

Press Release

**MEDILIGHT: Blue light for chronic wound healing**

**Berlin, May 2017 – Being in its third year, the MEDILIGHT project, which aims to develop a medical device for professional wound care, already brought about interesting research results in its biological part.**

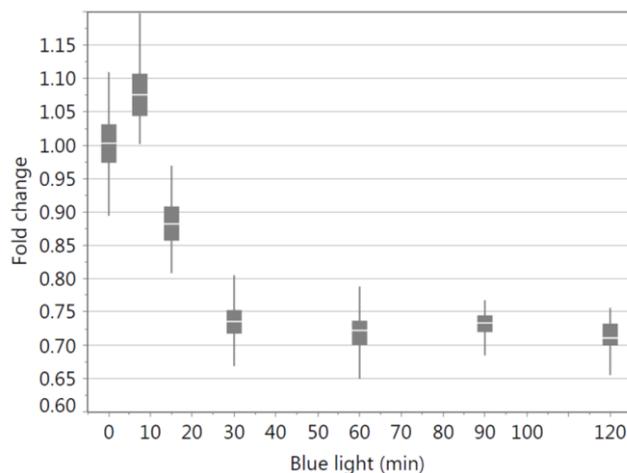
The European project MEDILIGHT aims to develop a medical device which uses proven therapeutic effects of visible light to enhance the self-healing process and to monitor the status and history of the wound during therapy (Figure 1).



**Figure 1: MEDILIGHT system**

In the biological part of the MEDILIGHT project, the proliferative and anti-proliferative effects of different light schedules have been tested *in-vitro* and *in-vivo*. For *in-vitro* studies, varying dosages, wavelengths and number of light cycles have been investigated using different skin cell types like keratinocytes and fibroblasts. Besides cell metabolism and proliferation gene expression profiles, signal cascades have been monitored at different time points after illumination to obtain a time curve of the light effects. In addition, scratch tests have been performed to provide an *in-vitro* indicator for wound healing. The *in-vitro* studies have been completed by irradiating different bacterial strains, such as *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae* showing a frequent occurrence in infected wounds. An impact of the chosen irradiation schedule is now tested on the skin of healthy and diabetic rats and will then pass to the final clinical proof of concept by treating healthy and diabetic individuals.

Blue light is known for its anti-microbial, anti-proliferative and anti-inflammatory effects without damaging the tissue as compared to hazardous UV light as well as its low penetration depth [1-3]. Therefore, in the first stages of the wound healing process, blue light irradiation is applied, inhibiting the formation of bacterial colonies on the one hand and preventing an overshooting epidermisation by growing keratinocytes leading to a premature wound closure. For later wound healing stages, after the wound is “disinfected”, it was planned to apply red light to stimulate an accelerated cell growth [4] of inactivated cells being located in deeper skin layers like fibroblasts or stem cells. So far, *in-vitro* studies using infra-/red light have not shown the desired effects, which is not in agreement with most of the studies published so far (Data not shown).



**Figure 2: Keratinocytes – XTT test results for the different exposure times 0, 7.5, 15, 30, 60, 90 and 120min 24h after blue light irradiation. The data set was normalized by using the no light controls.**

In contrast, biological data obtained for blue light indicate promising results for the development of a system used for an improved wound healing process through light stimulation. Furthermore, one of the aims set for blue light, preventing an overshooting epidermisation in premature healing stages by slowing down the cell metabolism of especially keratinocytes, could be achieved for longer blue light irradiations with a maximum effect at 30min (Figure 2) [5].

Fluorescent-activated cell sorting (FACS) was performed after 24h of 30min blue light irradiation confirming the anti-proliferative effect of blue light and excluding apoptotic events at the same time [6]. Also *in-vitro* studies treating different bacterial strains with blue light revealed bacteriostatic and even bactericidal effects (Data not shown).

Due to pending patent application about the pro-proliferative effect of blue light found in skin cells, more information on this topic will be provided, when possible.

The MEDILIGHT project has recently been presented at **Smart Systems Integration 2017** international conference and exhibition in Cork, **MedTech 2017** fair in Tokyo, and **European Wound Management Association 2017** conference in Amsterdam. According to Julien Steinbrunn of URGO RID, "*MEDILIGHT attracted attention of the audience due to the innovative nature of this concept, based on the effects of blue light on both healing cells and bacteria, enabling a new personalized treatment for advanced wound care*".

## References

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