

H2020 project fact sheet:

# Miniaturized smart system for light stimulation and monitoring of wound healing

## MEDILIGHT

### Introduction:

Chronic wounds represent a significant burden to patients, health care professionals, and health care systems, affecting over 40 million patients and creating costs of approximately 40 billion € annually.

### Project description:

Goal of the project is the fabrication of a **medical device for professional wound care**. The device will use recently proven **therapeutic effects of visible light** to enhance the self-healing process and monitor the status and history of the wound during therapy. The **blue part of the spectrum** (450–495nm) is known to have antibacterial effects predominantly at the surface layers of the skin. At certain conditions, blue light irradiations were found to also induce an accelerated cell growth of keratinocytes and fibroblasts.



A simplified picture of MEDILIGHT device. © MEDILIGHT

To be compliant with hygiene requirements the system will consist of two parts:

1. A **disposable wound dressing** with reusable LED illumination system and integrated sensors for measuring the temperature and the oxygenation of the wound placed on the top of the hermetically sealed wound dressing.



### Project facts:

Start date: 01/02/2015  
End date: 31/01/2018

Duration in months: 36

Project cost: € 2.98 M  
Project EU funding: € 2.48 M

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Topic:  
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### Keywords:

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Wound healing;  
Bio-medical;  
Disposable patch;  
Soft encasement;  
Smart electronics;  
Micro- and nano-structuring;  
Light-management;  
Printed electronics;  
Smart sensors.

2. A soft and compliant **electronic module** for multiple use containing all electronic parts, a microcontroller and wireless data transceiver for interaction with a smartphone/pda, and a rechargeable battery with battery status monitor.

The status of the wound will be **monitored** with temporal and low level spatial resolution. The electronic module will be optimized for functionality and user comfort. The detailed effects of light-exposure schemes will be explored and backed by ***in-vitro and in-vivo studies***. Results will be used to develop smart algorithms and implement it into respective programs and feedback loops of the device.

### Expected impact:

MEDILIGHT is a project, which translates several mastered technologies into a new application domain, which has not yet been fully explored. Nowadays solutions for light stimulation are focused on acne treatment, cosmetics or on pain modulation. These devices are in general of size of several tens of centimeters and usually have no intelligence. They are high cost equipment only to be used in a hospital or a doctor's office for treatment duration of a couple of minutes per day.

The MEDILIGHT concept could replace these devices, while maintaining the functionality and ergonomics due to flexible illumination structures and miniaturized electronics. In such a case the result of the project would be at least **10x smaller** (from stationary device 50x50 cm to a wearable module 5x5 cm) and at least **10x cheaper** (from several thousands to few hundreds of €).

The proposed systems will have a **positive impact on the quality of life of patients** and will provide a **significant reduction in treatment costs**, which represent a large cost reduction to European and World health authorities.

Last but not least, the MEDILIGHT result has the potential to become a device, for treatment of overshooting scar formation, which will open an additional target application for the **tissue re-modulation** (e.g. after surgery in visible body parts). The device can also be considered for a **photodynamic therapy** (PDT) for skin cancer.

### Consortium:

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