



NEUROCOSMETICS: A REVIEW TO THE SKIN-BRAIN CONNECTION

Anuja.V.Pathade *,Deven.S.Asपालani

Dr.Kolpe Institute Of Pharmacy, Kolpewadi, Kopargaon, Maharashtra, India

Author mail: 99devenaspalani@gmail.com

Abstract:

The “ ultramodern ” cosmetology assiduity is fastening on exploration devoted to discovering new Neurocosmetic functional constituents that could ameliorate the relations between the skin and the nervous system. Numerous ornamental companies have started to formulate neurocosmetic products that parade their exertion on the cutaneous nervous system by affecting the skin’s neuromediators. Through different mechanisms of action. This review aims to clarify the description of neurocosmetics, and to describe the features of some functional constituents and products available on the request, with a look at the nonsupervisory aspect. The attention is devoted to neurocosmetic constituents for combating skin stress, explaining the stress pathways, which are also identified with skin aging. “ Neuro- relaxing ”anti-aging constituents deduced from factory excerpts and neurocosmetic strategies to combat seditious responses related to skin stress are presented. Latterly, the molecular base of sensitive skin and the suitable neurocosmetic constituents to ameliorate this problem are bandied. With the end of presenting the major operation of Botox-suchlike constituents as the first neurocosmetics on the request, skin aging is also introduced, and its proposition is presented. To confirm the efficacy of the ornamental products on the request, the conception of ornamental claims is bandied.

Keywords: Neurocosmetics, Anti-Aging, Skin Care, Cosmetics.

1.Introduction

The skin, a awful and complex organ, manages the connections between us and the outside world. It provides information that allows us to dissect, examine, and cover it’s status — to understand and know it. The skin can appear as a oil on which a large part of our interior world is painted it’s a dynamic structure, in nonstop metamorphosis, that expresses private cerebral contents through which feelings take shape [1,2]. The studies performed in this “ new ” and fascinating field are radically transubstantiating the mortal approach and

exploration, moving precipitously from a sectorial vision of the various tissues, determined to be whole system, global vision of the vast connection of hormones, cytokines, and neuropeptides that nearly connect mind and body. Formerly again, as well described by Bovero, the skin, nervous system, and vulnerable system are integrated into a single network that's defined as the neuro-immuno-cutaneous system(NICS) [3,4]. Since good health also considers the enhancement of the skin's appearance, the use of safer and further effective dress products as a strategy, especially for combating skin aging, has precipitously increased over the times [5,6]. There are different ornamental forms on the request, each with its own function and different constituents, which are used in new products, meeting ancient traditions and recent inventions, with the purpose of restoring and perfecting skin mars. Still, as formerly banded, since these defects — generated by an external and internal discomfort — are the consequence of some marvels of which manifest themselves on the skin, and are reflected at the physical, cerebral, and social situations. They induce numerous dubieties when confused with the neurosciences or the good and sybaritic passions arising from the use of ornamental products. Therefore, this review aimed to clarify these nebulous generalities, contextualizing the operations of neurocosmetics. The review is opened by briefly describing the well-known ornamental functions and uses that have been regulated for times, also landing in the neurocosmetic world, presenting it precisely. Eventually, some aspects of ornamental claims and efficacy, safety assessment, and regulation of ornamental products, in order to frame the regulation of neurocosmetics, will be further banded [7,8,9].



2.The Cosmetology and Cosmetic Function To Neurocosmetics

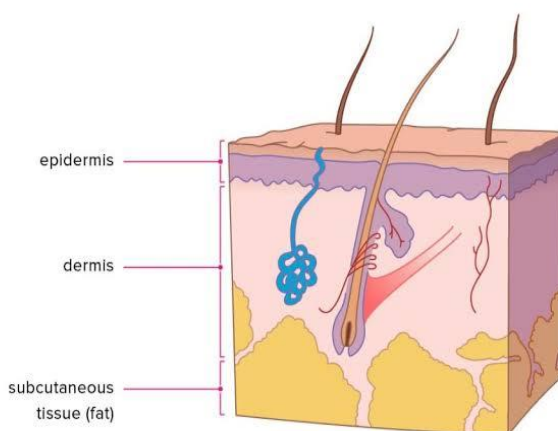
Cosmetology is the wisdom that studies the cosmetics' mechanism of action and their natural goods in humans, defining how to use them. In this field of functional cosmetics, it's objectives is to formulate products for restoring the normal skin balance, precluding or neutralizing the onset of any mars[10]. It's worth mentioning that the physiological balance is a dynamic condition; therefore, it doesn't relate to a situation in which metamorphosis processes don't take place[static balance], but to a system in which metamorphosis processes continuously do under dynamic equilibrium. When the skin is examined, as for any other organ, it should be allowed of as a system in which several biochemical responses take place, icing the life of cells and apkins. As a result, under normal physiological conditions, all of these responses are equilibrium with one another. Still, in particular situations, this equilibrium can be lacking, with different consequences on the skin(for illustration, changes in pH, differences in the water content, changes in the composition of the hydrophilic film, and so on)[11].In general, our organism is suitable to tone-restore it's normal "physiological" conditions but, in some cases, the imbalances get worse, encouraging the onset of mars or real pathologies.thus,several ornamental treatments represent useful tools for upgrading some skin instantiations, similar as acne.Still, cosmetics mustn't claim remedial parcels, but should cover the skin,keeping it in good condition and carrying out preventative conditioning. Although cosmetics are

formulated with numerous constituents with different functions, it is possible to distinguish them into three main classes, according to their current function Skincare(defensive/ nutritional function), makeup(aesthetic/ ornamental function), and toiletries(aseptic/ sanctification function). In particular, the ornamental functions allow us to classify different products according to their exertion performed at the skin or mucosal position[12]. By fastening the attention on the skincare order, which represents the content of this review, this class includes all products that aim to save, over time, the physiological and functional skin characteristics of the area where they're applied. Still, since Ultramodern cosmetology is substantially acquainted towards the expression of products with “ mixed functions ”, pertaining to a broad diapason of conditioning, it's clear that these differences are obsolete[13]. Starting from these considerations, the boundary between the different ornamental functions is narrowing; there's a tendency towards a general conception of cosmetics in which beauty and good come essential both for skin health conservation and for the Forestalment of skin mars and conditions.

- Soothing, anti-redness action displayed by constituents suitable to soothe pain and reduce skin greenishness in cases of mild inflammation, neutralizing vexation, and bringing relief to stressed-out skin;
- Regenerating action this refers to constituents with eutrophic parcels, promoting cell Rejuvenescence, and furnishing the necessary rudiments for skin development and conservation over time;
- Toning, “ lifting ” action this enterprises constituents that restore skin tone and firmness by acting at both the epidermis and dermis situations, encouraging the typical turgor of youthful and healthy skin[14].

3.The Neurocosmetics

Skin is constituted by the epidermis — the external, leakproof, stratified, scaled epithelium subcaste of ectodermal origin — and dermis, the inner and thicker supporting subcaste of connective towel of mesodermal origin [16,17] . A thick innervation involves the remotest skin layers, except for the stratum corneum [17].



From the spinal cord, sensitive nervous or neuro- vegetative filaments innerve the skin, modulating thermoregulation, sebaceous stashing, or melanogenesis, expounding formerly again the description of Misery “ Les nerfs à fleur de peau ”. Indeed, numerous feelings are felt at the skin position fear, stress, and happiness manifest themselves in fading(vasoconstriction), sweating, goosebumps, raised hairs, flushing(vasodilatation), or radiance [18,19]. The skin, as a system for the surveillance of environmental changes(heat, moisture, etc.) and perception of the terrain(body limits, recognition of thenon-self and objects, touch,etc.), produces stimulants that, through intercessors, are transmitted to the nervous system. For illustration, among

interceptors, there are neurotransmitters; These are chemical couriers, naturally synthesized by nervous fiber consummations, that are also produced by skin cells(keratinocytes, melanocytes, fibroblasts,etc.) and the vulnerable system [20,21]. The release of neuromediators can be convinced by physical, chemical, or indeed emotional stimulants. Among the 200 neuromediators presently known, about 25 have been set up in the skin. Some exemplifications include neuropeptides similar as substance P, calcitonin gene- affiliated peptide(CGRP), and bradykinins; neurohormones similar as melanocyte-stimulating hormone(MSH), and adrenocorticotrophic hormone(ACTH); catecholamines; enkephalins; endorphins; and acetylcholine. still, the neuromediators ' position changes accord- ing to the person and their physiological or pathological circumstances [22,23].

Specific receptors for these neuromediators, and enzymes for demeaning them, are expressed by cutaneous and vulnerable cells. The list of neurotransmitters to receptors induces the modulation of cell parcels and skin functions(impunity, cell isolation, prolifera- tion, saturation,etc.) [24]. For illustration, substance P activates keratinocytes by adding the conflation of interleukin 1 α and β , interleukin 8, and excrescence necrosis factor(TNF- α), as well as intercellular adhesion patch 1(ICAM- 1) expression on the keratinocyte face. Reciprocally, the skin can modulate neuronal exertion and growth. whim-whams growth factors are slightly involved for this purpose, controlling both the neuronal growth and the neurotransmitters ' secretion. The result is that the skin is the window that connects the nervous, vulnerable, cutaneous, and endocrine functions; it's important for maintaining physiological homeostasis [25,26].

This intriguing connection, where the skin transmits and receives information from sources, which potentiate the response of the NICE system and is useful for understanding neurocosmetics and the affiliated brain – Skin connection for skincare [27,28]

4. Psychocosmetics

With respect to neurocosmetics, the generality of psychocosmetics is naturally corre- lated with the generality of cosmetics itself. Cosmetic products help to have a Positive perception of oneself(tone- regard); therefore, cosmetics are promoters of good, enabling the connections and conditions necessary to gain delectation. So, although cosmetics, by description, are not considered to be drugs, they have a fundamental part in promoting health due to their capability to meliorate the existent's internal and social good, mood, and quality of life. All cosmetics can be considered the same, from de-odorants, skin moisturizers, makeup, cleaners,etc [29,30].

5. Neuroscience and It's application in Cosmetic Field

Neurosciences, with respect to neurocosmetics, are devoted to the study of the nervous system. As reported by Lombardi etal.(2019), there are different branches of neuroscience, depending on the exploration studies, styles, and tools. Some exemplifications are

- Cellular Neurosciences study the geste of nervous cells in vitro; these related trials are generally performed by manufacturing companies on neurocosmetic functional constituents;
- Behavioral Neurosciences study the cognitive(studies, recollections, and other internal Processes) and affective(feelings, passions, and mood) geste of individualities [31,32].

To produce further charming packaging designs, the sickie- behavioral approach and the traditional request exploration, neuroscientific, and cerebral methodologies could becombined for understanding not only consumer prospects(brand comprehensions), but also unconscious relations with consumer product. For illustration, the action readiness(whether the product is used or bought) and autonomic stimulation(which reflects the degree of motor medication for a certain action) are generally estimated with physiological

measures of the autonomic nervous system ANS), where different aspects of the products are estimated, and each type of evaluation is associated with specific physiological, suggestive, or motivational changes [33,34]. Among methodologies, it's worth mentioning a range of technologies, from biometrics — similar as heart rate variability(HR), galvanic skin response(GSR), facial electromyography (fEMG),etc. — to brain imaging, similar as functional glamorous resonance imaging(fMRI) [35]. Biological, cerebral, and ethological data can also be collected and anatomized by using different styles:

- Vital parameters similar as heart exertion recorded with ECG, respiratory activity/ frequency, salivary samples for covering cortisol release(i.e., the decrease in cortisol stashing in slaver after the use of a soothing cream should be observed), thermography related to cutaneous blood inflow(i.e., when flushing, etc.), the elaboration of facial skin temperature under stress, and the electrical dastard- Rent perception threshold(CPT); the hyperexcitability of whim-whams consummations($A\beta$) increases with age, in which a threshold increase indicates a reduction of unwelcome excitability, (i.e., an advanced state of heartiness...);
- Psychometric tests(perceived stress), similar as the Ethological Coding System for In-terviews(ECSI)(non-verbal geste). Likewise, using questionnaires, the goods(the hedonic pleasure of products) and appraisal(good/ bad or pleasant/ unwelcome) can be estimated [36,37,38].

6. Neurocosmetic Ingredients

Neurocosmetic functional constituents can be formulated in different ornamental forms targeted for every consumer's skin type and age. Some of the retailed neurocosmetic constituents are therefore bandied in the following section, fastening onanti-aging skincare constituents, and to more understand their mechanisms of action, a brief sapience into the affected Natural pathways will also be presented [29].

6.1 Neurocosmetic Ingredients for Combating Skin Stress

In ultramodern life, stress is defined as the body's response to a whole range of external and cerebral factors that disrupt homeostasis. Pollution, UV radiation, blue light, inadequate sleep, social media, connections, high number of working hours are some of the usual Ultramodern stressors. Stress is describe a set of signals that he noticed in his cases [39,40]. There are pieces of substantiation that cerebral stress could encourage some skin conditions similar as other cases, promote hair loss. Persons ' moods, feelings, and sensations do in the brain; latterly, the brain sends signals to the body, producing physiological effect. Still, skin cells don't stop the product of cortisol, If the exposure to stress isprolonged.also known as the stress hormone; therefore, its situations remain elevated, causing a waterfall of Dangerous consequences [41,42].

6.2 Neurocosmetic Ingredients for Sensitive Skin

The conception of “ sensitive skin ” is a complex dermatological condition defined by abnormal sensitive symptoms [43,44]. These unwelcome sensations can not be explained by lesions attributable to any skin complaint. The skin can appear normal or be accompanied by erythema. Sensitive skin can affect all body locales, especially the face, roughly half of the population considers their skin to be sensitive,substantially women[45,46]. Main types of sensitive skin can be defined, and as a whole, their instantiations could be credited to reduced hedge functions, inflammation with an complete hedge function or, generally, to healthy individualities having skin that environmental factors(wind, pollution, UV, temperature changes, and so on), Cleansers, cosmetics, or clothes [47,48]. These responses can range from slight discomfort to frequent visible skin vexation signs, similar as greenishness. In detail, the adverse responses relate to ideal/ visible and private/ sensitive symptoms for illustration, miserliness, surcharging, burning, and chinking, or occasionally pain, itching, and discomfort[49,50]. Therefore, it appears that these instantiations involve cutaneous whim-whams

filaments due to the overactivation of flash receptor eventuality(TRP)- type receptors in the skin, which leads to constant inflammation and original greenishness. In detail, with regard to TRP Receptors, the attention should be concentrated on the flash receptor eventuality ion channels subfamily V member 1(TRPV1) involved in neuroinflammation [51,52,53].

6.3 Neurocosmetic Ingredients for Skin Aging

Over the times, significant anatomical and physiological changes at the skin position, which precipitously drop skin consistence, pliantness, tone, and polychromatic uniformity, are observed. Although the aging process is gradational, skin aging times and styles largely depend on individual characteristics. The nature of the main causes that affect growing are inheritable and environmental; for this reason, natural aging and foreign aging are distinguished, as well described in the literature [54,55].

i) Intrinsic (chronological) aging or chrono-aging.

Natural aging is linked to the subject's age; it depends on complex physiological mechanisms involving a series of skin changes(exposed or not to sun), and is manifested through a slow process of towel degeneration. If it's allowed of as a miracle regarding a single existent, it can do before or latterly depending on their inheritable predisposition, and hormonal situations can impact the consistence of the skin, the amounts of collagen, and its water content. When considering people of the same age and life, the signs of growing appear more apparent in women than in men due to the lower consistence of the womanish skin, their lesser perceptivity to hormones, and their frequent expressiveness of the face. Likewise, manly skin is also richer in sebaceous glands that favor the conformation of a hydrolipidic film containing further lipids, guaranteeing protection from external agents [56,57].

ii) Extrinsic aging

Foreign aging is age-independent, and is associated with numerous features, including life actions, conditions, environmental pollution, and sun exposure(print- aging). In particular, smoking, poisonous substances, some medicines, and UV shafts induce the release of seditious intercessors, the deactivation of the body's natural defense systems, and the product of free revolutionaries, with a consequent increase in the tendency for the incarnation of growing skin. Print- growing substantially depends on the existent's skin phototype [58,59].

6.4 Biomimetic Peptides

Chemically, peptides are short chains of amino acids linked together by peptide bonds. Rather, in the particular care assiduity, the term " peptide " refers to motes that can gesture physiological changes at the dermal position or, in some cases, effectively trip into the dermis and contend with neurotransmitter- list spots to alter physiological Exertion temporarily [60,61]. Moment, peptides can be developed or modified in several ways to ameliorate solubility, to have better penetration, to increase receptor exertion, etc[62,63].

More specifically, it's better to specify that in the field of exploration and development of skincare ornamental phrasings, bioactive peptides — also known as Biomimetic peptides are composites that have an identical amino acid sequence to physiological peptides, but are constantly synthesized biotechnologically [64,65,66]. They are getting decreasingly popular for precluding or cheapening the clinical instantiations of damaged and dysfunctional skin, especially during the aging process, hyperpigmentation, and wrinkle development [67,68]. Numerous peptides retailed in ornamental products as Anti-aging, antioxidant, skin-lightening, towel repairing, soothing and neuromodulating, hair growth controlling, moisturizing, and hedge form peptide constituents are claimed to decelerate down the skin's aging Processes. Hence, the marketable eventuality for these motes appears to be high [69,70].

7. Anti-Aging Neurocosmetic Formulations on the Market

In recent times, numerous ornamental companies have tried to bring their innovative neuro-ornamental product lines to vend, both as respects expression technologies and constituents. In general, consumers' demands focus on innovative ornamental products that are safe, effective, and of high quality. Hence, diligence have tried to meet those demands, also, each ornamental product on the request must conform to the current legislation [71,72,73].

It's necessary to demonstrate that

- All constituents are safe after testing their toxin in vitro, ex vivo, and in vivo;
- All constituents are compatible with one another and with their packaging as the

Finished expression. Accordingly, to assess this aspect;

- The active constituents don't claim any remedial effect on the skin;
- The packaging is aesthetically seductive and safe;
- End products are also affable and have an acceptable cost – benefit rate.

Ornamental products can be portrayed, as well as chancing the right way to communicate to consumers the inventions related to a new functional component present in the ornamental product's expression, its effectiveness, the product's use, or innovative packaging [74,75].

8. Conclusion

Since the information about the description of neurocosmetics is frequently confused, especially by the marketing field, this review has been concentrated on the conception of neurocosmetics, pressing the significance of the ancestral natural and physiological connection between skin and brain; an figure on psychosomatics more explains this link. An overview of the neurosciences and their operations in the ornamental field, particularly related to ornamental product niceness, is described.

Specialized information(i.e., company/ supplier, physico- chemical characteristics, functionality orders, recommended use position, expression/ processing, claim ideas, benefits, proven efficacy demonstrated by in vitro, ex vivo, and in vivo tests, obediences) on marketed neurocosmetic constituents in skincare products substantially targeted for anti-aging Ornamental treatments has been reported. The ornamental products' nonsupervisory status and the significance of the safety assessment of cosmetics to guarantee their quality, efficacy, and safety have been substantiated. More specifically, the challenge for neurocosmetics is to formulate ideal multitasking products, suitable for each consumer's skin type, while esteeming their anatomical and physiological means(hormonal and inheritable factors, skin consistence, age, skin complexion), without forgetting to dissect their actions(smoking) Or environmental exposure(foreign factors). Therefore, new and intriguing advances are presented as a great occasion for ornamental companies. The coming step of this arising trend is the invention in probing and developing new methodologies, strategies, and ways to formulate ornamental products that will allow the discovery of a new world of benefits and claims.

9. Reference

1. Bovero, A. *Dermocosmetologia Dall'Inestetismo al Trattamento Cosmetico*, 1st ed.; Tecniche Nuove: Milano, Italy, 2011; ISBN 978-88481-2626-7.
2. Niedziela, M. Designing (Neuro) cosmetics for healthy mind, healthy body. *Househ. Pers. Care Today* 2019, 14, 21–22.
3. Lombardi, S.A.; Ratti, A. Neurocosmesi, psicocosmesi e neuroscienze: Cosa sono? *Kosmet. Numer. Due* 2019, 40–42. Available Online: <https://www.bregaglio.eu/2018/09/18/neurocosmesi-psicocosmesi-e-neuroscienze-cosa-sono/>.
4. Boulais, N. The epidermis: A sensory tissue. *Eur. J. Dermatol.* 2008, 18, 119–127.
5. EUR-Lex Access to European Union Law Consolidated Text: Regulation (EC) No 1223/2009 of the European Parliament and of The Council of 30 November 2009 on Cosmetic Products (Recast) (Text with EEA Relevance) Text with EEA Relevance. Available Online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02009R1223-2020120>
6. Ahsan, H. The biomolecules of beauty: Biochemical pharmacology and immunotoxicology of cosmeceuticals. *J. Immunoass. Immunochem.* 2019, 40, 91–108.
7. McGlone, F.; Reilly, D. Sensitive skin and the somatosensory system, 2nd Edition. In *Cosmetic Dermatology: Products and Procedures*; Draeos, Z.D., Ed.; Wiley-Blackwell: Oxford, UK, 2016; pp. 38–46, ISBN 978-1-4051-8635-3.
8. Chamberlin, C.M.; Peschard, O.; Mondon, P.; Lintner, K. Quantifying Skin Relaxation and Well-Being. *Cosmet. Toilet. Mag.* 2004, 119, 65–70.
9. Roosterman, D.; Goerge, T.; Schneider, S.W.; Bunnett, N.W.; Steinhoff, M. Neuronal Control of Skin Function: The Skin as a Neuroimmunoendocrine Organ. *Physiol. Rev.* 2006, 86, 1309–1379
10. U.S. Food & Drug Administration Is It a Cosmetic, a Drug, or Both? (Or Is It Soap?). Available online: <https://www.fda.gov/Cosmetics/cosmetics-laws-regulations/it-cosmetic-drug-or-both-or-it-soap#Definecosmetic>
11. Surber, C.; Kottner, J. Skin care products: What do they promise, what do they deliver. *J. Tissue Viability* 2017, 26, 29–36
12. Bom, S.; Jorge, J.; Ribeiro, H.M.; Marto, J. A step forward on sustainability in the cosmetics industry: A review. *J. Clean. Prod.* 2019, 225, 270–290
13. EUR-Lex Access to European Union Law Report From the COMMISSION to the European Parliament and the Council on Product Claims Made Based on Common Criteria in the Field of Cosmetics COM/2016/0580 Final. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2016:0580:FIN>
14. Husein el Hadmed, H.; Castillo, R.F. Cosmeceuticals: Peptides, proteins, and growth factors. *J. Cosmet. Dermatol.* 2016, 15, 514–519.
15. Morganti, P.; Coltelli, M.-B. A New Carrier for Advanced Cosmeceuticals. *Cosmetics* 2019, 6, 10.
16. Misery, L. Neuro-immuno-cutaneous system (NICS). *Pathol. Biol.* 1996, 44, 867–874
17. Theoharides, T.C.; Stewart, J.M.; Taracanova, A.; Conti, P.; Zouboulis, C.C. Neuroendocrinology of the skin. *Rev. Endocr. MMeta.* 2016, 17, 287–294.
18. Shivatare, R.S.; Musale, R.; Lohakare, P.; Patil, D.; Choudhary, D.; Ganu, G.; Nagore, D.H.; Kewatkar, S.M. Isolation, Identification And Characterization of Ximenynic Acid with Anti-Aging Activity from Santalum Album. *Int. J. Res. Pharm. Sci.* 2020, 11, 1394–1399.
19. The Derm Review Amino Acids In Skincare: Arginine. Available online: <https://thederreview.com/arginine/>.
20. BE BEAUTIFUL. What Is the Role of Arginine in Skincare. Available online: <https://www.bebeautiful.in/all-things-skin/everyday/arginine-in-skincare>.

21. ARKANA Biomimetic Therapy—The Way to Regain Youth. Available online: <https://arkanacosmetics.com/news/biomimetic-Therapy-the-way-to-regain-youth>
22. Prospector AdipofillⁱⁿTM. Available online: <https://www.ulprospector.com/en/eu/PersonalCare/Detail/4499/215014/Adipofillin>
23. LucasMeyer-Cosmetics L-Ornithine Vectorized in a IonosomeTM. Available online: <https://www.lucasmeyercosmetics.com/en/Node/578>
24. DeJohn, A. Volumizing Anti-aging Skin Care Ingredient. Available online: <https://www.cosmeticsdesign.com/Article/2012/06/13/Volumizing-anti-aging-skin-care-ingredient>
25. LucasMeyer-Cosmetics. Adipofill Bio-controlled Lipofilling. LucasMeyer-Cosmetics. Available online: www.lucasmeyercosmetics.Com
26. Harada, D.; Nagamachi, S.; Aso, K.; Ikeda, K.; Takahashi, Y.; Furuse, M. Oral administration of l-ornithine increases the content Of both collagen constituting amino acids and polyamines in mouse skin. *Biochem. Biophys. Res. Commun.* 2019, 512, 712–715.
27. Loing, E.; Belhaj, N.; Ollier, V.; Bezivin, C. New generation of resistant delivery system for a better skin bioavailability and anti-aging targeted action. Available online: <https://www.sconline.org/wp-content/uploads/2014/10/Loing.pdf>
28. Stanek, J.; Wochner, M.; Gupta, S. Current and Future ‘Body-sculpting’Cosmetics. *CoValence Lab. Res. CT* 2015, 130, 20–31.
29. Sgoifo, A.; Carnevali, L.; Pattini, E.; Carandina, A.; Tanzi, G.; Del Canale, C.; Goi, P.; De Felici del Giudice, M.B.; De Carne, B.;Fornari, M.; et al. Psychobiological evidence of the stress resilience fostering properties of a cosmetic routine. *Stress* 2021, 24,53–63
30. Berke, J.D. What does dopamine mean? *Nat. Neurosci.* 2018, 21, 787–793
31. Global Cosmetic Industry. The Beauty Innovator’s Resource Happy Talk is Serious Science. Available online: <https://www.Gcimagazine.com/business/rd/ingredients/Happy-Talk-is-Serious-Science-574289811.html>
32. Effegilab The Era of Psycho-Cosmetics. Available online: <https://effegilab.com/en/lera-della-psico-cosmesi/>
33. Giannakakis, G.; Grigoriadis, D.; Giannakaki, K.; Simantiraki, O.; Roniotis, A.; Tsiknakis, M. Review on psychological stress Detection using biosignals. *IEEE Trans. Affect. Comput.* 2019, 1
34. Chojnowska, S.; Ptaszyńska-Sarosiek, I.; Kłepka, A.; Knaś, M.; Waszkiewicz, N. Salivary Biomarkers of Stress, Anxiety and Depression. *J. Clin. Med.* 2021, 10, 517.
35. Pössel, P.; Ahrens, S.; Hautzinger, M. Influence of cosmetics on emotional, autonomous, endocrinological, and immune reactions. *Int. J. Cosmet. Sci.* 2005, 27, 343–349
36. Cosmetics Business Active Ingredient Neurophroline Blocks Stress Hormone to Control Skin. Available online: https://cosmeticsbusiness.com/news/article_page/Active_ingredient_Neurophroline_blocks_stress_hormone_to_control_skin/12_0025
37. Researchgate Study of the Application and Validation of the Ethological Coding System for Interviews (ECSI). AvailableOnline: https://www.researchgate.net/publication/287225071_Study_of_the_application_and_validation_of_the_Ethological_Coding_System_for_Interviews_ECSI
38. Paas Oliveros, L.K.; Villanueva Valle, J.; González Arredondo, S.I.; Fresán, A.; Arango de Montis, I.; Brüne, M.; MuñozDelgado, J. Study of the Application and Validation of the Ethological Coding System for Interviews (ECSI). Available online: http://www.revistasaludmental.mx/index.php/salud_mental/article/view/SM.0185-3325.2015.005
39. Dunn, J.H.; Koo, J. Psychological Stress and skin aging: A review of possible mechanisms and potential therapies. *Dermatol. Online J.* 2013, 19, 18.
40. Fink, G. Stress: Definition and History. In *Stress Science: Neuroendocrinology*; Fink, G., Ed.; Academic Press: Oxford, UK, 2009; pp 3–9, ISBN 9780123785718.

41. Chen, Y.; Lyga, J. Brain-Skin Connection: Stress, Inflammation and Skin Aging. *Inflamm. Allergy Drug Targets Former. Curr. Drug Targets Inflamm. Allergy* 2014, 13, 177–190.
42. Kimyai-Asadi, A.; Usman, A. The Role of Psychological Stress in Skin Disease. *J. Cutan. Med. Surg.* 2001, 5, 140–145.
43. Misery, L.; Ständer, S.; Szepietowski, J.; Reich, A.; Wallengren, J.; Evers, A.; Takamori, K.; Brenaut, E.; Le Gall-Ianotto, C.; Fluhr, J.; Et al. Definition of Sensitive Skin: An Expert Position Paper from the Special Interest Group on Sensitive Skin of the International Forum for the Study of Itch. *Acta Derm. Venereol.* 2017, 97, 4–6.
44. Wandrey, F.; Schmid, D.; Züllli, F. Peptide Inspired by Sea Anemone Venom Comforts Sensitive Skin. *SOFW J.* 2018, 19–23. Available online: <https://www.sofw.com/de/hikashop-menu-for-categories-listing/product/221-peptide-inspired-by-sea-Anemone-venom-comforts-sensitive-skin>.
45. Kligman, A.M.; Sadiq, I.; Zhen, Y.; Crosby, M. Experimental studies on the nature of sensitive skin. *Ski. Res. Technol.* 2006, 12, 217–222.
46. Givaudan Mariliance™ Marine Neuro-Soothe. Available online: <https://www.givaudan.com/fragrance-beauty/active-beauty/Products/mariliance>
47. Talagas, M.; Lebonvallet, N.; Berthod, F.; Misery, L. Cutaneous nociception: Role of keratinocytes. *Exp. Dermatol.* 2019, 28, 1466–1469.
48. Misery, L. Sensitive Skins May Be Neuropathic Disorders: Lessons from Studies on Skin and Other Organs. *Cosmetics* 2021, 8, 14
49. Pinolumin for Flawless Skin. Available online: <https://www.personalcaremagazine.com/story/18396/pinolumin-for-flawless-Skin>
50. Wandrey, F.; Schmid, D.; Züllli, F. Flawless skin via Swiss stone pine extract. *Pers. Care Asia Pac.* 2016, 27–30. Available online: <https://www.google.it/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiJ39Xa3-LxAhVO4qQKHwZZApoQFnoECAUQAA&url=https%3A%2F%2Fesent.pl%2Fpl%2Fp%2Ffile%2F1d68c6828d2d78974480bee2712e596%2FFlawless%20Skin%20Via%20Swiss%20Stone%20Pine%20Extract%20Personal%20Care%20Magazine%20November%202016-1.pdf&usg=AOvVaw1QJLnqDi0iNyb206vtRpQn>.
51. Talagas, M.; Misery, L. Role of Keratinocytes in Sensitive Skin. *Front. Med.* 2019, 6, 108.
52. Ehnis-Pérez, A.; Torres-Álvarez, B.; Cortés-García, D.; Hernández-Blanco, D.; Fuentes-Ahumada, C.; Castanedo-Cázares, J.P. Relationship between transient receptor potential vanilloid-1 expression and the intensity of sensitive skin symptoms. *J. Cosmet. Dermatol.* 2016, 15, 231–237.
53. Caterina, M.J. Transient receptor potential ion channels as participants in thermosensation and thermoregulation. *Am. J. Physiol. Integr. Comp. Physiol.* 2007, 292, R64–R76.
54. Farage, M.A.; Miller, K.W.; Elsner, P.; Maibach, H.I. Characteristics of the Aging Skin. *Adv. Wound Care* 2012, 2, 5–10
55. Makrantonaki, E.; Zouboulis, C.C. Molecular Mechanisms of Skin Aging. *Ann. N. Y. Acad. Sci.* 2007, 1119, 40–50.
56. Fang, J.-Y.; Wang, P.-W.; Huang, C.-H.; Chen, M.-H.; Wu, Y.-R.; Pan, T.-L. Skin aging caused by intrinsic or extrinsic processes Characterized with functional proteomics. *Proteomics* 2016, 16, 2718–2731.
57. Tobin, D.J. Introduction to skin aging. *J. Tissue Viability* 2017, 26, 37–46.
58. Farage, M.A.; Miller, K.W.; Elsner, P.; Maibach, H.I. Functional and physiological characteristics of the aging skin. *Aging Clin. Exp. Res.* 2008, 20, 195–200
59. Zhang, S.; Duan, E. Fighting against Skin Aging: The Way from Bench to Bedside. *Cell Transplant.* 2018, 27, 729–738.
60. Bachem Cosmetic Peptides. Available online: <https://www.bachem.com/knowledge-center/white-papers/>
61. Sotiropoulou, G.; Zingkou, E.; Pampalakis, G. Redirecting drug repositioning to discover innovative cosmeceuticals. *Exp. Dermatol.* 2021, 30, 628–644.

62. Moeini, R.; Memariani, Z.; Asadi, F.; Bozorgi, M.; Gorji, N. Pistacia Genus as a Potential Source of Neuroprotective Natural Products. *Planta Med* 2019, 85, 1326–1350
63. Codif Technologie Naturelle LAKESIS. Available online: <http://www.codif-tn.com/en/principesactifs/lakesis/>
64. Zeldich, E.; Chen, C.-D.; Colvin, T.A.; Bove-Fenderson, E.A.; Liang, J.; Tucker Zhou, T.B.; Harris, D.A.; Abraham, C.R. The Neuroprotective Effect of Klotho is Mediated via Regulation of Members of the Redox System. *J. Biol. Chem.* 2014, 289, 24700–24715.
65. Yodoi, J.; Matsuo, Y.; Tian, H.; Masutani, H.; Inamoto, T. Anti-Inflammatory Thioredoxin Family Proteins for Medicare, Healthcare and Aging Care. *Nutrients* 2017, 9, 1081.
66. Bachem Cosmetic Peptides. Available online: <https://www.bachem.com/knowledge-center/white-papers/>
67. Rodan, K.; Fields, K.; Falla, T. Bioactive Peptide. In *Cosmeceuticals and Cosmetic Practice*; Farris, P.K., Ed.; John Wiley & Sons, Ltd: Oxford, UK, 2014; pp. 142–152, ISBN 978-1-118-38483-1
68. Fields, K.; Falla, T.J.; Rodan, K.; Bush, L. Bioactive peptides: Signaling the future. *J. Cosmet. Dermatol.* 2009, 8, 8–13.
69. Aguilar-Toalá, J.E.; Hernández-Mendoza, A.; González-Córdova, A.F.; Vallejo-Cordoba, B.; Liceaga, A.M. Potential role of natural bioactive peptides for development of cosmeceutical skin products. *Peptides* 2019, 122, 170170.
70. Carli, B. Stop the Clock: Botox Alternatives. *HPC Today Househ. Pers. Care Today* 2017, 12, 52–54.
71. Ctpa Cosmetic Product Claims Regulatory Framework. Available online: <https://www.ctpa.org.uk/resources-claims>
72. Nohynek, G.J.; Antignac, E.; Re, T.; Toutain, H. Safety assessment of personal care products/cosmetics and their ingredients. *Toxicol. Appl. Pharmacol.* 2010, 243, 239–259.
73. Dent, M.; Amaral, R.T.; Da Silva, P.A.; Ansell, J.; Boisleve, F.; Hatao, M.; Hirose, A.; Kasai, Y.; Kern, P.; Kreiling, R.; et al. Principles Underpinning the use of new methodologies in the risk assessment of cosmetic ingredients. *Comput. Toxicol.* 2018, 7, 20–26.
74. Juncan, A.M. Packaging Evaluation and Safety Assessment of a Cosmetic Product. *Mater. Plast.* 2018, 55, 644
75. Lionetti, N.; Rigano, L. Labeling of Cosmetic Products. *Cosmetics* 2018, 5, 22