A new royal jasmine extract to connect skin biology and emotions through Piezo1 mechanoreceptors.

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Introduction of research

In skin, multiple mechanisms exist to sense, transduce, and transmit force. These mechanisms include mechanosensitive ion channels (e.g., Piezo channels), and E-cadherin-based cell-cell adhesions. Mechanical forces drive the modelling of tissues, this relies on the transmission of forces between cells by adherens junctions. E-cadherin potentiates the mechanosensitivity of the Piezo1 channel (1). E-cadherin integrates mechanotransduction as they are under constitutive actomyosin-generated tension that is increased at cell–cell contacts (2). Activation of the piezo1 receptor converts physical force into biochemical information and is involved in maintaining of tissue organization. Thanks to piezo1, epidermal keratinocytes mediate touch sensation by detecting and encoding tactile information to sensory neurons (3, 4). Pleasant touch plays a crucial role in behavior and social communication and is associated with Oxytocin increase and release. Oxytocin is a key modulator in regulating social behavior and affective processing (5). More specifically, it has been reported that stroking touch and massage facilitate endogenous Oxytocin release. Our research suggests that the piezo1/E-cadherins interactions should be linked to activation of the Oxytocinergic system, including its powerful anti-aging, anti-stress effects (6, 7).

Methodology

The extraction process of the *Jasminum Grandiflorum* flower uses the phytobiome of jasmine flowers to orchestrate phytocompounds biotransformation, without any addition of exogenous microorganisms' source. Expression of piezo1, E-cadherin, and Oxytocin were monitored by immunohistochemistry, and ELISA assay. Antagonist Dooku1 was used for piezo1 receptor inhibition. At the clinical level, emotional well-being was assessed using an innovative protocol based on three criteria: physiological well-being (measurement of Oxytocin in saliva), psychological well-being (WHO-5 Well-being Index questionnaire well-being questionnaire) and emotional expression, measured by patented biometric technology, Emotion capture©.

Results.

Expression studies using reconstructed human epidermis (RHE) models have revealed that the expression of piezo1 decrease can be associated with aging (Fig. 1A). Oxytocin receptor (OXTR) expression

decreased (-29%) in an induced-senescent RHE (Fig. 1B). Both pathways are linked to expression changes in relation to aging.

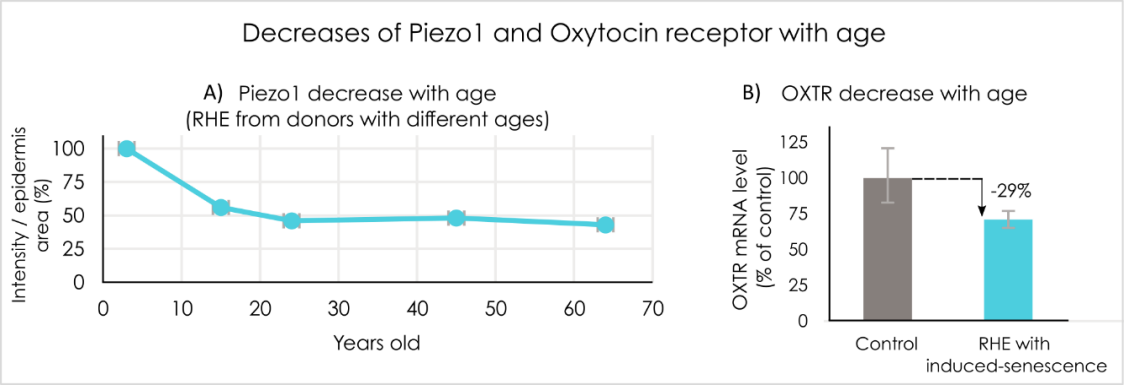


Figure 1: Expression of piezo1 protein and OXTR mRNA with aging. (A) Quantification of Piezo1 expression in reconstructed epidermis. Keratinocytes from donors with various ages were used. (B) Quantification of OXTR mRNA by qPCR in RHE. Foxo3 expression was silenced with a siRNA to induce the senescence.

Inhibition of piezo1 activity by the antagonist Dooku1 decreased E-cadherins and Oxytocin expression. Application of a *Jasminum grandiflorum* extract resulted in preservation of both E-cadherin and Oxytocin level compared to Dooku1 condition (Fig. 2A). Oxytocin is a secreted molecule, and an inhibition of piezo1 activity reduced its release in the *ex vivo* skin culture media. Application of the *Jasminum grandiflorum* extract resulted in a preserved level of Oxytocin released compared to Dooku1 condition (Fig. 2B).

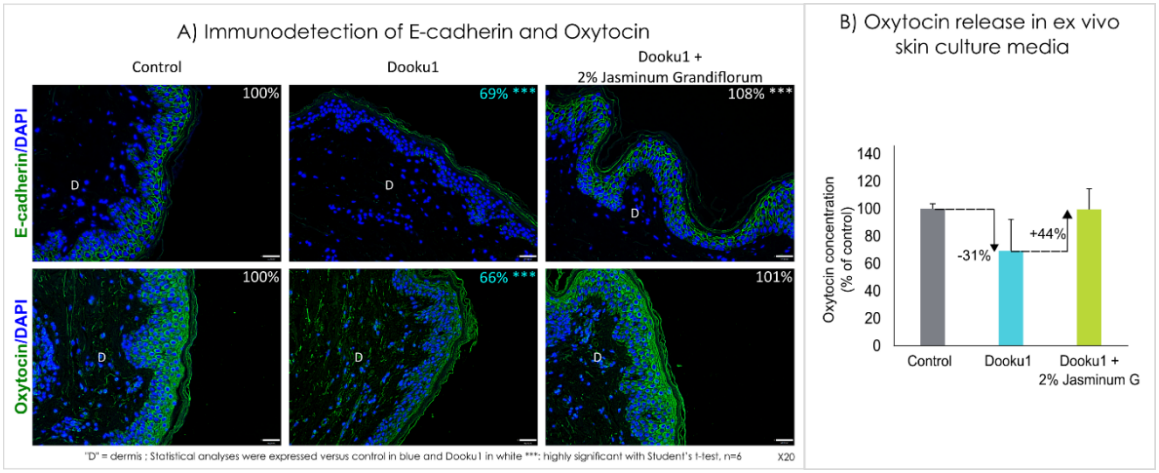
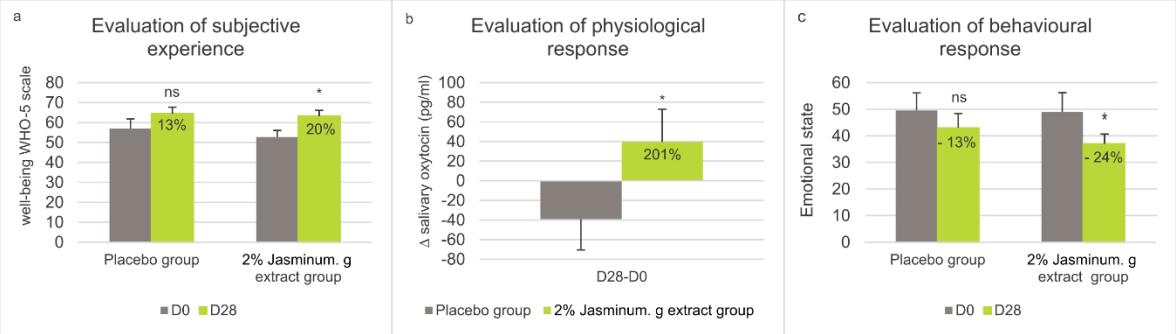


Figure 2: Inhibition of PIEZO1 channel in *ex vivo* skin biopsies. A) Immuno detection of E-cadherin and Oxytocin in *ex vivo* human skin treated with Dooku1, and the *Jasminum Grandiflorum* extract at 2% for 48 hours. B) ELISA quantification of Oxytocin released in the *ex vivo* skin culture media. ELISA was performed in the collected culture media of *ex vivo* skin biopsies treated with Dooku1 and the *Jasminum Grandiflorum* extract at 2% for 48 hours.

The emotional well-being provided to volunteers by applying a cream containing *Jasminum Grandiflorum* extract at 2% was compared to a group of volunteers applying a placebo cream. After 1 month of applications, the WHO-5 Well-being Index questionnaire showed a higher level of wellness felt for the group applying the formula containing *Jasminum Grandiflorum* extract (Fig. 3A). Moreover, this same group, revealed a higher level of salivary oxytocin than the placebo group (Fig. 3B). Finally, the real-time recording of emotions on the panel of volunteers, showed a lower real-time stress level in the group that applied the formula containing *Jasminum Grandiflorum* extract compared to the placebo group. (Fig. 3C).



Conclusion.

The *Jasminum Grandiflorum* extract has been shown to preserve the skin mechanics. For the first time, our results have shown that the use of a phytofermented cosmetic ingredient derived from *Jasmine Grandiflorum* would biologically activate sensors, release molecules such as Oxytocin into the skin.

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About the speaker

Isabelle Imbert, Ph.D.

Dr. Imbert joined ISP in 2007 through the company's acquisition of Vincience in Sophia-Antipolis, France. She holds a Ph.D. in Molecular and Cellular Biology from the University of Montpellier (Institute of Human Genetics, CNRS, Montpellier, France).

Dr. Imbert specialized in cancer research for her post-doctoral studies at the St Jude Children's Research Hospital in Memphis. In 2001, she joined the cosmetic industry. Her main research interest consisted in adapting the latest outcomes in the fields of Biology and Molecular sciences to the cosmetic industry.

Since 2011, Dr. Imbert holds a global role in Ashland focusing on the development of innovative skin care technologies and concepts for biofunctionals.

She is currently leading the R&D facilities for Biofunctionals and Naturals in Sophia-Antipolis, France. Part of her role consists in supporting Ashland biofunctionals sustainability program by promoting local biodiversity and ethical sourcing.

She frequently publishes on Ashland biofunctionals innovative research and development in scientific and cosmetic journals. Dr. Imbert is a member of the Society of Investigative Dermatology, Society of Cosmetic Chemists and the French Society of Cosmetology.