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Cytoprotection effect of an active formulation against osmotic stress in keratinocytes

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Statement of the Problem: The stratum corneum is subject to an osmotic gradient, impacting its barrier function. The aim of our study was to: Establish conditions for the induction of an efficient osmotic stress (OS) after Sorbitol (S) treatment in human epidermal keratinocytes (HEK); Evaluate the expression of OS-associated genes by qPCR; Determine the potential of an active formulation (AF) to induce osmoprotective effects in OS-treated cells using microarrays; Identify molecular pathways involved in the response and validate the modulated expression of AF-induced genes using qPCR.

Methodology & Theoretical Orientation: HEK were treated with S at concentration between 25-300 mM in media and cell growth-migration (IncuCyte®) was performed to define optimal concentration of OS (100-200 mM). RNAs were extracted and retrotranscribed from HEK: Non-treated, S-treated, AF pre-treated with S (200 mM) and without S for 8-24 hours. Gene expression profiles were deduced from microarrays (Agilent technology) and AF-modulated genes are analyzed with PredictSearch™ to identify molecular pathways. Modulation of gene expression was confirmed by qPCR.

Findings: In line with other studies, stress induced-genes (IER3-HSPA2-HSPH1), skin differentiation (AQP3-IVL-S100A9) and repression of pro-inflammation (IL1b-IL8) was observed in S-treated keratinocytes. AF was able to decrease the stress induced-genes and AQP3 expression. Additionally, among AF induced-genes, several of them (GCLC-GPX2-TALDO1) are involved in glutathione synthesis and its reduction.

Conclusion & Significance: Our results suggested that AF elicits an osmoprotection activity as well as antioxidant effects against OS through the strong positive regulation of various genes involved in glutathione synthesis and its reduction

Biography

Carole Gard is the Director of Pharmaceutical Affairs at Horus Pharma, a pharmaceutical company based in France. She is a Pharmacist and has been working for 13 years in this company specialized in ophthalmological and dermatological products. Her area of expertise, rigor and passion lead her to manage many R&D projects in order to develop preservative free and innovative therapeutic products.

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