FB Academy
Kleresca

Explore more scientific summaries

Fluorescent Light Energy: the future for treating inflammatory skin conditions?

EDGE, D. *ET AL.* 2019

OBJECTIVE

The clinical efficacy of Fluorescent Light Energy (FLE) has previously been reported in both disease-affected and healthy skin. This paper's main objective was to investigate the cellular mechanism of action of FLE on skin cells.

RESULTS

Different studies were performed to see the effect of FLE related to inflammatory skin conditions:

1. Effect on the inflammation in a representative acne vulgaris patient:
   - » Reduction of inflammatory lesions and associated redness. Once inflammation was resolved, there was a visible overall enhancement of the skin's texture and visibly faded acne scarring **(Fig.1)**.

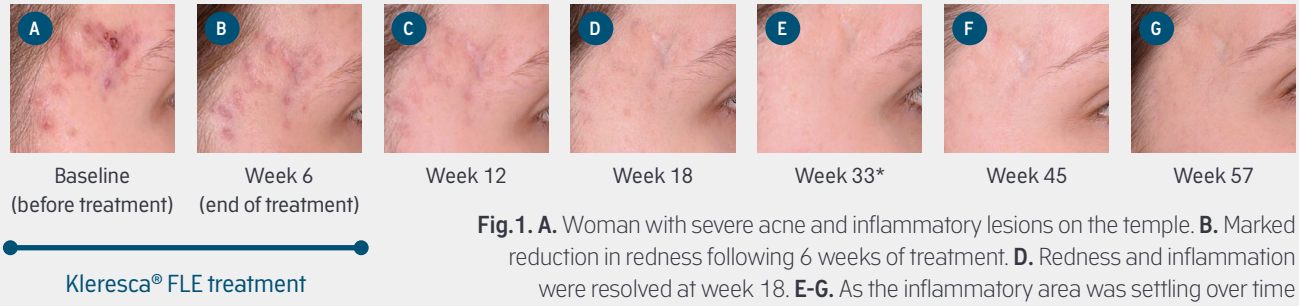


Fig.1. A. Woman with severe acne and inflammatory lesions on the temple. **B.** Marked reduction in redness following 6 weeks of treatment. **D.** Redness and inflammation were resolved at week 18. **E-G.** As the inflammatory area was settling over time (week 12 onwards), there was a concurrent improvement of scar appearance

2. Effect of FLE compared to continuous LED light on collagen production from primary human dermal fibroblast (HDF) in both, presence and absence of the pro-inflammatory cytokine interferon gamma (IFN-γ), which simulates stressed HDF cells.

To test this, three sets of cells were prepared and exposed to: **1)** Non-illuminated control; **2)** Mimicking lamp and **3)** Exposed to FLE.

The mimicking lamp had an identical spectral output to Kleresca®, but was generated by continuous LED light instead of excited chromophore emissions combined with blue LED light, i.e. no fluorescence created.

- » Collagen production in fibroblasts treated with FLE was significantly increased compared to non-illuminated control cells and cells treated with the mimicking lamp **(Fig. 2)**
- » FLE enhanced the collage production from non-stressed HDF cells (absence of IFN-γ), explaining why we do not see collagen production in stressed and inflamed skin

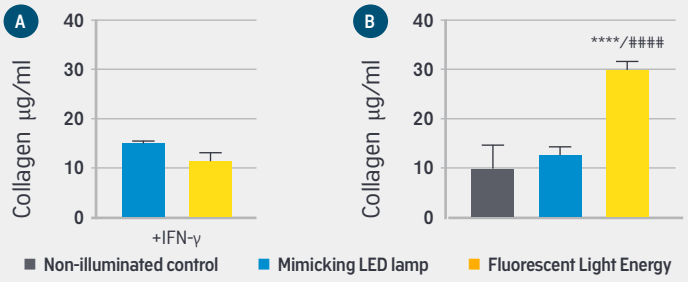


Fig.2. A. Cells pretreated with IFN-γ, simulating stressed skin and inflammatory conditions, did not increase collagen production.

B. For non-stressed HDF cells collagen, production was significantly increased for FLE compared to non-illuminated control cells and those treated with the mimicking lamp.

Edge, D. *et al.* Fluorescent Light Energy: the future for treating inflammatory skin conditions? J Clin Aesthet Dermatol (2019);12(5):E61–E68.

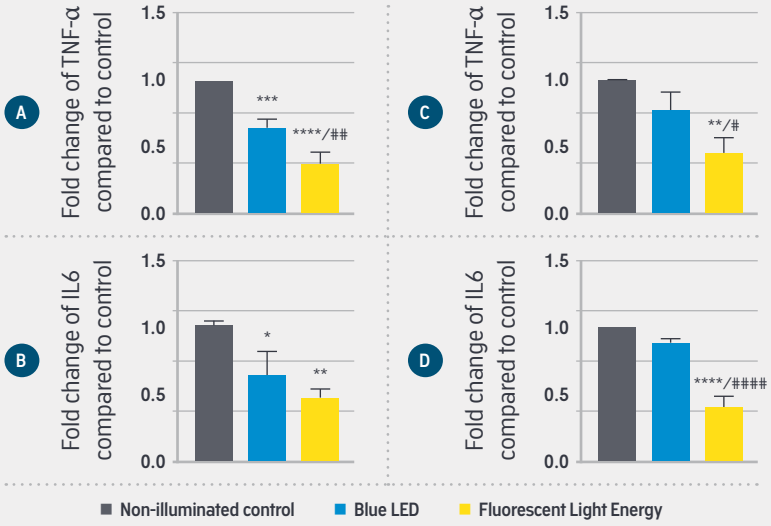
3. Effect on cytokine production from HDF and human epidermal keratinocytes (HEK) after illumination with either blue LED or FLE.
   - » Higher decrease in the inflammatory profile of HDF and HEK cells using FLE compared to blue LED light **(Fig. 3)**
   - » HEK only responded to treatment with FLE

Fig. 3. A. FLE significantly reduced TNF-α release from HDF cells compared to blue LED light

B. IL-6 release was significantly reduced from HDF cells following both blue LED light treatment and FLE treatment compared to non-illuminated control cells

C. TNF-α release from HEK cells was not affected by blue LED, however FLE-treatment decreased its production.

D. IL-6 release from HEK cells was not affected by blue LED but was significantly decreased with FLE-treatment.



4. Effect on angiogenesis in human aortic endothelial (HAE) cells compared to blue LED.

In order to check this, cells were divided in four groups and treated differently: **1)** Negative control, non-treated; **2)** Blue LED lamp; **3)** FLE and **4)** Positive control with growth factor (VEGF, Vascular endothelial growth factor).

- » Enhanced angiogenesis in HAE compared to blue LED. **(Fig.4)**

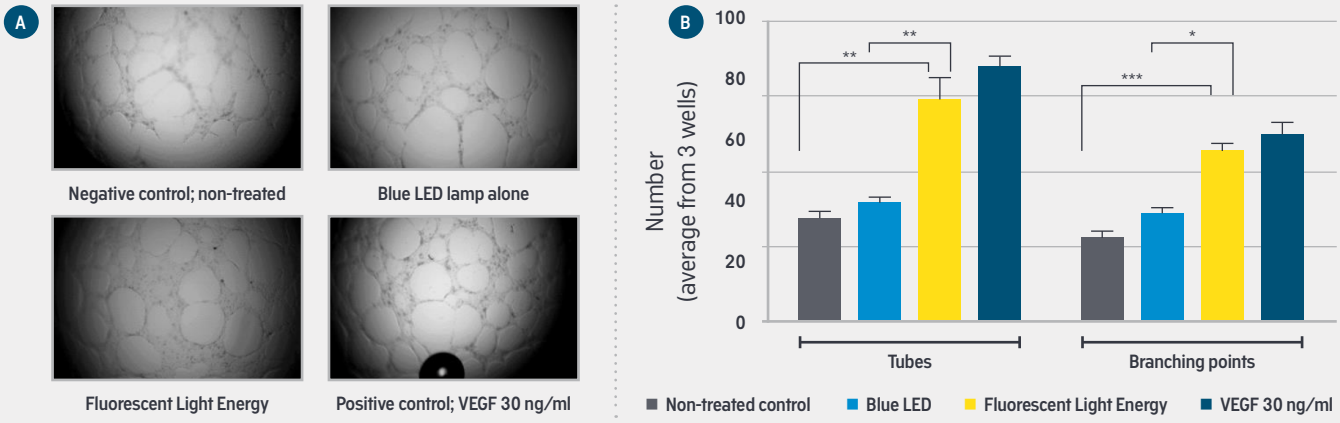


Fig. 4 A and **B.** Treatment with FLE significantly increased both branching and tube formation compared to either non-illuminated control cells or blue LED alone.

CONCLUSIONS

- FLE has the capacity to enhance fibroblastic collagen production, attenuate the inflammatory signature of a variety of cutaneous cells and enhance angiogenesis
- FLE serves both aesthetic and therapeutic purposes by contributing to normalize and de-stress the skin
- FLE was superior to an equivalent continuous conventional LED light
- FLE has shown good results for the treatment of inflammatory skin conditions and achieves better aesthetic outcomes

For more information, visit the original publication.

Edge, D. *et al.* Fluorescent Light Energy: the future for treating inflammatory skin conditions? J Clin Aesthet Dermatol (2019);12(5):E61–E68.