

# Vitis Vinifera extract counteracts exposure aggressions in a 3D full-thickness human skin model exposed to different environmental stressors



Zhuo Cai<sup>1</sup>, Yuan Lu<sup>1</sup>, M. Albouy<sup>2</sup>, S. Heraud<sup>2</sup>, A. Thépot<sup>2</sup>, Bingjie Wang<sup>1</sup>, M. Dos Santos<sup>2</sup>

1. Guangzhou Yatsen Global Co., Ltd. 510030, Guangzhou, China  
2. LABSKIN CREATIONS, Edouard Herriot Hospital, Lyon, France

## Introduction

Several exposure aggressions, such as sunlight and pollution are known to affect the skin and can trigger molecular processes that accelerate premature skin aging through mechanisms including oxidative stress, inflammation, and impairment of skin functions [1]. Self-induced factors such as diet, smoking and other miscellaneous factors, including lifestyle choices and use of cosmetic products, also play a significant role in potentiating skin aging [2].

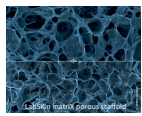
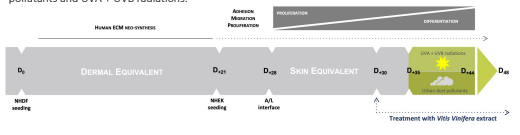
Vitis vinifera regarded as an important medicinal plant and its main active polyphenol, resveratrol, have shown considerable antioxidant properties, besides possessing protective and therapeutic effects against various skin complications such as inflammation and wound healing [3].

To protect the skin from numerous pollutants and daily stresses, we developed an innovative Vitis Vinifera extract and its effects on epidermal barrier and cohesion, dermal extracellular matrix synthesis and anti-oxidant were studied.

[1] Concepcion Parrado, et al. Front Pharmacol. 2019; 10: 759.  
[2] Jennifer Salsberg, et al. J Cosmet Dermatol. 2019 Jun;18(3):815-820.  
[3] Monika Michalak. Int J Mol Sci. 2022 Jan; 23(2): 585.

## Materials & Methods

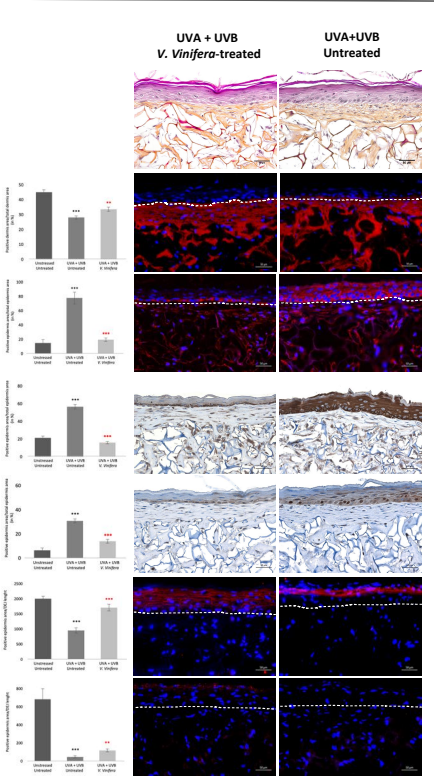
To validate the potential repairing properties of V. vinifera extract, a 3D full-thickness human skin model was developed, along with exposure to individual daily stresses including environmental pollutants and UVA + UVB radiations.



3D full-thickness reconstructed skin model was obtained by culturing NHDF in a scaffold made of collagen, glycosaminoglycans and chitosan (LabSkin matrix, Lyon, France) during 21 days under optimized cell culture conditions for ECM neo-synthesis. NHCK were then seeded on the top of the dermal equivalent constructs and raised at the air/liquid interface to allow the formation of the epidermal compartment.

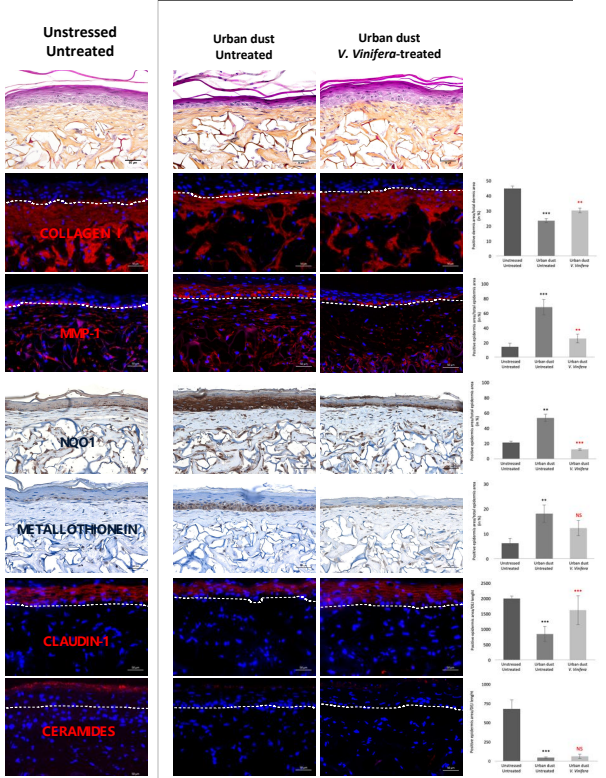
## Results & Discussion

### UVA<sub>A</sub>+UV<sub>B</sub> EXPOSURE



Vitis vinifera protects from UVA+UVB cutaneous alterations in a 3D full-thickness reconstructed skin model

### URBAN POLLUTION



Vitis vinifera prevents pollution-related deleterious effects in a 3D full-thickness reconstructed model

## Conclusions

All environmental stresses individually applied to our 3D skin model significantly affected both cellular and tissular functionalities. Comparatively to the unstressed control condition, our results demonstrated a significant increase in MMP-1, NQO1, and metallothionein expression and a decrease in type I collagen, filaggrin, claudin-1, ceramides, and LCE-1A expression, in our 3D skin model either exposed to UVA and UVB radiations and urban dust.

In conclusion, the application of V. vinifera significantly counteracts the effects of exposure aggressions in an *in vitro* skin model, suggesting its protective effects against daily UV and pollutant exposure.