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Topical Mitopure Study At-A-Glance

Overview

Background

Mitopure®, a pure form of Urolithin A, is a postbiotic molecule that has been clinically shown to activate mitophagy and improve biological hallmarks of aging, including mitochondrial dysfunction and inflammation.

Skin, a visible biomarker of aging, experiences intrinsic and extrinsic age-related decline, leading to visual changes including fine lines and wrinkles, thinning and dryness. This study evaluates whether topical Mitopure can safely and effectively target key biological drivers of skin aging and lead to clinical improvements.

Study Partners

L'Oréal and Lancôme, Research and Innovation Team, France. Clinical studies were conducted in partnership with SGS Proderm, Germany.

Publication

October 16, 2026 in **IScience**

Hypothesis

Topical Mitopure will improve biological drivers of skin aging, including mitochondrial health, inflammation and cellular senescence as well as clinical signs of aging, including wrinkle depth, hydration and collagen.

Study Design

Four trials are included in this paper

	Study Method	Outcomes Measured
Biological Impact	2D skin cell cultures 3D reconstructed human skin models Ex vivo skin explants (intact human skin tissue)	Mitochondrial respiration Mitophagy Inflammation (pro-inflammatory cytokines) Cellular senescence markers Extracellular matrix proteins, including collagen and hyaluronic acid Keratin proteins associated with the epidermis and barrier integrity
Skin Aging	Randomized placebo-controlled clinical trial of 48 Caucasian women aged 50-75 with a mean age of 58 who have mild-to-moderate wrinkles. 0.5% or 1.0% topical Mitopure was applied to one side of the face and a control cream was applied to the other twice daily for eight weeks.	Skin barrier function measured by transepidermal water loss (TEWL) Wrinkle depth measured using standardized facial photography to capture 3D structure of periorbital wrinkles at 2 and 8 weeks Skin hydration measured by a corneometer on the outermost layer of the skin and skin's water content at two and eight weeks Collagen organization pathways, measured by RNA-sequencing on forearm tissue samples containing epidermis and dermis, at baseline and after 8 weeks
UV-Protection	Randomized placebo-controlled clinical trial including 22 participants, 48% men, aged 18-65 with an average age of 44 Participants were randomized into either .5% or 1% Mitopure and cream applied to the skin after intentional and controlled UVB exposure	Protection from UV-induced photodamage (erythema)
Safety	Human Repeat-Insult Patch Test (HRIPT) on all 112 participants	Safety Irritation Sensitization

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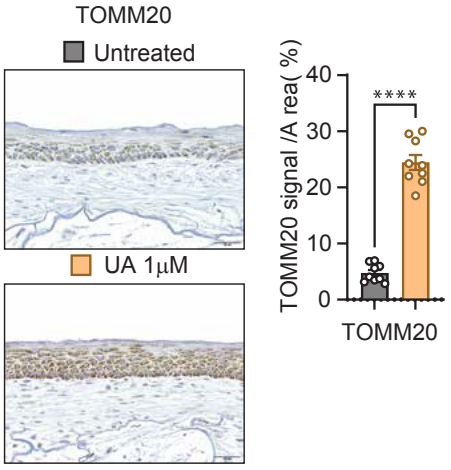
Study Findings
Biological Impact

Improves markers of mitochondrial function

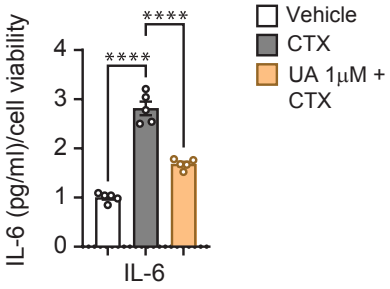
In human epidermal and dermal models, Mitopure improves markers of mitochondrial function, mitophagy and biogenesis.

Mitopure increases the number and efficiency of mitochondria in skin cells.

When applied to intrinsic skin aging models constructed of aged keratinocytes and fibroblasts, Mitopure improves mitochondrial respiration and mitochondrial content increases. Gene expression of mitophagy markers also increases.



TOMM20, a mitochondrial biomarker in the epidermal layer, increases with 1% Mitopure compared to control.



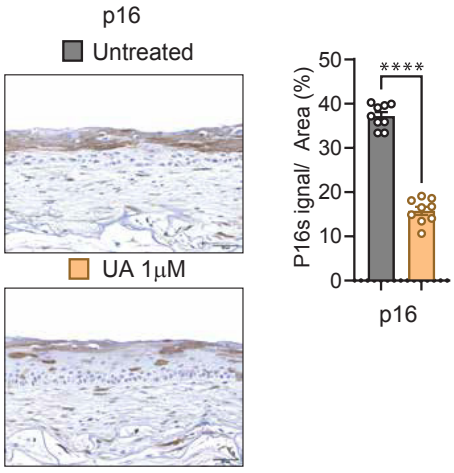
Decreases interleukin-6 (IL-6)

When applied to human epidermal keratinocytes, 1% Mitopure significantly reduces levels of cytokine IL-6, supporting the inflammatory response.

IL-6, a marker of inflammation, decreases with 1% Mitopure.

Improves markers of cellular senescence

When Mitopure is applied, genes associated with cellular senescence are downregulated, consistent with results seen in preclinical models.



P16, a hallmark of cellular senescence, markedly reduces in full-thickness skin model.

Improves skin quality

Mitopure improves both thickness and overall quality of the skin, promoting a healthy epidermis while preserving structural integrity.

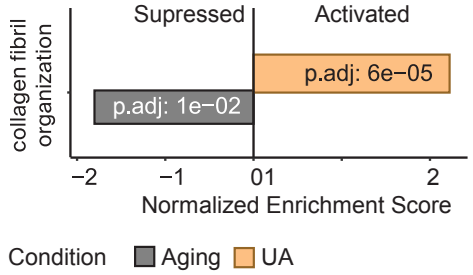
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Study Findings
Skin Aging

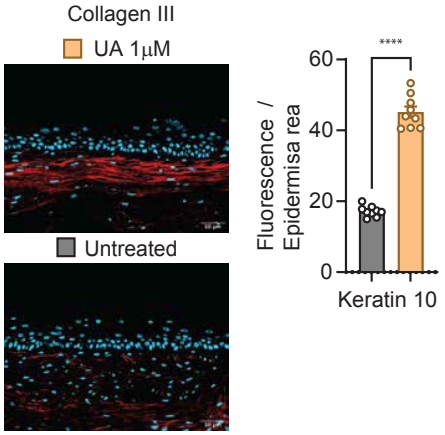
Increases collagen assembly and organization

After using 1% Mitopure for eight weeks, expression of genes related to collagen assembly and organization increase, including the skin's most abundant collagen types I and III, which are typically downregulated with age.

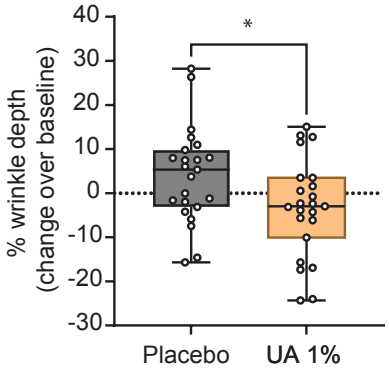


Genes related to collagen are activated in the Mitopure group.

Skin cell studies of the dermis also show that Mitopure increases collagen III, improving the quality and structure of the extracellular matrix.



Preclinically, collagen III increases in Mitopure-treated cells compared to control.



Reduces wrinkle depth

Wrinkle depth significantly reduces in participants using a topical cream with 1% Mitopure, with visible effects observed after just two weeks. Wrinkle depth continues to reduce significantly after eight weeks compared to placebo.

No statistically significant difference is observed between the 0.5% Mitopure group and placebo.

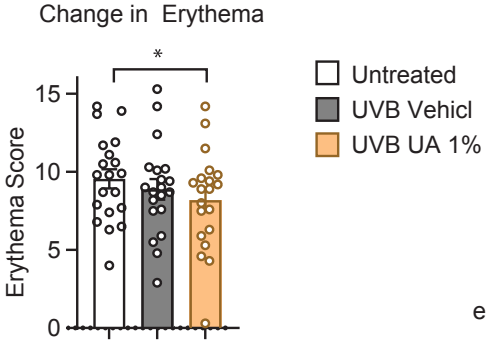
Wrinkle depth significantly reduces when 1% Mitopure is used compared to placebo.

Study Findings
UV Protection

Protects skin from photodamage

Inducing a mild-to-moderate sunburn increases redness levels in all groups. Post sunburn exposure, participants treated with 1% Mitopure have significantly less skin redness compared to the untreated group over 24 hours, indicating photodamage protection.

The increase in erythema and redness of the skin is lower in the 1% Mitopure group than control.



Reduces inflammatory response relative to UVB and UVA exposure

Skin cell studies also show that Mitopure reduces the inflammatory response and helps to protect the skin from oxidative damage triggered by UVB and UVA exposure.

Protects from environmental stressors

Preclinical studies show that Mitopure demonstrates a strong protective benefit from environmental stressors, including damage from UVA and PM10 exposure.

POWERED BY mitopure®

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Study Findings
Safety

Mitopure is safe and well-tolerated

Mitopure does not cause irritation or sensitivity at either dose. No skin reactions or adverse events were observed or reported by any participant.

Clinical Relevance

Topical 1% Mitopure targets multiple biological drivers and hallmarks of skin aging. This molecule addresses visible signs while also protecting the skin from external stressors.

Mitopure supports skin cells by activating mitophagy, improving mitochondrial function, supporting cellular senescence and reducing inflammatory response markers.

Mitopure supports collagen assembly and organization, contributing to improvements in the extracellular matrix that help maintain skin structure. Clinically, Mitopure improves wrinkle depth compared to placebo.

Wrinkles and visible signs of aging are closely linked to cellular stress, inflammatory response and structural degradation of the skin. By targeting underlying processes, Mitopure may help preserve skin integrity and function over time.

Skin is a visible biomarker of aging — a recognized component of health and longevity. By supporting key cellular pathways, Mitoure improves the appearance of skin and its health and resilience with age.

Read the Full Study

Topical application of urolithin A activates mitophagy and enhances mitochondrial function to promote skin longevity