Blue LED light irradiation induces wound healing improvements through modulation of the inflammatory infiltrate

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Introduction

A problem to be solved:

To design a non-invasive, low cost, easy-to-use device for:

- inducing **photohaemostasis** of superficial bleeding
- promoting **wound healing** in difficult wounds

- **Take advantage of endogenous absorbers in blood such as oxy- (deoxy-) haemoglobin**
- **Maximize haemoglobin absorption against absorption of other absorbers (i.e. melanin)**
- **Transform light energy into a thermal effect or photochemical effect**
In vivo tests
Analysis of the healing phase in mice models

Materials & Methods

- 2 superficial abrasions on the back (Ø 1cm)
- Random treatment on one of the wound
- Follow up @0, 1, 3, 6, 12, 18, 24, 72 h
- Macroscopic observation during follow up
- Histology, immunohistochemistry and confocal microscopies of biopsies

Results long term follow up
Tests were performed in albino and black mice, diabetic, coagulopathic and TRPV1 knock-out mice

- Higher immunity reaction in 1 - 6 hours, a lower degree of inflammation after 24 hours
In vivo tests
Promoting wound healing in difficult wounds (selected patients)

Difficult wounds: Pressure ulcer

Difficult wounds: Trauma ulcer
Conclusions

• Effects of blue LED wounds irradiation:
  1. Acceleration of the early healing phase
  2. Improvement of the healing process in superficial abrasions and in difficult wounds