

NEUROCOSMETIC ACTIVE TO LOOK AND FEEL GOOD

To address the growing trend of emotional wellbeing and self-care in beauty, TiMOOD™ is a novel neurocosmetic active ingredient that provides skin benefits but also improves emotional wellbeing via the skin-brain axis. Based on timut pepper, a spice plant from the Himalayas, TiMOOD™ can improve neuronal function in the skin and thereby support a healthy-looking and even skin complexion. Moreover, TiMOOD™ positively influences the mood and emotional wellbeing of stressed people, as assessed by a non-verbal neuropsychological test, which was applied for the first time in the field of neurocosmetics.

EMOTIONAL WELLBEING AND SKINCARE

In a global society characterized by more and more people feeling stressed, the concept of emotional wellbeing, which is the ability to adapt to stressful situations and produce positive emotions, has become increasingly important. Whereas self-care in beauty, such as beauty rituals, can help to boost mental health, a more relaxed state of mind, in turn, can improve skin appearance, as stress is a well-known inducer of skin problems. Skin that feels good can boost one's mood; not only consciously due to a visible improvement of the facial appearance but also unconsciously via the skin-brain axis.

THE SKIN-BRAIN CONNECTION

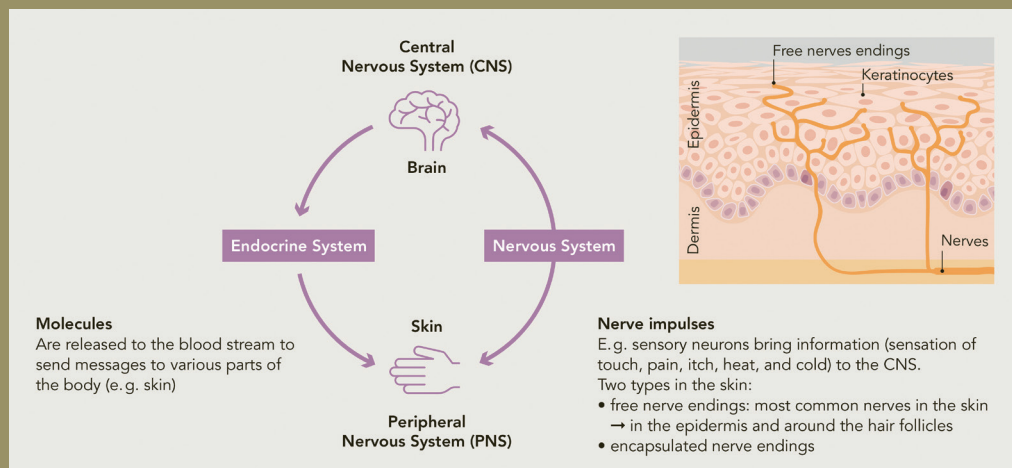
The skin and the brain are linked by several systems. The endocrine system transfers information from the brain to the skin indirectly through the release of molecules, whereas the nervous system directly links the brain and the skin through the presence of nerve cells. Our skin contains a dense network of sensory neurons, which are peripheral nerve cells that link the skin and the brain. The epidermis is characterized by the endings of such neurons, which can be encapsulated or free nerve endings. The supply of the skin with nerves is called skin innervation and functions as a sensor to warn the body of danger,

such as heat coming from the environment. Cutaneous nerves, however, also respond to endogenous stimuli and emotions. Sensory neurons can impact physiological functions, such as inflammation and cell growth, and thus skin health through secreted factors, which are called neuropeptides. Aged skin shows a natural decline of skin innervation, which may be linked to impaired skin functions and skin-brain communication.

TIMUT PEPPER – A SPICE PLANT WITH HEALTH BENEFITS

Timut pepper (*Zanthoxylum alatum / armatum*) grows as shrub in the southern parts of the Himalayas. As member of the citrus family, the fruit has

a characteristic grapefruit-like taste but also a tongue-tingling sensation like the closely related Sichuan pepper, although it is not a real pepper. Timut pepper, which is also called Nepalese pepper, is one of the most important spices in Nepalese, Bhutanese, and Tibetan cuisine. Due to their biological activities like antiviral, anti-inflammatory, and antioxidant effects, the bark, seeds, and fruits of timut pepper have a long history in traditional medicine and are used to treat depression, gastrointestinal and digestive disorders, as well as for the topical treatment of toothache, skin irritation, and wounds. In our research, we have already studied a timut pepper extract for application in food supplements and we could show that it can improve cognitive functions in terms of both learning and memory benefits, especially by improving the speed of performing tasks, which may indicate improved neural efficiency.





TIMOOD™ FROM TIMUT PEPPER

TIMOOD™ is a novel neurocosmetic active based on timut pepper. For the active ingredient TIMOOD™, fruits of wild timut pepper plants are sustainably harvested in rural areas of Nepal. To produce TIMOOD™, sun-dried fruits are extracted with water and glycerol. TIMOOD™ not only protects neurons from ageing and thereby supports a healthy and even skin complexion, but also improves wellbeing in stressful times.



TIMUT PEPPER EXTRACT PROTECTS NEURONS FROM AGEING

The ability of TIMOOD™ to protect skin innervation was tested in a co-culture model of human sensory neurons and keratinocytes, treated

with timut pepper extract. As neurons do not divide, the number of cells decreased during the study due to the natural loss of some neurons, mimicking an ageing process. Treatment with timut pepper extract led to a significantly higher number of sensory neurons and increased neurite length compared to the untreated control as assessed by immunostaining. In the same study, timut pepper extract was found to increase the proliferation rate of keratinocytes and the release of dopamine. A higher number of keratinocytes could enhance the growth of neurites by growth factor release. Dopamine, a neurotransmitter mainly released by neurons in the brain and known as feel-good molecule, can be also released by keratinocytes, and is involved in several important processes of the skin, such as microcirculation and barrier function. Thus, by stimulating keratinocyte growth and protecting neurons, timut pepper extract supports skin-brain communication and a functional and healthy skin.

TIMOOD™ IMPROVES THE SKIN COMPLEXION

To assess the effect of TIMOOD™ on the skin, a placebo-controlled clinical study on a panel of 43 volunteers (40-61 years) feeling stressed and/or uncomfortable in their skin was performed. The volunteers were split into two groups and used either a cream containing 2% TIMOOD™ or a corresponding placebo face-cream twice daily for 28 days. To assess skin complexion, the L* (lightness) value was measured at different spots on either the jaw or the forehead of each volunteer and the standard deviation of these measurements was used as a measure of skin tone evenness. The treatment with TIMOOD™ resulted in a significant improvement of skin tone evenness by 26.4% on the forehead and by 15.5% on the jaw compared to initial conditions and placebo. The positive effect of TIMOOD™ on skin complexion was confirmed by an expert grading which showed increased evenness of the complexion and skin luminosity, a reduced skin redness, and a fresher and healthier complexion after the 28-day treatment with TIMOOD™. These results were

confirmed by the volunteers in a self-assessment questionnaire.

TIMOOD™ BALANCES EMOTIONAL WELLBEING

To test emotional wellbeing, a neuropsychological approach was used in the same clinical study. The EmoCompass® is a market research tool that is used to determine the emotions of consumers based on the principles of neuromarketing. This test is usually used as a basis for marketing decisions for fast-moving consumer goods. The application in the field of neurocosmetics is a novelty. For the test, the volunteers were asked the question "How do you feel?", to which they were requested to give a non-verbal answer by generating emotional patterns consisting of coded shapes and colours on a computer screen. The personal emotional image prevents the answers from being distorted by "translating" the emotions into language and the low level of association with shapes and colours cannot be influenced by personal memories. The results of the test showed an improvement in emotional wellbeing in terms of a less stressed and more relaxed state in the volunteers who used the cream with 2% TIMOOD™ for 28 days.

To summarize, the new neurocosmetic active TIMOOD™ improves the innervation of the skin, supporting a homogenous skin complexion and balancing the emotional wellbeing of people feeling stressed.

Mibelle Biochemistry, Stand AA50

