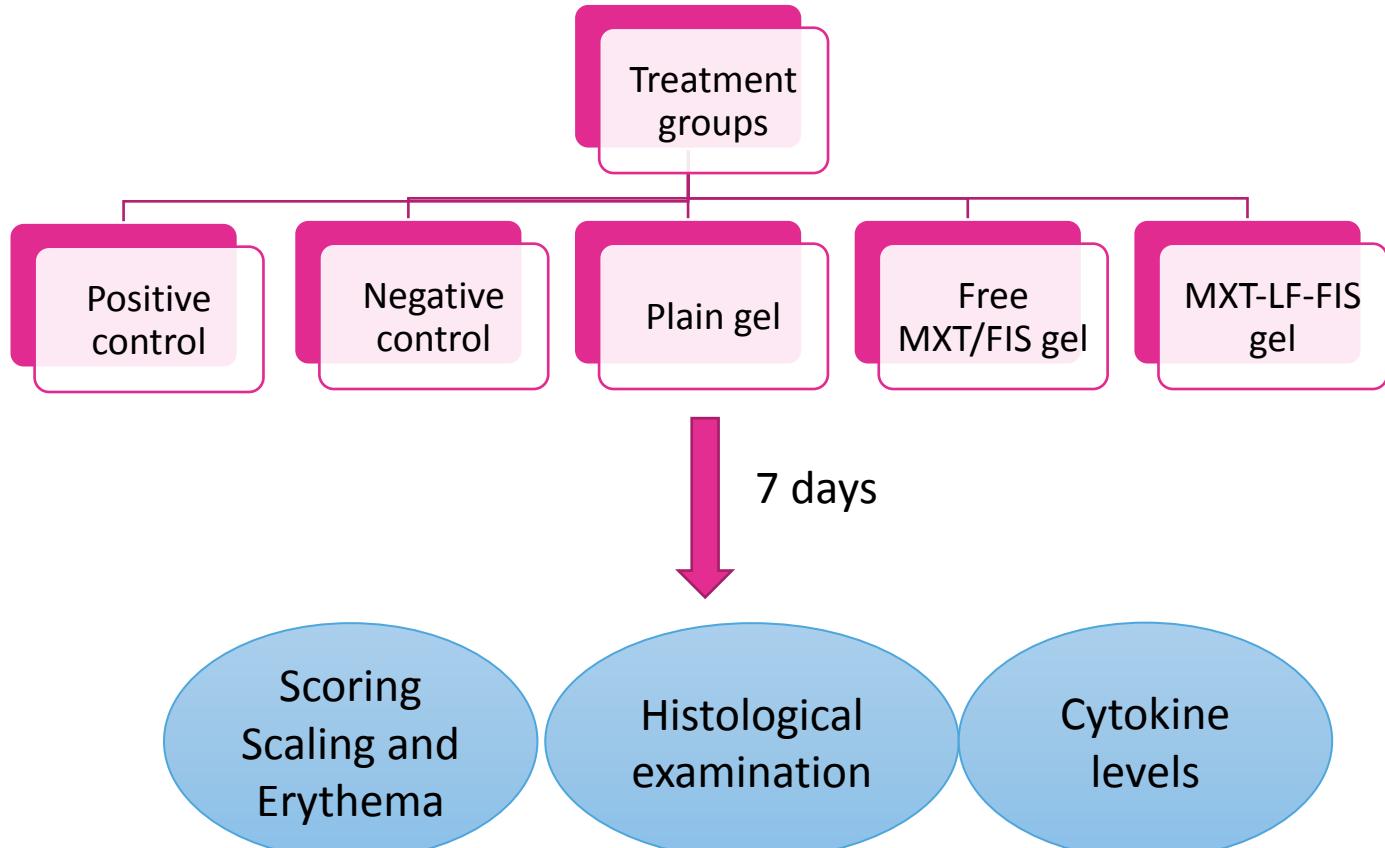
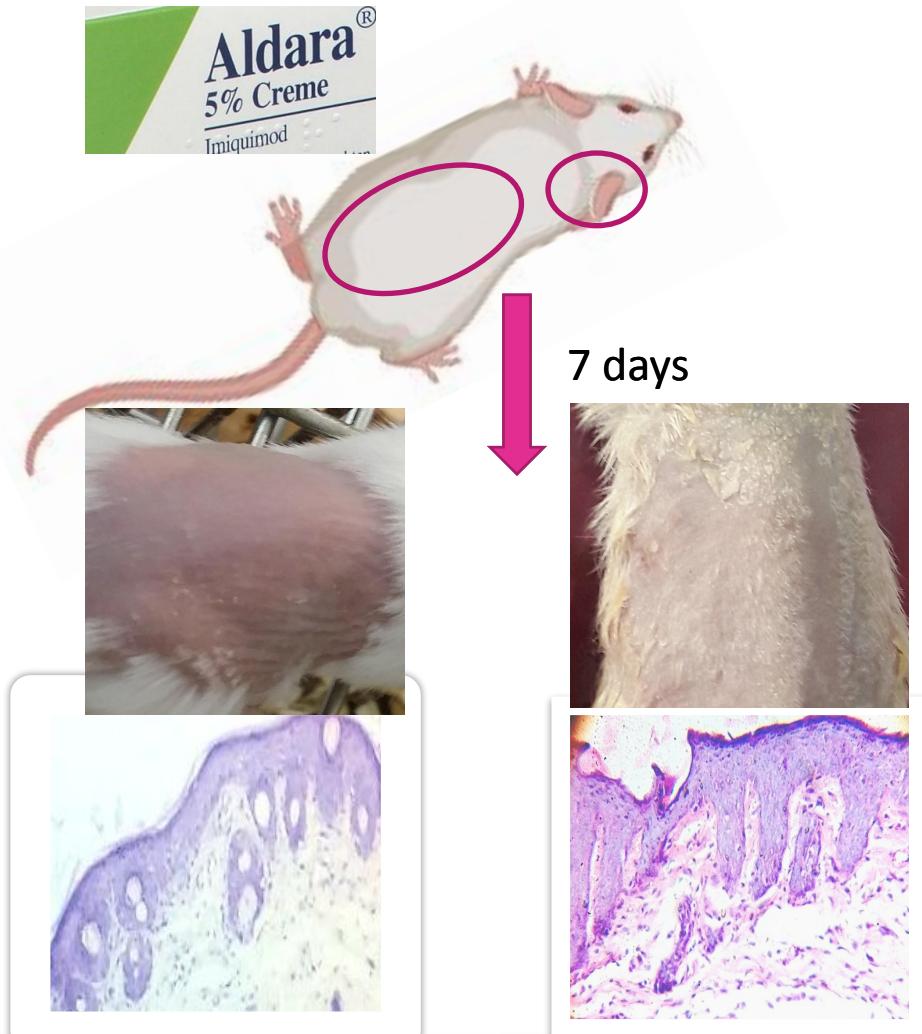


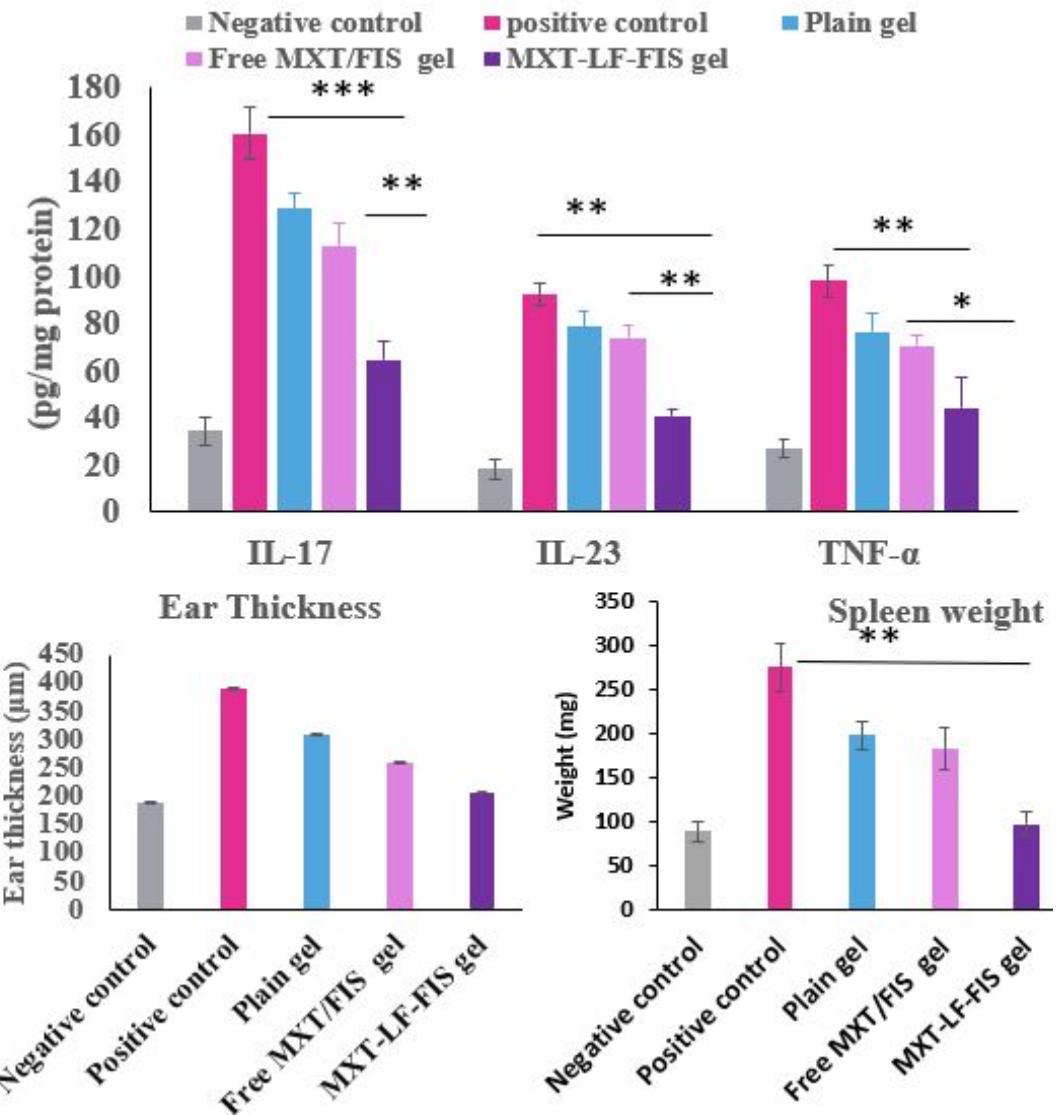
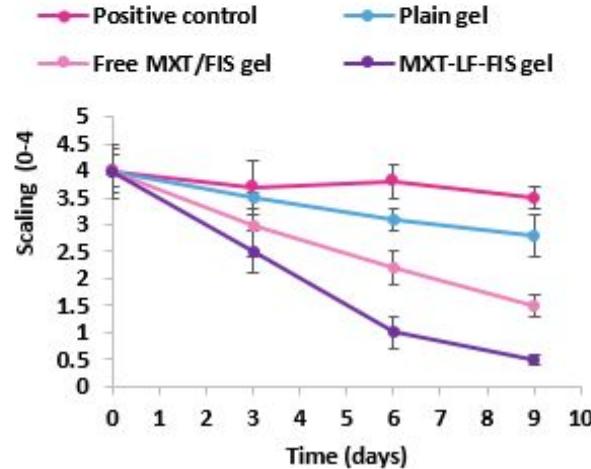
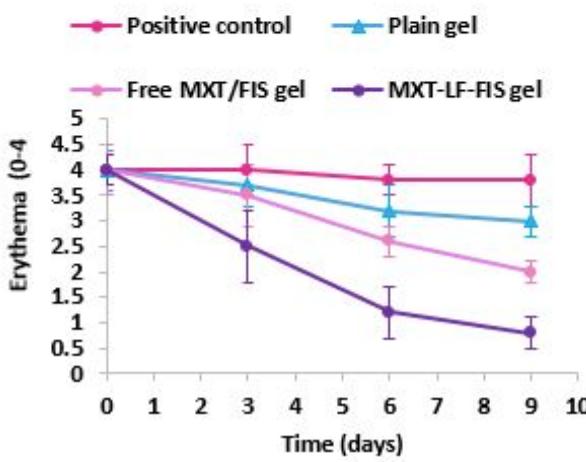
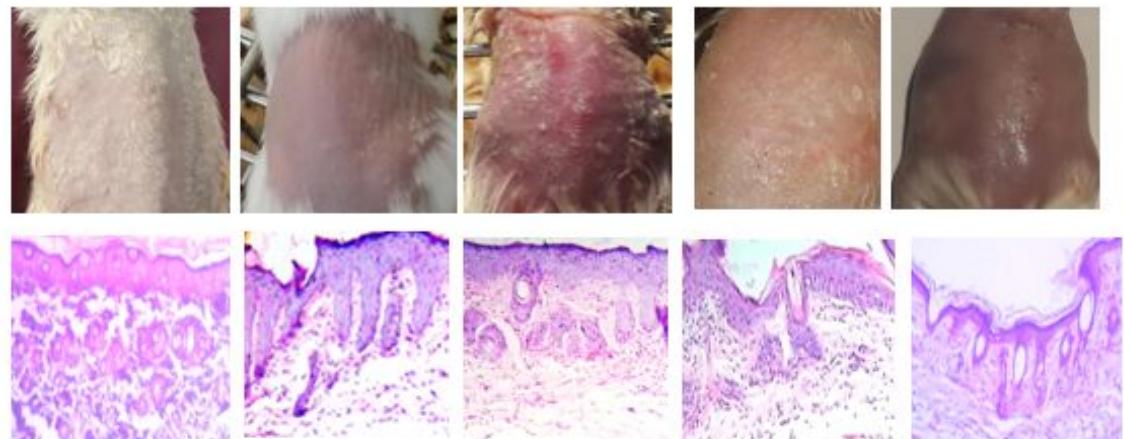
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In vivo antipsoriatic efficacy





Conclusion

We designed a localized treatment approach for psoriasis harnessing the bioactivity & structural functionality of GRAS natural components.

Conjugation of LF to hydrophobic drugs allows its dermal delivery & significantly improves the drugs' pharmacological activity

Alternative that can be clinically translated lowering the socioeconomic burden of the patient treatment in a safe, low-risk manner

Opens a **new horizon** in the field of localized dermal for aggressive skin diseases, such as cancer



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