FB Academy
Kleresca

Inflammation: A key target in treating many skin conditions

Introduction to human skin

The skin is our largest organ and the outer covering of the body guarding underlying muscles, bones, ligaments and internal organs.

It is made up of many different cell types, including keratinocytes, fibroblasts and resident immune cells. These cells are organised into distinct layers in the skin (Fig. 1) and can communicate with each other to coordinate many vital processes, such as: inflammation, wound healing and angiogenesis[1].

The main role of the skin is to act as a barrier, and it is the 1st line of defense to protect the human body against pathogens. If the barrier fails, the next defense is the initiation of an inflammatory response[2].

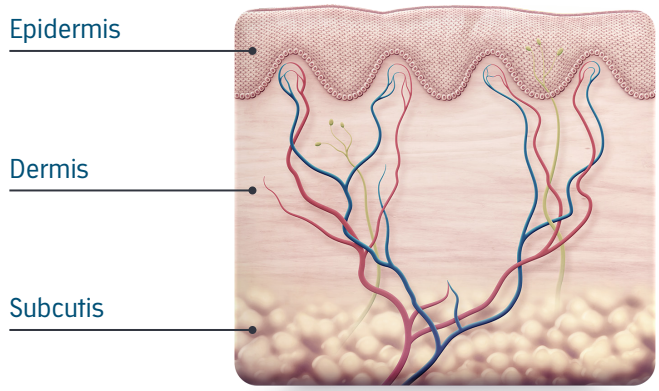

Figure 1. *Human skin structure is composed of three main layers.*

What is inflammation?

Inflammation is a natural and necessary physiological defense mechanism of the body where the immune system reacts to foreign invasion i.e. bacteria, infection or tissue injury by initiating an inflammatory response to remove the uninvited culprit and induce a healing response[3]. Infections, wounds, and other tissue damage would not be able to heal without an inflammatory response.

THE SIGNS AND SYMPTOMS OF INFLAMMATION ARE ALWAYS THE SAME[2]:

- **Redness:** small blood vessels in the area widen and allow more blood to be delivered to the tissue.
- **Heat:** the increased blood flow and activation of cell metabolism to the affected area makes it feel warm to the touch.
- **Swelling:** the small blood vessels become leaky, leading to a build-up of fluid in the area.
- **Pain:** the inflamed area is likely to be painful, especially during and after touching. This is due to the chemicals released which stimulate nerve endings, making the area more sensitive.

The combination of these symptoms may lead to some immobility or reduced function in the region of inflammation.

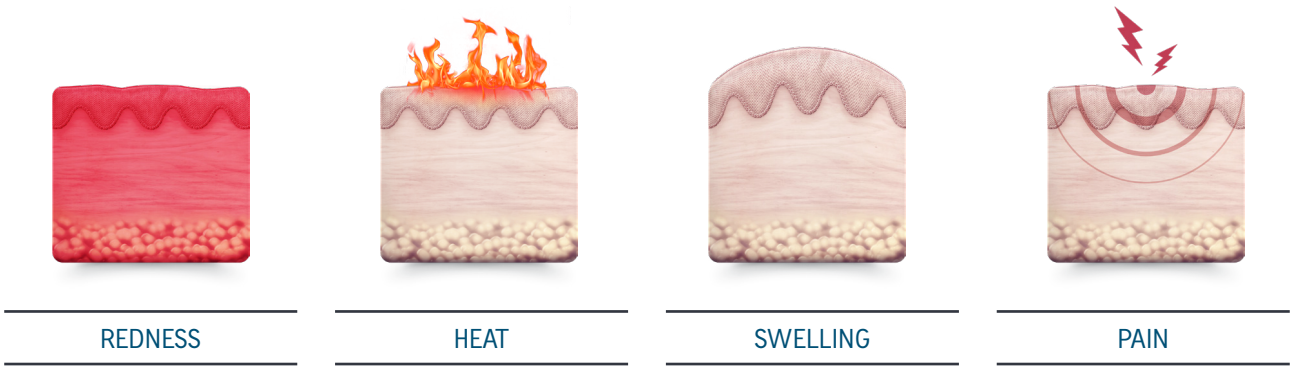

Figure 2. *Drawing illustrating the different symptoms of inflammation.*

When is inflammation a problem?

Sometimes, inflammation can persist longer than necessary causing more harm than benefit, where instead of the common acute response it can become chronic. Chronic inflammation is a feature of many conditions, including: cardiovascular disease, diabetes as well as skin diseases, where immune cells and their signals can interact with skin cells; i.e. keratinocytes and fibroblasts, amplify the response and be problematic[3].

Inflammation is a common issue in different skin conditions

Inflammation is a major feature of many different skin diseases, including: acne (Fig. 3), rosacea (Fig. 4), dermatitis, actinic keratosis and psoriasis. To target inflammation in these conditions, it is often treated with a variety of topical and systemic agents[4,5]. In the recent years though, light therapy (phototherapy) is becoming increasingly popular for treating inflammatory skin diseases[6] and fluorescent light energy (FLE) offers a non-destructive and non-systemic alternative that stimulates the skin's own repair mechanism.

Figure 3. *Acne patient with inflammatory lesions.*

Figure 4. *Rosacea patient with inflamed areas and redness of the skin.*

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Effects of fluorescent light energy (FLE) on the treatment of inflammatory skin diseases

FLE is clinically proven at targeting inflammation and its symptoms in patients with acne vulgaris[7,8], various forms of rosacea[9-11], acneiform eruption[12] and recently, the difficult to treat acne conglobata and hidradentis suppurativia[13].

These clinical studies are supported by *in-vitro* (laboratory) studies showing that FLE reduces inflammation and boosts skin healing in part, by:

- Decreasing the production of pro-inflammatory cytokines (IL-6 and TNF-α) from key skin cells, i.e. human dermal fibroblast (HDF) and epidermal keratinocyte cells.
- Enhancing collagen production from HDFs and promoting angiogenesis[14].

This is the mode of action of the different Kleresca® Treatments. FLE effectively destresses, revitalises and restores skin health by stimulating the skin's own repair mechanisms in a harmless, non-destructive and painless manner. It is currently the only technology on the market using FLE to activate the skin from within.

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