ACNE, ROSACEA, AND RELATED DISORDERS (INCLUDING HIDRADENITIS SUPPURATIVA)

MOISTURIZING AND ANTI-SEBUM EFFECTS OF A HYALURONAN DERIVATIVE

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Background: High water content combined with low sebum secretion are regarded as positive features for human skin. However, sebum over production is very common as multiple intrinsic or extrinsic factors can dysregulate it. Oily skin appearance, discomfort and acne occurrence lead to consumers strong request for sebum reduction.

Objective: To meet this demand together with maintaining a good epidermal hydration, we designed a cosmetic ingredient (MSH) that both limits sebum and stimulates hydration.

Materials and Methods: Anti-sebum effect was evaluated on immortalized human sebocytes pre-incubated with MSH during 24 hours before lipogenesis induction. Intracellular lipids were stained with the fluorescent probe Bodipy® then quantified.
Moisturizing effect was studied on HaCaT keratinocytes exposed to MSH during 24 hours. Hyaluronic acid (HA) release was assessed, by ELISA kit after 48 hours.
Mechanistic comprehension was obtained through CD44 (HA receptor) immunostaining, in both cell types and through mRNA hyaluronan synthase 3 (HAS 3) analysis by reverse transcription-polymerase chain reaction in keratinocytes (RT-QPCR). Both proteins are implicated in a recently discovered metabolic platform called “hyalurosome”. Formation of filopodia, (fine cytoplasmic extensions holding the hyalurosome), were visualized on human keratinocyte after actin staining. Finally, the expression of the lipogenic enzyme 11ß-hydrosteroid dehydrogenase type 1 (11ß-HSD1) was evaluated by immunostaining.

Results: In vitro tests show that MSH dose-dependently limit lipids accumulation in sebocytes and enhances HA production in keratinocytes. Both mechanisms of action rely on the interaction between MSH and the CD44 receptor which is expressed by sebocytes and keratinocytes. HAS 3, is activated upon MSH-induced assembly of the “hyalurosome”. This assembly was evidenced by the formation of multiple filopodia protruding from keratinocytes cell membrane. In sebocytes, MSH inhibits the activity of 11ß-HSD1.

Conclusions: Thanks to an original mechanism of action, our hyaluronan derivative MSH combines two complementary properties: moisturization and sebum reduction.