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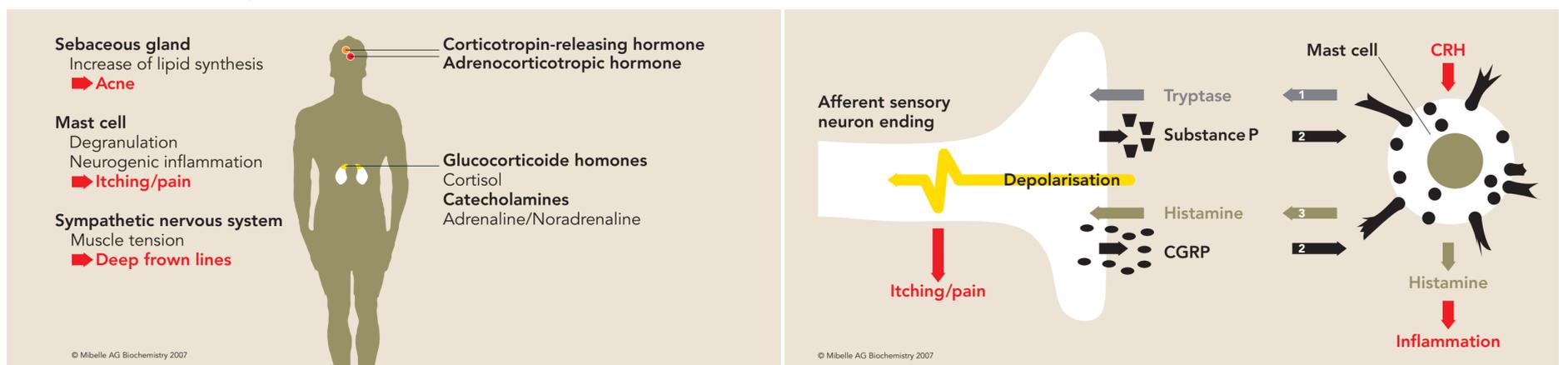
# Psychological Stress and Negative Skin Reactions. Biochemical Background and Cosmetic Solutions.

## Objective

Psychological stress such as anxiety attacks, depression, overwork, frustration, fear, divorce or exams has negative effects on healthy skin. It delays wound healing, impairs the skin's immune response and worsens skin diseases such as atopic dermatitis, psoriasis and acne. The biochemical mechanisms of these reactions are now studied and treatments investigated. Cosmetic products with appropriate ingredients may be developed to alleviate skin reactions induced by psychological stress.

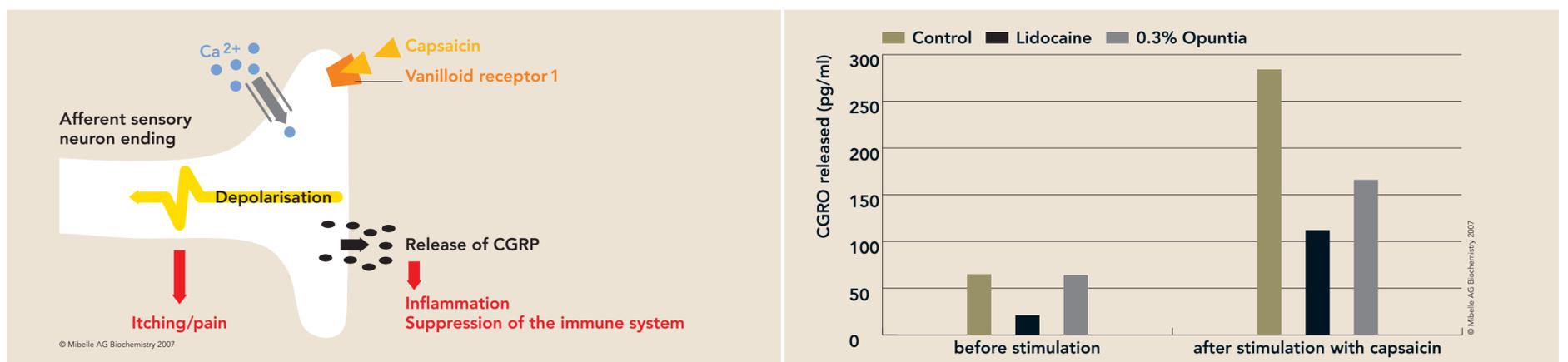
## Introduction

Upon perception of psychological stress the hypothalamic-pituitary-adrenal axis is stimulated, leading to the release of glucocorticoids and activation of the sympathetic nervous system by catecholamines. Peripheral effects in the skin are mediated by receptors for corticotropin-releasing hormone (CRH) on mast cells and on sebocytes.

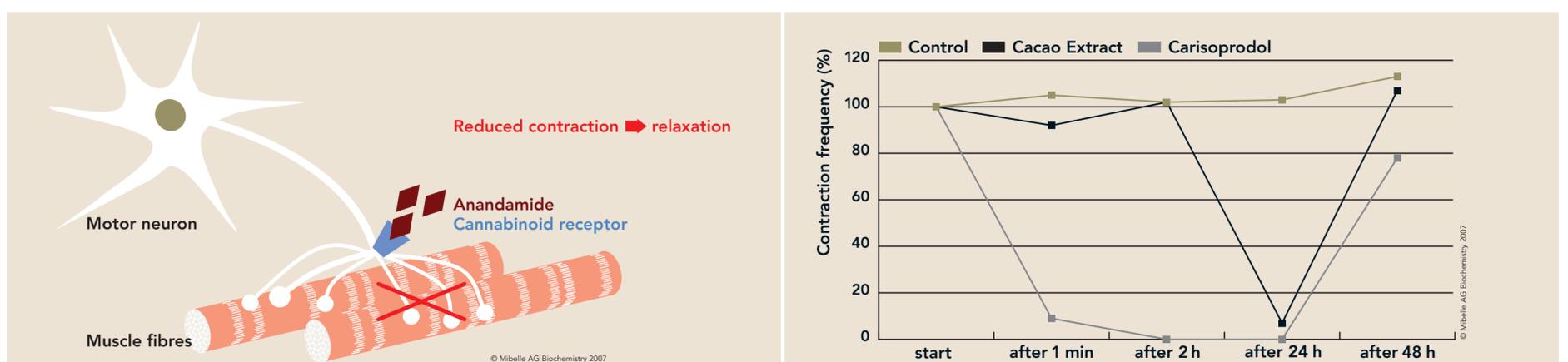


## In Vitro Test Systems and Results

A co-culture model of keratinocytes with sensory neurons was established to screen for actives with soothing and calming activity. An extract of *Opuntia streptacantha* was found to significantly reduce CGRP release from sensory nerve cells after capsaicin stimulation.



A co-culture model of muscle cells with dorsal root ganglia was used to demonstrate the muscle relaxation activity of a cacao bean extract containing the endocannabinoid anandamide.



## Conclusions

Cosmetic products containing the *Opuntia* cactus extract or anandamide from cacao beans may be used to alleviate skin reactions induced by psychological stress. However, long term in vivo studies need to be performed to show that these formulations can really interact with the very complicated biochemical reactions taking place under chronic psychological stress to reduce visibly negative effects on the skin.