

Abstracts Collection

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LATEST NEWS ON ACNE CLINICAL AND THERAPEUTIC IMPLICATIONS

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Sun exposure, a relevant exposome factor in acne patients and how photoprotection can improve outcomes

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Keywords

Studio di revisione, effetti dell'esposizione solare nel contesto acneico, aderenza alla terapia

Abstract

Background

Acne pathophysiology includes a complex interaction among inflammatory mediators, hyperseborrhea, alteration of keratinization and follicular colonization by *Propionibacterium acnes*.

Aims

To describe the impact of the exposome on acne and how photoprotection can improve outcomes.

Methods

A narrative review of the literature was carried out; searches with Google Scholar and Pubmed from January 1992 to November 2022 were performed. The keywords used were "acne," "sunscreens," "photoprotection," "cosmetics," "cosmeceuticals," "pathogenesis," "etiology," "exposome," "sunlight," "stress," "lack of sleep," "diet," "postinflammatory hyperpigmentation," "pollution," "exposome," "ultraviolet radiation," and "visible light."

Results

Environmental factors such as solar radiation, air pollution, tobacco consumption, psychological stress, diverse microorganisms, nutrition, among others, can trigger or worsen acne. Solar radiation can temporarily improve lesions. However, it can induce proinflammatory and profibrotic responses, and produce post-inflammatory hyperpigmentation and/or post-inflammatory erythema. While photoprotection is widely recommended to acne patients, only four relevant studies were found. Sunscreens can significantly improve symptomatology or enhance treatment and can prevent post-inflammatory hyperpigmentation. Furthermore, they can provide camouflage and improve quality of life. Based on acne pathogenesis, optimal sunscreens should have emollient, antioxidant and sebum controlling properties.

Conclusions

The exposome and solar radiation can trigger or worsen acne. UV light can induce post-inflammatory hyperpigmentation/erythema, and can initiate flares. The use of specifically formulated sunscreens could enhance adherence to topical or systemic therapy, camouflage lesions (tinted sunscreens), decrease inflammation, and reduce the incidence of post-inflammatory hyperpigmentation/erythema.

Highlights

La radiazione solare può temporaneamente migliorare le lesioni. Tuttavia, può indurre risposte proinfiammatorie e profibrotiche e causare iperpigmentazione post-infiammatoria e/o eritema post-infiammatorio. I filtri solari possono migliorare significativamente la sintomatologia o potenziare il trattamento e prevenire l'iperpigmentazione post-infiammatoria. In base alla patogenesi dell'acne, i filtri solari ottimali dovrebbero avere proprietà emollienti, antiossidanti e controllare il sebo. L'uso di filtri solari specificamente formulati può migliorare l'aderenza alla terapia topica o sistemica, camuffare le lesioni, ridurre l'infiammazione e ridurre l'incidenza di iperpigmentazione/eritema post-infiammatori.

Ultrasound-triggered interfacial engineering-based microneedle for bacterial infection acne treatment

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SCIENCE ADVANCES Vol 9, Issue 10, 8 Mar 2023

Keywords

Alternativa all'antibiotico, uso di ultrasuoni, acne e infiammazione

Abstract

Acne is an inflammatory skin disease mainly caused by *Propionibacterium acnes*, which can cause local inflammatory reactions and develop into chronic inflammatory diseases in severe cases. To avoid the use of antibiotics and to effectively treat the site of acne, we report a sodium hyaluronate microneedle patch that mediates the transdermal delivery of ultrasound-responsive nanoparticles for the effective treatment of acne. The patch contains nanoparticles formed by zinc porphyrin-based metal-organic framework and zinc oxide (ZnTCPP@ZnO). We demonstrated activated oxygen-mediated killing of *Propionibacterium acnes* with an antibacterial efficiency of 99.73% under 15 min of ultrasound irradiation, resulting in a decrease in levels of acne-related factors, including tumor necrosis factor- α , interleukins, and matrix metalloproteinases. The zinc ions up-regulated DNA replication-related genes, promoting the proliferation of fibroblasts and, consequently, skin repair. This research leads to a highly effective strategy for acne treatment through the interface engineering of ultrasound response.

Highlights

Il cerotto oggetto dello studio contiene nanoparticelle formate da un framework metallo-organico basato su porfirina di zinco e ossido di zinco (ZnTCPP@ZnO). I dati hanno dimostrato l'uccisione mediata dall'ossigeno attivato di *Propionibacterium acnes* con un'efficienza antibatterica del 99,73% in 15 minuti di irradiazione ad ultrasuoni, con conseguente diminuzione dei livelli di fattori correlati all'acne, tra cui il fattore di necrosi tumorale- α , le interleuchine e le metalloproteinasi di matrice. Gli ioni di zinco hanno promosso l'espressione dei geni correlati alla replicazione del DNA, favorendo la proliferazione dei fibroblasti e, di conseguenza, la riparazione della pelle.

Recent advances in understanding inflammatory acne: Deciphering the relationship between *Cutibacterium acnes* and Th17 inflammatory pathway

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JEADV Vol 37, Issue S2:3-11

Keywords

Relazione tra il batterio e le cellule del nostro sistema immunitario, minor uso di antibiotici, mantenimento del microbiota cutaneo

Abstract

Acne vulgaris is a common chronic inflammatory skin disease of the pilosebaceous units. Four factors contribute to acne: hyperseborrhea and dysseborrhea, follicular hyperkeratinisation, skin microbiome dysbiosis and local immuno-inflammation. Recent key studies have highlighted a better understanding of the important role of *Cutibacterium acnes* (*C. acnes*) in the development of acne. Three major findings in the last decade include: (1) the ability of *C. acnes* to self-organize in a biofilm associated with a more virulent activity, (2) the loss of the *C. acnes* phylotype diversity and (3) the central role of the Th17 pathway in acne inflammation. Indeed, there is a close link between *C. acnes* and the activation of the Th17 immuno-inflammatory pathway at the initiation of acne development. These mechanisms are directly linked to the loss of *C. acnes* phylotype diversity during acne, with a predominance of the pro-pathogenic phylotype IA1. This specifically contributes to the induction of the Th17-mediated immuno-inflammatory response involving skin cells, such as keratinocytes, monocytes and sebocytes. These advancements have led to new insights into the underlying mechanisms which can be harnessed to develop novel treatments and diagnostic biomarkers. A major disadvantage of traditional treatment with topical antibiotics is that they induce cutaneous dysbiosis and antimicrobial resistance. Thus, future treatments would no longer aim to 'kill' *C. acnes*, but to maintain the skin microbiota balance allowing for tissue homeostasis, specifically, the restoration of *C. acnes* phylotype diversity. Here, we provide an overview of some of the key processes involved in the pathogenesis of acne, with a focus on the prominent role of *C. acnes* and the Th17-inflammatory pathways involved.

Highlights

Esiste un legame stretto tra *C. acnes* e l'attivazione della via immuno-infiammatoria Th17 nelle prime fasi di sviluppo dell'acne. Questi meccanismi sono direttamente correlati alla perdita di diversità filogenetica di *C. acnes* durante la patologia acneica, con una predominanza del filotipo IA1 pro-patogeno. Questo squilibrio contribuisce specificamente all'induzione della risposta immuno-infiammatoria mediata da Th17 che coinvolge le cellule cutanee, come cheratinociti, monociti e sebociti. Pertanto, i futuri trattamenti non mireranno più a "uccidere" *C. acnes*, ma a mantenere l'equilibrio del microbiota cutaneo consentendo l'omeostasi del tessuto, in particolare il ripristino della diversità di *C. acnes*.

Correlating the Gut Microbiota and Circulating Hormones with Acne Lesion Counts and Skin Biophysical Features

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Microorganisms 2023, 11(8): 2049

Keywords

Correlazione tra lesioni acneiche, ormoni circolanti e alcuni batteri intestinali, stress, microbiota

Abstract

Acne vulgaris is a common inflammatory condition that is multi-factorial and impacted by both intrinsic and extrinsic features. Several previous studies have assessed for correlations between factors such as circulating hormones, stress, or the microbiome. However, there have not been any correlations specifically against lesion counts or differentiating correlations between inflammatory and non-inflammatory lesion counts. Here, we correlate several factors against acne lesions. Twenty men and women with mild to moderate acne were recruited, and their hormonal levels and their gut microbiome were collected and correlated against their inflammatory and non-inflammatory lesions of acne. Facial non-inflammatory lesions were weakly correlated to sebum excretion rate and weakly inversely correlated to forehead and cheek hydration. We examined stress through the use of a normalized peak-to-trough ratio (higher numbers indicated less stress), which correlated with skin hydration and inversely correlated with sebum excretion rate. Sebum excretion rate was weakly correlated to testosterone levels, and facial hydration correlated with estradiol levels. Correlations with the gut microbiome showed differential correlations with inflammatory and non-inflammatory lesions, with *Clostridium* sp AF 23-8 correlating to inflammatory lesion counts, while *Actinomyces naeslundii* str Howell 279 correlated to non-inflammatory lesions. Overall, measures of stress and circulating hormones correlate to skin biophysical properties and acne lesion counts. Also, different gut bacteria correlate with either inflammatory or non-inflammatory lesion counts. We hope that our findings stimulate further work on the gut–mind–stress–skin axis within acne.

Highlights

Le analisi del microbioma intestinale hanno mostrato correlazioni differenziali con lesioni infiammatorie e non infiammatorie, con *Clostridium* sp AF 23-8 correlato ai conteggi delle lesioni infiammatorie, mentre *Actinomyces naeslundii* str Howell 279 correlato ai conteggi delle lesioni non infiammatorie. Nel complesso, le misure di stress e gli ormoni circolanti correlano con le proprietà biofisiche della pelle e con i conteggi delle lesioni acneiche. Inoltre, diversi batteri intestinali correlano con i conteggi delle lesioni sia infiammatorie che non infiammatorie. La speranza è che queste scoperte stimolino ulteriori ricerche sull'asse intestino-mente-stress-cute nel contesto acneico.

A Clinical Study Evaluating the Efficacy of Topical Bakuchiol (UP256) Cream on Facial Acne

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J Drugs Dermatol. 20(3):307-310

Keywords

Acne pelle scura, iperpigmentazione post infiammatoria, efficacia di bakuchiol

Abstract

Acne vulgaris is a common skin disease that manifests clinically as comedones, papules, nodules, and cysts. In this single center, open-label pilot study (ISRCTN13992386), we aimed to evaluate the effectiveness of UP256 cream, a newly patented topical product containing 0.5% bakuchiol, on facial acne and acne-related post-inflammatory hyperpigmentation (PIH). A series of 13 subjects enriched for Fitzpatrick skin types III–VI with mild or moderate acne received treatment with UP256 twice daily for 12 weeks. Efficacy assessments included changes in inflammatory and non-inflammatory lesions as well as a reduction in Evaluator Global Severity Score (EGSS) assessments of acne severity and PIH. Safety, adverse events, and cutaneous tolerability were evaluated throughout the study. UP256 significantly reduced the number of inflammatory lesions and improved existing PIH. UP256 was also cosmetically acceptable and well tolerated by all study subjects. Overall, our results demonstrate that monotherapy with UP256 improves mild to moderate acne and may be particularly well suited for individuals with skin of color.

Highlights

Un nuovo prodotto topico brevettato contenente il 0,5% di bakuchiol è stato valutato sull'acne del viso e sull'iperpigmentazione post-infiammatoria correlata all'acne (PIH). Le valutazioni dell'efficacia includono variazioni nelle lesioni infiammatorie e non infiammatorie, così come una riduzione della gravità dell'acne misurata attraverso il punteggio globale di gravità da parte del valutatore (EGSS) e della PIH. Sono stati valutati sicurezza, eventi avversi e tollerabilità cutanea. I nostri risultati dimostrano che la monoterapia migliora l'acne lieve-moderata.

