

Symposium: Fakten und Trends in der Dermokosmetik

Riechrezeptoren in der Haut – Verbesserung der Wundheilung und der Hautregeneration durch Sandelholzduft

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As the outermost barrier of the body, the skin is exposed to multiple environmental factors, including temperature, humidity, mechanical stress, and chemical stimuli such as odorants that are often used in cosmetic articles. Keratinocytes, the major cell type of the epidermal layer, express a variety of different sensory receptors that enable them to react to various environmental stimuli and process information in the skin.

Here we report the identification of a novel type of chemoreceptors in human keratinocytes, the olfactory receptors (ORs). We cloned and functionally expressed the cutaneous OR, OR2AT4, and identified Sandalore, a synthetic sandalwood odorant, as an agonist of this receptor. Sandalore induces strong Ca^{2+} signals in cultured human keratinocytes, which are mediated by OR2AT4, as demonstrated by receptor knockdown experiments using RNA interference. The activation of OR2AT4 induces a cAMP-dependent pathway and phosphorylation of extracellular signalregulated kinases (Erk1/2) and p38 mitogen-activated protein kinases (p38 MAPK). Moreover, the long-term stimulation of keratinocytes with Sandalore positively affected cell proliferation and migration, and regeneration of keratinocyte monolayers in an in vitro wound scratch assay.

These findings combined with our studies on human skin organ cultures strongly indicate that the OR 2AT4 is involved in human keratinocyte re-epithelialization during wound-healing processes.

Literature

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3. J Biol Chem (2016) 291 (34):17772-86

