



SCIREA Journal of Biology

<http://www.scirea.org/journal/Biology>

February 26, 2023

Volume 8, Issue 2, April 2023

<https://doi.org/10.54647/biology180273>

Aging Is Disease Caused by Inflammation and Oxidation

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Abstract:

The skin care program uses active ingredients recommended by doctors who treat skin and mucosal diseases (including aging) and should pay more attention to symptom reversing and preventing chronic inflammation. This adjustment of treatment and prevention strategy is necessary, because chronic inflammation seems to be closely related to many preventable and treatable skin diseases and visible skin aging. It has been established the final common pathway at the molecular and cellular levels of skin inflammation as many systemic and mucocutaneous diseases, including ageing. The inevitable results of the strategy include inhibition of skin inflammation as the main activator of cuticle permeability barrier, blocking any proinflammatory environment pollution such as ultraviolet radiation, and quenching of these stained tissue reaction. This review will provide a scientific theoretical basis for the conclusion that chronic inflammation is a common feature of many mucosal skin pathophysiology processes, including external skin aging.

Keywords: Aging Face, Anti-aging Products, Anti-inflammatory

1. Inflammation Is Associated with Disease

Denham Harmon reported the cell destruction of the reactive oxygen species (ROS) and inflammatory cascade reaction for the first time 50 years ago [1] Lavker and Kligman subsequently recorded inflammation as the etiological reason of external skin aging about twenty years ago [2]. In his book "wrinkle therapy", Perricone has brought damage to the skin caused by inflammation of the skin into the public's eyes. He said, visible skin aging can be reduced by daily use of antioxidants and / or anti-inflammatory components of cosmeceuticals and daily intake of food rich in antioxidants and / or anti-inflammatory to prevent [1]. Articles published in several major journals in the past few years further reveal the development of inflammation in skin and other organs is a key event in the development of diseases, cancer and aging [1]. Andrew Weil, a health master, published his anti - inflammatory diet, because he believed, "there is no doubt that diet can affect inflammation." he together with other researchers pointed out that "inflammation and heart disease, colon cancer, esophageal cancer, prostate cancer and skin cancer, Alzheimer's disease, stroke, multiple sclerosis, rheumatic fever, rheumatoid arthritis, type I diabetes, systemic lupus erythematosus and scleroderma as well as aging strongly indicate that the single main inflammation weaken treatment will be effective in the treatment and prevention of human and fatal condition. This has fundamentally changed the medical community's concept of disease treatment. " [3-5]

2. Mucous Skin Inflammation - Disease Association

As for treatment, the concept of prevention and reversal of chronic inflammation should also be applied to the surface of mucosal skin, which is the first part of the interface between dry surficial environment and aquatic inner environment. These tissues are exposed to many prooxidants and proinflammatory injuries. Therefore, skin and mucous cells should be expected to be directly exposed to antioxidants and / or anti-inflammatory agents and prophylactic active compounds. All antioxidants have anti - inflammatory effects. On the contrary, it is not correct because there are other proinflammatory pathways that are not regulated by the antioxidants of the destructive matrix metalloproteinase (MMP). Aspirin, diclofenac and indomethacin are useful partial and oral anti - inflammatory agents, but not antioxidants. It has been reported that indomethacin can reverse the partial wrinkles caused by photoaging in the mouse model [6].

The main source of ROS in the skin and in all human tissues is from normal cell respiration

and metabolism. The acute reactions of these ROS included infiltration of polymorphonuclear leukocytes that subsided within 10-14 days after injury. Persistent damages, such as Nicholoff and Naidu committed in experiments, lead to changes in lymphoid tissue infiltration and significantly up-regulated MMP synthesis. The following are the abnormal repair of tissue and cell destruction, as well as collagen, elastin and matrix. In the case of exogenous aging, MMPs induces microscars, and the clinical manifestations are fine lines and wrinkles. Non melanoma skin cancer is also caused by these chronic inflammatory cascades [7].

Elias and Feingold have shown that the destruction of the cuticle barrier is not only a feature of many chronic inflammatory diseases, but also induces inflammation itself. These diseases include contact dermatitis, atopic dermatitis and seborrheic dermatitis, exogenous aging, certain keratinization and papular dermatosis, such as psoriasis and lichen planus [8].

The incidence of chronic inflammatory dermatosis in all age groups seems to be significantly increased. About 15% to 30% of American children have eczema dermatitis. Occupational contact dermatitis has become the main healthy issue of working class in the United States and the world. It is reported that in 2004, 39% of American adults had chronic inflammatory dermatosis that lasted more than 1 months in their lifetime [9].

Rudolf Virchow proposed the development of cancer at the site of inflammation 150 years ago [4]. Over the last ten years, mutual mutation of inflammation has been widely accepted as the cause for reinforcing the malignant deterioration of multiple cell types.

The malignant skin tumour has reached the prevalence rate. Over the past three years, more than one million Americans have been diagnosed with surgical skin cancer. About 50% of the people over 65 years of age have precancerous keratosis. The most common surgery in the Department of Dermatology today involves the treatment of skin cancer. Although the relationship between the sun and skin cancer are publicly and medically educated a lot, the operation of skin cancer has increased by 12%, which is more than 1.7 million [10]. In 1980s with the introduction of the sun protection factor (SPF) [15], but the trend of increase was greater, and expanded the scope of protection of radiation including ultraviolet A (UVA) exposure.

However, at the same time, the popularity of the Alfa hydroxy acid (AHA), retinoid and microcrystalline skin exfoliation strategy has expanded rapidly. The number of beauticians and spa centres that perform exfoliation, including the types that doctors have, is growing rapidly as well.

Mild barrier damage can be caused by any reasons, such as ultraviolet induced concealed but destructive chronic inflammation [11]. It has been found that any degree of repeated or chronic destruction of the cuticle barrier can activate chronic inflammation [8]. The complete recovery of acute inflammation and the subsequent permeability barrier of the cuticle does not seem to induce or aggravate the destructive chronic inflammation, if the treatment is more than 2 weeks.

The chronic inflammation induced by AHA and retinoid seems to be the main results of the disorder. The US Food and Drug Administration (FDA) issued a warning to AHA products in 2000. Its concentration is more than 10% and pH is less than 3. This is due to photosensitivity and worsening keratinocytes. Because AHA is not a photosensitizer, unlike retinoid, light reactivity must be attributed to the stripping of the barrier. Halliday and others reported an increase in skin malignancies and prolonged use of retinoic acid [12]. These results are controversial, because short term local use of retinoid helps to reduce the clinical observation of skin malignancies in human and several animal species [13].

The correlation between the rise of skin cancer and the increasing exfoliation strategy has forced skin care professionals to consider whether chronic inflammation induces the destruction of cuticle permeability barrier. It has been known for long that the closed dressings and ointments can accelerate the healing of the wound. In addition, the U.S. Food and Drug Administration for drug skin protection developed a non-prescription monographs, including Vaseline, glycerin and allantoin. Elias confirmed that local application of ceramide, lipid mixture of cholesterol and free fatty acids effectively reversed the permeability barrier function.

3. Aging Is Impacted by Anti-inflammation Therapy

The anti-inflammatory effects of aging methotrexate and corticosteroids therapy is the treatment of psoriasis, dermatitis, mainly forming the confrontation therapy of cutaneous T cell lymphoma and other inflammatory systemic diseases and malignant tumours, which strongly indicates the physiological and pathological links between inflammation and tumour diseases. The non steroidal anti-inflammatory drug diclofenac has been approved by FDA to be used for the treatment of actinic keratosis before the treatment of local application. Systemic lupus erythematosus (SLE), dermatomyositis and scleroderma are systematic diseases characterized by abnormal skin and mucous membrane. The atrophy of the epidermis

and the irregular pigmentation are the characteristics of these diseases and the parameters of the external aging [6].

For the successful support of some alternative and complementary drug therapies for many diseases including cancer, the conclusion is that the inflammation is the last common way of many diseases. In 1995, the public's use of alternative and supplementary drugs exceeded the number of outpatient drugs. Half of the ten major selling herbs have documented the anti-inflammatory and / or antioxidant mechanisms of human and / or animals. 100 kinds of herbs are sold in a non-prescription skin care products, including cosmeceuticals. Many of them have recorded anti-inflammatory and / or antioxidant activities, suggesting that they may be beneficial to the treatment and / or prevention of inflammatory diseases and external aging. There are more than 8000 kinds of antioxidant components recorded. However, only 14 species have been incorporated into local preparations. These preparations have been documented in human clinical trials to reverse some of the external signs of aging [14, 15].

In a double-blind clinical trial, it has been proved that the herbal components with known antioxidants and / or anti-inflammatory activities have been applied in local dermatology and cosmetic products for the treatment of some inflammatory diseases, so as to significantly improve the signs of external skin aging. These include topical application of plant extracts rich in AHAs, retinol, ascorbic acid and some soy milk preparation, general bean fruit, as an independent agent [11], dates fruit [16], Green Tea (when ingested) [17], colloidal oatmeal and oat and arbutin [18-20], parthenolide free extract of feverfew [21], proprietary formula meadowfoam and flax.

Sales of the top 10 herbs in 2004 sold more than \$1 billion. In a double-blind clinical trial recorded three kinds of oral supplements, which contains a variety of herbal antioxidants and / or anti-inflammatory activity, such as pomegranate mixture, to effectively improve the exogenous [22]. Signs of aging in the open and double-blind clinical trial was recorded with a single component of plant derived oral products, to improve the external signs of skin aging, and including curcumin [20], olive oil [23], Pycnogenol [20], and white polyacrylic acid. When combined use of partial and oral intake, green tea and pomegranates each showed the effectiveness of the open label test [17, 22].

Unfortunately, most clinical trials of skin care products lack safety and effectiveness at present, which makes some challenges to choose these products to patients. The new company has launched a number of products, which should be more prominent in the near future. Directly applied to tissue, the most effective anti-inflammatory agents are likely to reach the

concentration of treatment to block and reverse the inflammation. This shows that the partial application product will be the primary choice. However, the stability and active ingredient delivery of the formulation is the main challenge, as recommended by Dr. Pinnell, the world's leading antioxidant expert [24].

4. Molecular Mechanism

Environmental insults that produce destructive ROS include smoking, pollution, harsh skin care programs, medical and cosmetic procedures, preservatives, partial drug given takers, stimulants including certain prescription external therapies, allergens, blisters, wounds, ultraviolet and X radiation. Lavker and Kligman described the first correlation between inflammation and skin aging in 1988, when they reported infiltration of mononuclear leukocytes and mast cells in the skin of light injury and closely associated with papillary dermal fibroblasts. It is now known that the cuticle permeability barrier destroys the activation of epidermal keratinocytes to release preformation and up-regulation of synthesis of a variety of bioreactors. Preformed tumour necrosis factor alpha (TNF alpha), interleukin 1 (IL-1) and 8 (IL-8) are released by barrier destruction. Other proinflammatory cytokines, chemokines and ions are the first steps to trigger protective acute inflammation [7,2,6], up-regulating the subsequent formation of cuticle lipid synthesis and keratinocyte proliferation, thus repairing the damaged osmosis barrier⁸.

The binding of epidermal TNF α and IL-1 to its receptor and activation of kinase pathway can induce inflammatory cascade by transferring two nuclear receptors, activating protein (AP-1) and nuclear factor kappa beta (NFk beta) into the nucleus. Including IL-8, intracellular activation of macrophage factor (ICAM-1), defensin, E- selectin, transforming growth factor - beta (TGF beta) and prostaglandin E2 (PG-E2), the synthesis of various transcription factors were up-regulated. These gene products lead to chemotaxis of inflammatory cell infiltration and other proinflammatory [25, 26].

MMPs is a zinc dependent enzyme that participates in the degradation and remodeling of matrix matrix, collagen and elastin. These destructive enzymes are synthesized in fibroblasts, keratinocytes, mast cells, macrophages and T lymphocytes. Collagenase (MMP-1), matrix lysin (MMP-3) and gelatinase (MMP-9) are the most important. Signs of external skin aging, such as fine lines, wrinkles, weakness and laxity, are due to atrophy of solar elastic tissue, collagen destruction and tissue atrophy induced by destructive MMP activity. They play an

important role not only in inflammation, tissue catabolism and remodelling, but also caused by MMP induced chronic inflammation, which leads to the deterioration of the skin and mucous membrane cells [26].

5. Future Strategy

Therefore, the prevention and reversal of chronic inflammation should be the treatment and prevention of skin and mucous membrane diseases, aging, and cancer. The ideal scheme will include skin care products with local application of anti-inflammatory and / or antioxidant effects, as well as the product optimization of the stratum corneum permeability barrier. The most extensive spectrum scheme also includes diet and possible oral supplements, which are rich in anti-inflammatory and / or antioxidant components. Exfoliation procedures should be used immediately, through barrier repair preparations, including ceramide, cholesterol, and free fatty acids. In addition, the beauty and elegance formula with antiphlogistic / barrier properties should be regularly used to enhance the consistent use of AHA and retinoid. It should be expected that these strategies can maximize and maintain the protective function and structure of the skin surface of the mucous membrane.

6. Conclusion

The relationship between chronic inflammation and a variety of skin and systematic diseases, including malignant tumours and skin aging, was first proposed a century ago. The cellular and molecular mechanisms of destructive chronic inflammation have been established. Chronic inflammation is the last common point of all kinds of diseases and symptoms providing clues for effective treatments with anti-inflammatory drugs to diverse skin diseases, cancer and external aging. Recent publications show that destructive chronic inflammation can be reversed and / or prevented through food, oral supplements, and partial skin care programs consisting of anti-inflammatory and / or antioxidant components. Therefore, physicians who treat skin diseases including aging should strongly consider focusing on reversing and / or preventing partial and oral inflammation and dietary adjustment. Optimizing the permeability barrier function of the cuticle is also necessary to prevent the activation of destructive chronic inflammation to the maximum extent.

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